Gestão_de_estoques

August 28, 2025

1 ANÁLISE DE GERENCIAMENTO DE INVENTÁRIO

IN-
TRO-
DUÇÃO

O gerenciamento eficiente de inventário é um dos pilares fundamentais para o sucesso de qualquer empresa que trabalha com produtos físicos. A capacidade de otimizar os níveis de estoque, prever demandas futuras e minimizar custos operacionais pode representar a diferença entre o lucro e o prejuízo.

Contexto do Negócio

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Problema: Empresa possui muitos produtos em estoque, mas apenas ~10% vendem anualmente -
Objetivo: Usar machine learning para gerar scores de probabilidade de venda por produto -
Decisão: Determinar quais produtos manter e quais remover do inventário -
Impacto: Otimizar

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1.1 OBJETIVOS

Este notebook tem como objetivo realizar uma **análise de dados de inventário** para extrair insights que possam orientar decisões estratégicas de negócio. Os principais objetivos incluem:

1.1.1 Objetivos Principais:

- **Análise Exploratória**: Compreender o comportamento dos dados de estoque, vendas e demanda
- **Identificação de Padrões**: Descobrir tendências sazonais e padrões de consumo
- **Otimização de Estoque**: Determinar níveis ótimos de estoque para minimizar custos
- **Previsão de Demanda**: Desenvolver modelos preditivos para antecipação de necessidades futuras
- **Análise de Performance**: Avaliar indicadores-chave de performance (KPIs) do inventário

1.1.2 Importância do Projeto

- **Redução de Custos**: Otimização de capital de giro através do controle inteligente de estoque
- **Melhoria no Atendimento**: Redução de stockouts e melhoria na disponibilidade de produtos
- **Planejamento Estratégico**: Insights para tomada de decisões baseada em dados
- **Eficiência Operacional**: Identificação de gargalos e oportunidades de melhoria

DETALHES DO CONJUNTO DE DADOS
Sobre o Dataset

Este dataset contém informações de produtos de uma empresa que precisa decidir quais itens manter ou remover do seu inventário. O conjunto combina **dados históricos de vendas** com **inventário ativo atual**, permitindo a criação de modelos preditivos para otimização de estoque.

Estrutura dos Dados

O dataset é dividido em dois tipos de registros:

Dados Históricos (`File_Type = "Historical"`)

- Vendas dos últimos 6 meses
- Contém a variável target (`SoldFlag`)
- Usado para treinar modelos preditivos

Dados Ativos (`File_Type` = `"Active"`)

- Inventário atual da empresa - Não possui informações de venda - Receberá scores de probabilidade do modelo

Descrição das Variáveis

Identificadores

* `Order` Contador sequencial (pode ser ignorado) * `SKU_number` Código único de identificação do produto * `File_Type` Tipo de registro: "Historical" ou "Active"

Variável Target

* **SoldFlag** **TARGET PRINCIPAL** - 1 = produto vendeu nos últimos 6 meses, 0 = não vendeu

* **SoldCount** Quantidade total vendida nos últimos 6 meses

Características do Produto

* **ReleaseYear** Ano em que o produto foi lançado
* **ReleaseNumber** Número da versão/edição do produto
* **New_Release_Flag** 1 = produto que teve lançamentos futuros (ReleaseNumber > 1), 0 = não
* **StrengthFactor** Métrica interna da empresa (significado não especificado)

Variáveis de Preço *

PriceReg Preço regular do produto *

LowUserPrice Preço promocional para usuários *

LowNetPrice Preço líquido promocional

Marketing e Operações *

MarketingType Tipo de estratégia de marketing: "S" ou "D" *

ItemCount Quantidade de itens/unidades por registro

1.2 MODELO DE BASE VS MACHINE LEARNING

Antes de iniciarmos a análise devemos nos perguntar: não seria mais simples pegar o SKU dos produtos vendidos e identificar os produtos novos com base no SKU ao invés de utilizarmos machine learning?

1.2.1 Vantagens da Abordagem Simples (Modelo de Base)

- *Velocidade*: Implementação em 5 linhas de código
- *Simplicidade*: 100% interpretável pelos gestores

- *Confiabilidade*: "Se vendeu antes, pode vender de novo"
- *Sem Overfitting*: Não há risco de complicar desnecessariamente
- *Baseline Sólida*: Ótimo ponto de partida

1.2.2 Desvantagens da Abordagem Simples

- *Produtos Novos*: E os SKUs que nunca venderam mas têm potencial?
- *Sazonalidade*: Produto que não vendeu nos últimos 6 meses mas vende no Natal?
- *Tendências*: Mudanças de mercado não são capturadas
- *Características*: Ignora preço, marketing, categoria, etc.
- *Oportunidades Perdidas*: Pode descartar produtos promissores

1.2.3 Vantagens do Machine Learning

- *Descoberta de Padrões*: "Produtos com preço X e marketing Y têm 70% chance de vender"
- *Produtos Similares*: Identifica novos produtos com características de sucesso
- *Variáveis Múltiplas*: Considera preço, ano, marketing, etc.
- *Adaptabilidade*: Aprende com mudanças de tendências
- *Precisão Refinada*: Scores de probabilidade ao invés de sim/não binário

1.2.4 Desvantagens do Machine Learning

- *Complexidade*: horas de desenvolvimento vs
- *Black Box*: Difícil explicar para gestores "por que manter produto X?"
- *Overfitting*: Pode "decorar" padrões que não se repetirão
- *Dados*: Precisa de dados limpos e representativos
- *Manutenção*: Precisa retreinamento periódico

1.2.5 Quando Usar Abordagem simples quando?

- Se a variedade dos seus produtos é limitada e os padrões de venda se repetem consistentemente, você pode usar a abordagem de que o que vendeu bem no passado, venderá novamente no futuro; ou quando necessitamos de uma solução rápida e não temos tempo de rodar um modelo de machine learning.

1.2.6 Quando Usar Machine Learning quando?

- Quando você lida com um portfólio dinâmico e com o lançamento constante de novos produtos, a complexidade aumenta. Nesse cenário, múltiplas variáveis como preço, ações de marketing e sazonalidade influenciam diretamente nas vendas.

- Em vez de depender de padrões históricos, um modelo preditivo pode encontrar conexões complexas, como a de que "produtos similares a X tendem a vender bem". Isso permite ir além da simples repetição, ajudando a otimizar constantemente as estratégias.

1.2.7 Recomendação

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1.3 Para a maioria dos casos, comece com a abordagem simples como baseline e evolua para ML apenas se necessário!

1.4 IMPORTAR BIBLIOTECAS NECESSÁRIAS

```python
#@title Bloco de Código 1
# ==============================================================================
# IMPORTAR BIBLIOTECAS NECESSÁRIAS
# ==============================================================================

# Bibliotecas para manipulação e análise de dados
import pandas as pd
import numpy as np

# Bibliotecas utilitárias
import os
import sys
import warnings
warnings.filterwarnings('ignore')
from pathlib import Path

# Bibliotecas para visualização de dados
import matplotlib.pyplot as plt
from matplotlib.ticker import FuncFormatter
import matplotlib as mpl
from matplotlib.patches import Ellipse
import seaborn as sns
from textwrap import fill
import plotly.express as px

# Bibliotecas para análise estatística
from scipy import stats
from scipy.stats import pearsonr, spearmanr
import statsmodels.api as sm
from scipy.stats import gaussian_kde
from sklearn.compose import ColumnTransformer
from sklearn.preprocessing import OneHotEncoder, PowerTransformer
from sklearn.impute import SimpleImputer
from sklearn.pipeline import Pipeline
from sklearn.decomposition import PCA
from sklearn.cluster import KMeans
from sklearn.mixture import GaussianMixture
from sklearn.neighbors import NearestNeighbors
from sklearn.metrics import (
```

```
    roc_auc_score, recall_score, precision_score,
    accuracy_score, f1_score, confusion_matrix,
    silhouette_score, silhouette_samples,
    davies_bouldin_score, calinski_harabasz_score
)


# Importar bibliotecas machine learning
#%pip uninstall pycaret -y
#%pip install -U pycaret==3.3.2 imbalanced-learn
from pycaret.classification import setup, compare_models, pull, load_model,␣
 ↪predict_model, finalize_model, evaluate_model, save_model, stack_models,␣
 ↪finalize_model, blend_models, tune_model
import pycaret
print(pycaret.__version__)

# Pasta para salvar modelos
SAVE_DIR = Path(r"D:/OneDrive/Documentos/GitHub/portifolio/gestao_estoques/
 ↪models")
```

Note: you may need to restart the kernel to use updated packages.

WARNING: Skipping pycaret as it is not installed.

Collecting pycaret==3.3.2
  Using cached pycaret-3.3.2-py3-none-any.whl.metadata (17 kB)
Requirement already satisfied: imbalanced-learn in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (0.14.0)
Requirement already satisfied: ipython>=5.5.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(8.37.0)
Requirement already satisfied: ipywidgets>=7.6.5 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(8.1.7)
Requirement already satisfied: tqdm>=4.62.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(4.67.1)
Requirement already satisfied: numpy<1.27,>=1.21 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(1.26.4)
Requirement already satisfied: pandas<2.2.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(2.1.4)
Requirement already satisfied: jinja2>=3 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(3.1.6)
Requirement already satisfied: scipy<=1.11.4,>=1.6.1 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(1.11.4)
Requirement already satisfied: joblib<1.4,>=1.2.0 in

```

c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(1.3.2)
Requirement already satisfied: scikit-learn>1.4.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(1.4.2)
Requirement already satisfied: pyod>=1.1.3 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(2.0.5)
Requirement already satisfied: category-encoders>=2.4.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(2.7.0)
Requirement already satisfied: lightgbm>=3.0.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(4.6.0)
Requirement already satisfied: numba>=0.55.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(0.61.2)
Requirement already satisfied: requests>=2.27.1 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(2.32.5)
Requirement already satisfied: psutil>=5.9.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(7.0.0)
Requirement already satisfied: markupsafe>=2.0.1 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(3.0.2)
Requirement already satisfied: importlib-metadata>=4.12.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(8.7.0)
Requirement already satisfied: nbformat>=4.2.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(5.10.4)
Requirement already satisfied: cloudpickle in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(3.1.1)
Requirement already satisfied: deprecation>=2.1.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(2.1.0)
Requirement already satisfied: xxhash in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(3.5.0)
Requirement already satisfied: matplotlib<3.8.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(3.7.5)
Requirement already satisfied: scikit-plot>=0.3.7 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(0.3.7)
Requirement already satisfied: yellowbrick>=1.4 in

c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(1.5)
Requirement already satisfied: plotly>=5.14.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(5.24.1)
Requirement already satisfied: kaleido>=0.2.1 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(1.0.0)
Requirement already satisfied: schemdraw==0.15 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(0.15)
Requirement already satisfied: plotly-resampler>=0.8.3.1 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(0.10.0)
Requirement already satisfied: statsmodels>=0.12.1 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(0.14.5)
Requirement already satisfied: sktime==0.26.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(0.26.0)
Requirement already satisfied: tbats>=1.1.3 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(1.1.3)
Requirement already satisfied: pmdarima>=2.0.4 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from pycaret==3.3.2)
(2.0.4)
Requirement already satisfied: packaging in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
sktime==0.26.0->pycaret==3.3.2) (25.0)
Requirement already satisfied: scikit-base<0.8.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
sktime==0.26.0->pycaret==3.3.2) (0.7.8)
Requirement already satisfied: contourpy>=1.0.1 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
matplotlib<3.8.0->pycaret==3.3.2) (1.3.2)
Requirement already satisfied: cycler>=0.10 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
matplotlib<3.8.0->pycaret==3.3.2) (0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
matplotlib<3.8.0->pycaret==3.3.2) (4.59.2)
Requirement already satisfied: kiwisolver>=1.0.1 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
matplotlib<3.8.0->pycaret==3.3.2) (1.4.9)
Requirement already satisfied: pillow>=6.2.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
matplotlib<3.8.0->pycaret==3.3.2) (11.3.0)
Requirement already satisfied: pyparsing>=2.3.1 in

c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
matplotlib<3.8.0->pycaret==3.3.2) (3.2.3)
Requirement already satisfied: python-dateutil>=2.7 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
matplotlib<3.8.0->pycaret==3.3.2) (2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
pandas<2.2.0->pycaret==3.3.2) (2025.2)
Requirement already satisfied: tzdata>=2022.1 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
pandas<2.2.0->pycaret==3.3.2) (2025.2)
Requirement already satisfied: threadpoolctl>=2.0.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from scikit-
learn>1.4.0->pycaret==3.3.2) (3.6.0)
Requirement already satisfied: patsy>=0.5.1 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from category-
encoders>=2.4.0->pycaret==3.3.2) (1.0.1)
Requirement already satisfied: zipp>=3.20 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from importlib-
metadata>=4.12.0->pycaret==3.3.2) (3.23.0)
Requirement already satisfied: colorama in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
ipython>=5.5.0->pycaret==3.3.2) (0.4.6)
Requirement already satisfied: decorator in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
ipython>=5.5.0->pycaret==3.3.2) (5.2.1)
Requirement already satisfied: exceptiongroup in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
ipython>=5.5.0->pycaret==3.3.2) (1.3.0)
Requirement already satisfied: jedi>=0.16 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
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Requirement already satisfied: matplotlib-inline in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
ipython>=5.5.0->pycaret==3.3.2) (0.1.7)
Requirement already satisfied: prompt_toolkit<3.1.0,>=3.0.41 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
ipython>=5.5.0->pycaret==3.3.2) (3.0.51)
Requirement already satisfied: pygments>=2.4.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
ipython>=5.5.0->pycaret==3.3.2) (2.19.2)
Requirement already satisfied: stack_data in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
ipython>=5.5.0->pycaret==3.3.2) (0.6.3)
Requirement already satisfied: traitlets>=5.13.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
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Requirement already satisfied: typing_extensions>=4.6 in

c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
ipython>=5.5.0->pycaret==3.3.2) (4.15.0)
Requirement already satisfied: wcwidth in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
prompt_toolkit<3.1.0,>=3.0.41->ipython>=5.5.0->pycaret==3.3.2) (0.2.13)
Requirement already satisfied: comm>=0.1.3 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
ipywidgets>=7.6.5->pycaret==3.3.2) (0.2.3)
Requirement already satisfied: widgetsnbextension~=4.0.14 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
ipywidgets>=7.6.5->pycaret==3.3.2) (4.0.14)
Requirement already satisfied: jupyterlab_widgets~=3.0.15 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
ipywidgets>=7.6.5->pycaret==3.3.2) (3.0.15)
Requirement already satisfied: parso<0.9.0,>=0.8.4 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
jedi>=0.16->ipython>=5.5.0->pycaret==3.3.2) (0.8.5)
Requirement already satisfied: choreographer>=1.0.5 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
kaleido>=0.2.1->pycaret==3.3.2) (1.0.10)
Requirement already satisfied: logistro>=1.0.8 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
kaleido>=0.2.1->pycaret==3.3.2) (1.1.0)
Requirement already satisfied: orjson>=3.10.15 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
kaleido>=0.2.1->pycaret==3.3.2) (3.11.3)
Requirement already satisfied: simplejson>=3.19.3 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
choreographer>=1.0.5->kaleido>=0.2.1->pycaret==3.3.2) (3.20.1)
Requirement already satisfied: fastjsonschema>=2.15 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
nbformat>=4.2.0->pycaret==3.3.2) (2.21.2)
Requirement already satisfied: jsonschema>=2.6 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
nbformat>=4.2.0->pycaret==3.3.2) (4.25.1)
Requirement already satisfied: jupyter-core!=5.0.*,>=4.12 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
nbformat>=4.2.0->pycaret==3.3.2) (5.8.1)
Requirement already satisfied: attrs>=22.2.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
jsonschema>=2.6->nbformat>=4.2.0->pycaret==3.3.2) (25.3.0)
Requirement already satisfied: jsonschema-specifications>=2023.03.6 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
jsonschema>=2.6->nbformat>=4.2.0->pycaret==3.3.2) (2025.4.1)
Requirement already satisfied: referencing>=0.28.4 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
jsonschema>=2.6->nbformat>=4.2.0->pycaret==3.3.2) (0.36.2)
Requirement already satisfied: rpds-py>=0.7.1 in

c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
jsonschema>=2.6->nbformat>=4.2.0->pycaret==3.3.2) (0.27.1)
Requirement already satisfied: platformdirs>=2.5 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from jupyter-
core!=5.0.*,>=4.12->nbformat>=4.2.0->pycaret==3.3.2) (4.4.0)
Requirement already satisfied: pywin32>=300 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from jupyter-
core!=5.0.*,>=4.12->nbformat>=4.2.0->pycaret==3.3.2) (311)
Requirement already satisfied: llvmlite<0.45,>=0.44.0dev0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
numba>=0.55.0->pycaret==3.3.2) (0.44.0)
Requirement already satisfied: tenacity>=6.2.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
plotly>=5.14.0->pycaret==3.3.2) (9.1.2)
Requirement already satisfied: dash>=2.9.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from plotly-
resampler>=0.8.3.1->pycaret==3.3.2) (3.2.0)
Requirement already satisfied: tsdownsample>=0.1.3 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from plotly-
resampler>=0.8.3.1->pycaret==3.3.2) (0.1.4.1)
Requirement already satisfied: Flask<3.2,>=1.0.4 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from dash>=2.9.0->plotly-
resampler>=0.8.3.1->pycaret==3.3.2) (3.1.2)
Requirement already satisfied: Werkzeug<3.2 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from dash>=2.9.0->plotly-
resampler>=0.8.3.1->pycaret==3.3.2) (3.1.3)
Requirement already satisfied: retrying in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from dash>=2.9.0->plotly-
resampler>=0.8.3.1->pycaret==3.3.2) (1.4.2)
Requirement already satisfied: nest-asyncio in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from dash>=2.9.0->plotly-
resampler>=0.8.3.1->pycaret==3.3.2) (1.6.0)
Requirement already satisfied: setuptools in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from dash>=2.9.0->plotly-
resampler>=0.8.3.1->pycaret==3.3.2) (78.1.1)
Requirement already satisfied: blinker>=1.9.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
Flask<3.2,>=1.0.4->dash>=2.9.0->plotly-resampler>=0.8.3.1->pycaret==3.3.2)
(1.9.0)
Requirement already satisfied: click>=8.1.3 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
Flask<3.2,>=1.0.4->dash>=2.9.0->plotly-resampler>=0.8.3.1->pycaret==3.3.2)
(8.2.1)
Requirement already satisfied: itsdangerous>=2.2.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
Flask<3.2,>=1.0.4->dash>=2.9.0->plotly-resampler>=0.8.3.1->pycaret==3.3.2)
(2.2.0)
Requirement already satisfied: Cython!=0.29.18,!=0.29.31,>=0.29 in

```
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
pmdarima>=2.0.4->pycaret==3.3.2) (3.1.3)
Requirement already satisfied: urllib3 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
pmdarima>=2.0.4->pycaret==3.3.2) (2.5.0)
Requirement already satisfied: six>=1.5 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from python-
dateutil>=2.7->matplotlib<3.8.0->pycaret==3.3.2) (1.17.0)
Requirement already satisfied: charset_normalizer<4,>=2 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
requests>=2.27.1->pycaret==3.3.2) (3.4.3)
Requirement already satisfied: idna<4,>=2.5 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
requests>=2.27.1->pycaret==3.3.2) (3.10)
Requirement already satisfied: certifi>=2017.4.17 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
requests>=2.27.1->pycaret==3.3.2) (2025.8.3)
Requirement already satisfied: executing>=1.2.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
stack_data->ipython>=5.5.0->pycaret==3.3.2) (2.2.0)
Requirement already satisfied: asttokens>=2.1.0 in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
stack_data->ipython>=5.5.0->pycaret==3.3.2) (3.0.0)
Requirement already satisfied: pure_eval in
c:\users\ecosi\anaconda3\envs\ml310\lib\site-packages (from
stack_data->ipython>=5.5.0->pycaret==3.3.2) (0.2.3)
Using cached pycaret-3.3.2-py3-none-any.whl (486 kB)
Installing collected packages: pycaret
Successfully installed pycaret-3.3.2
Note: you may need to restart the kernel to use updated packages.
3.3.2
```

## 1.5 IMPORTAR DADOS

```python
[2]:  # ===========================================================================
      # IMPORTAR DADOS
      # ===========================================================================
      # Leitura dos dados
      df = pd.read_csv("D:/OneDrive/Documentos/GitHub/portifolio/gestao_estoques/data/
       ↪SalesKaggle3.csv")

      # Exibe as 5 primeiras linhas
      print("Primeiras linhas:")
      display(df.head())

      # Tipos de dados
```

```
print("\n Tipos de colunas:")
print(df.dtypes)
```

Primeiras linhas:

	Order	File_Type	SKU_number	SoldFlag	SoldCount	MarketingType	\
0	2	Historical	1737127	0.0	0.0	D	
1	3	Historical	3255963	0.0	0.0	D	
2	4	Historical	612701	0.0	0.0	D	
3	6	Historical	115883	1.0	1.0	D	
4	7	Historical	863939	1.0	1.0	D	

	ReleaseNumber	New_Release_Flag	StrengthFactor	PriceReg	ReleaseYear	\
0	15	1	682743.0	44.99	2015	
1	7	1	1016014.0	24.81	2005	
2	0	0	340464.0	46.00	2013	
3	4	1	334011.0	100.00	2006	
4	2	1	1287938.0	121.95	2010	

	ItemCount	LowUserPrice	LowNetPrice
0	8	28.97	31.84
1	39	0.00	15.54
2	34	30.19	27.97
3	20	133.93	83.15
4	28	4.00	23.99

```
 Tipos de colunas:
Order                int64
File_Type           object
SKU_number           int64
SoldFlag           float64
SoldCount          float64
MarketingType       object
ReleaseNumber        int64
New_Release_Flag     int64
StrengthFactor     float64
PriceReg           float64
ReleaseYear          int64
ItemCount            int64
LowUserPrice       float64
LowNetPrice        float64
dtype: object
```

1.6 VISÃO GERAL DO DATASET

[3]:
```python
# ============================================================================
# VISÃO GERAL DO DATASET
# ============================================================================

# visão geral do df
print(" VISÃO GERAL DO DATASET")
print("="*50)

# Dimensões do dataset
print(f" Dimensões: {df.shape[0]:,} linhas x {df.shape[1]} colunas")

# Valores únicos por coluna
print("\n Valores únicos por coluna:")
for col, unique_count in df.nunique().items():
    print(f"   {col}: {unique_count:,}")

# Análise específica para File_Type (se existir)
if 'File_Type' in df.columns:
    print(f"\n Distribuição por File_Type:")
    counts = df['File_Type'].value_counts()
    for file_type, count in counts.items():
        print(f"   {file_type}: {count:,} registros ({count/len(df)*100:.1f}%)")

# Separar dados históricos e ativos (se aplicável)
if 'File_Type' in df.columns:
    hist_data = df[df['File_Type'] == 'Historical']
    active_data = df[df['File_Type'] == 'Active']
    print(f"\n Dados separados: {len(hist_data):,} históricos +␣
 ↪{len(active_data):,} ativos")
```

```
 VISÃO GERAL DO DATASET
==================================================
 Dimensões: 198,917 linhas x 14 colunas

 Valores únicos por coluna:
   Order: 198,917
   File_Type: 2
   SKU_number: 133,360
   SoldFlag: 2
   SoldCount: 37
   MarketingType: 2
   ReleaseNumber: 71
   New_Release_Flag: 2
   StrengthFactor: 197,424
   PriceReg: 11,627
   ReleaseYear: 85
```

```
ItemCount: 501
LowUserPrice: 12,102
LowNetPrice: 15,403

Distribuição por File_Type:
  Active: 122,921 registros (61.8%)
  Historical: 75,996 registros (38.2%)

Dados separados: 75,996 históricos + 122,921 ativos
```

1.7 Interpretação dos Resultados

1.7.1 1. Dimensões do Dataset

Característica	Valor
Registros (linhas)	198.917
Variáveis (colunas)	14

1.7.2 2. Valores Únicos por Coluna

Variável	Valores Únicos	Descrição
Order	198.917	Cada pedido é único (chave primária).
File_Type	2	Apenas dois tipos de arquivos: Histórico e Ativo.
SKU_number	133.360	O número de produtos únicos.
SoldFlag	2	Flag binária que indica se o produto foi vendido (sim/não).
SoldCount	37	O número de diferentes quantidades vendidas.
MarketingType	2	Dois tipos distintos de estratégia de marketing.
ReleaseNumber	71	O número de diferentes lançamentos.
New_Release_Flag	2	Flag binária que indica se o produto é um novo lançamento (sim/não).
StrengthFactor	197.424	Quase todos os valores são únicos.
PriceReg	11.627	O número de diferentes preços regulares.
ReleaseYear	85	O número de diferentes anos de lançamento.
ItemCount	501	O número de diferentes contagens de itens.

Variável	Valores Únicos	Descrição
LowUserPrice	12.102	O número de diferentes preços baixos para o usuário.
LowNetPrice	15.403	O número de diferentes preços líquidos baixos.

1.7.3 3. Distribuição por Tipo de Arquivo

Tipo de Arquivo	Registros	Porcentagem
Histórico	75.996	38.2%
Ativo	122.921	61.8%

1.7.4 Características do Dataset:

- Dataset balanceado: com mais dados ativos que históricos
- Alta granularidade: de produtos (133k SKUs únicos)
- Variáveis categóricas simples: (flags binários)
- Variáveis numéricas diversificadas: (preços, contadores, fatores)

1.7.5 Observações Importantes:

- *Order*: tem valores únicos = cada linha é um pedido único
- *StrengthFactor*: tem quase todos valores únicos (197k de 198k)
- Muita variação em preços (*PriceReg, LowUserPrice, LowNetPrice*)
- Dados cobrem 85 anos diferentes (*ReleaseYear*)

1.8 ESTATÍSTICAS DESCRITIVAS

```
[4]: # ============================================================================
     # ESTATÍSTICAS DESCRITIVAS
     # ============================================================================

     # Incluir variáveis categóricas
     df.describe(include='all').T
```

```
[4]:                       count  unique    top     freq            mean  \
     Order              198917.0     NaN    NaN      NaN   106483.543242
     File_Type            198917       2  Active   122921             NaN
     SKU_number         198917.0     NaN    NaN      NaN   861362.626422
     SoldFlag            75996.0     NaN    NaN      NaN        0.171009
     SoldCount           75996.0     NaN    NaN      NaN        0.322306
     MarketingType        198917       2      S    100946             NaN
     ReleaseNumber      198917.0     NaN    NaN      NaN        3.412202
     New_Release_Flag   198917.0     NaN    NaN      NaN        0.642248
     StrengthFactor     198917.0     NaN    NaN      NaN  1117115.214521
```

```
PriceReg            198917.0   NaN   NaN   NaN      90.895243
ReleaseYear         198917.0   NaN   NaN   NaN    2006.016414
ItemCount           198917.0   NaN   NaN   NaN      41.426283
LowUserPrice        198917.0   NaN   NaN   NaN      30.982487
LowNetPrice         198917.0   NaN   NaN   NaN      46.832053


                           std       min          25%        50%         75%  \
Order              60136.716784       2.0      55665.0   108569.0    158298.0
File_Type                   NaN       NaN          NaN        NaN         NaN
SKU_number         869979.38013   50001.0     217252.0   612208.0    904751.0
SoldFlag               0.376519       0.0          0.0        0.0         0.0
SoldCount              1.168615       0.0          0.0        0.0         0.0
MarketingType               NaN       NaN          NaN        NaN         NaN
ReleaseNumber          3.864243       0.0          1.0        2.0         5.0
New_Release_Flag        0.47934       0.0          0.0        1.0         1.0
StrengthFactor     1522090.38546     6.275   161418.7675   582224.0   1430083.0
PriceReg              86.736367       0.0         42.0      69.95       116.0
ReleaseYear            9.158331       0.0       2003.0     2007.0      2011.0
ItemCount             37.541215       0.0         21.0       32.0        50.0
LowUserPrice          69.066155       0.0         4.91      16.08       40.24
LowNetPrice          128.513236       0.0        17.95      33.98       55.49


                         max
Order               208027.0
File_Type                NaN
SKU_number         3960788.0
SoldFlag                 1.0
SoldCount               73.0
MarketingType            NaN
ReleaseNumber           99.0
New_Release_Flag         1.0
StrengthFactor    17384454.0
PriceReg            12671.48
ReleaseYear           2018.0
ItemCount             2542.0
LowUserPrice        14140.21
LowNetPrice         19138.79
```

1.9 Análise das Estatísticas Descritivas

1.9.1 Observações Principais:

Variáveis com Dados Incompletos: - **SoldFlag** e **SoldCount**: apenas 75,996 registros (38%) - corresponde exatamente aos dados históricos - Confirma que vendas só existem no dataset histórico

Variáveis Categóricas: - **File_Type**: 2 categorias (Active mais frequente) - **MarketingType**: 2 categorias (S mais frequente com 100,946 registros)

Identificadores: - **Order**: 198,917 valores únicos (chave primária) - **SKU_number**: 133,360 produtos únicos

Flags Binários: - **New_Release_Flag**: 64% são novos lançamentos (média 0.64) - **SoldFlag**: 17% dos itens históricos foram vendidos

Métricas de Negócio: - **ReleaseYear**: Dados de 2003 a 2018 (15 anos) - **PriceReg**: Preços de 0,00 a 12,671 (média R$ 90,90) - **ItemCount**: 1 a 2,542 itens por pedido (média 41) - **SoldCount**: Máximo 73 unidades vendidas

Alerta: - **StrengthFactor**: Valores extremamente altos (até 17+ milhões) - possível erro ou métrica calculada

---

1.10 PLOTAR COLUNAS CATEGÓRICAS

```
[5]:  #=====================================================================
      # PLOTAR COLUNAS CATEGÓRICAS
      #=====================================================================


      # ---------- Mapeamentos ----------
      file_type_mapping = {
          'Historical': 'Dados Históricos',
          'Active': 'Dados Ativos'
      }
      marketing_mapping_global = {
          'S': 'Marketing Padrão',
          'D': 'Marketing Direto'
      }
      release_mapping = {
          0: 'Sem Novos Lançamentos',
          1: 'Com Novos Lançamentos'
      }


      # ---------- Funções auxiliares ----------
      def make_palette(categories, cmap_name='tab20'):
          """Gera uma lista de cores distintas do colormap para o nº de categorias."""
          import seaborn as sns
          return sns.color_palette(cmap_name, n_colors=len(categories))

      def wrap_labels(labels, width=14):
          """Quebra rótulos longos em múltiplas linhas para não sobrepor."""
          return [fill(str(l), width=width) for l in labels]

      def barplot_counts(ax, series, title, xlabel, ylabel):
          """
          Desenha barplot com:
            - cores únicas por categoria
```

```python
        - rótulos (contagem + %) sem sobreposição
        - y-format com milhares
    """
    # Ordena por valor desc para estética (opcional)
    series = series.sort_values(ascending=False)

    cats = series.index.astype(str).tolist()
    vals = series.values.astype(float)
    total = vals.sum()

    # Paleta distinta por categoria
    colors = make_palette(cats)

    # Desenha barras
    bars = ax.bar(cats, vals, color=colors, edgecolor='black', linewidth=0.6)

    # Eixo Y com folga para rótulos
    ymax = vals.max() if len(vals) else 0
    ax.set_ylim(0, ymax * 1.25 + (1 if ymax == 0 else 0))

    # Formatação do eixo Y
    ax.yaxis.set_major_formatter(FuncFormatter(lambda x, p: f'{x:,.0f}'))

    # Rótulos nas barras (contagem e %), com offset fixo para não colidir
    for bar, v in zip(bars, vals):
        pct = (v / total * 100) if total > 0 else 0.0
        y = bar.get_height()
        ax.text(
            bar.get_x() + bar.get_width() / 2.,
            y + max(ymax * 0.03, 0.5),                  # offset baseado no topo␣
↪(não no valor da barra)
            f'{int(v):,}\n({pct:.1f}%)',
            ha='center', va='bottom', fontsize=10, fontweight='bold',␣
↪clip_on=False
        )

    # Títulos e eixos
    ax.set_title(title, fontsize=12, fontweight='bold', pad=10)
    ax.set_xlabel(xlabel, fontsize=10, fontweight='bold')
    ax.set_ylabel(ylabel, fontsize=10, fontweight='bold')

    # Rótulos do eixo X com quebra de linha e leve rotação
    ax.set_xticklabels(wrap_labels(cats, width=16), rotation=0, ha='center')
    ax.tick_params(axis='both', labelsize=10)

# ---------- Preparação dos dados ----------
d1 = df.copy()
```

```python
# a) Tipo de arquivo
d1['File_Type_Clean'] = d1['File_Type'].map(file_type_mapping).
  ↪fillna(d1['File_Type'])
ft_counts = d1['File_Type_Clean'].value_counts()

# b) Marketing geral
d1['MarketingType_Clean'] = d1['MarketingType'].map(marketing_mapping_global).
  ↪fillna(d1['MarketingType'])
mk_counts_all = d1['MarketingType_Clean'].value_counts()

# c) New_Release_Flag
d1['New_Release_Flag_Clean'] = d1['New_Release_Flag'].map(release_mapping).
  ↪fillna(d1['New_Release_Flag'])
rel_counts = d1['New_Release_Flag_Clean'].value_counts()

# d) Somente Ativos
d_active = d1[d1['File_Type'] == 'Active'].copy()
d_active['MarketingType_Clean'] = d_active['MarketingType'].
  ↪map(marketing_mapping_global).fillna(d_active['MarketingType'])
mk_counts_active = d_active['MarketingType_Clean'].value_counts()

# e) Somente Históricos
d_hist = d1[d1['File_Type'] == 'Historical'].copy()
d_hist['MarketingType_Clean'] = d_hist['MarketingType'].
  ↪map(marketing_mapping_global).fillna(d_hist['MarketingType'])
mk_counts_hist = d_hist['MarketingType_Clean'].value_counts()

# ---------- Figure única com subplots ----------
fig, axes = plt.subplots(2, 3, figsize=(18, 9), constrained_layout=True)
axes = axes.ravel()

barplot_counts(
    ax=axes[0],
    series=ft_counts,
    title='Distribuição por Tipo de Dados',
    xlabel='Tipo de Dados',
    ylabel='Quantidade de Registros'
)

barplot_counts(
    ax=axes[1],
    series=mk_counts_all,
    title='Distribuição por Tipo de Marketing (Geral)',
    xlabel='Tipo de Marketing',
    ylabel='Quantidade de Registros'
)
```

```
barplot_counts(
    ax=axes[2],
    series=rel_counts,
    title='Distribuição por Flag de Novo Lançamento',
    xlabel='Status',
    ylabel='Quantidade de Registros'
)

barplot_counts(
    ax=axes[3],
    series=mk_counts_active,
    title='Distribuição de Marketing – Inventário Ativo',
    xlabel='Tipo de Marketing',
    ylabel='Qtd. de Produtos Ativos'
)

barplot_counts(
    ax=axes[4],
    series=mk_counts_hist,
    title='Distribuição de Marketing – Dados Históricos',
    xlabel='Tipo de Marketing',
    ylabel='Qtd. de Produtos Históricos'
)

axes[5].axis('off')   # painel sobrando

fig.suptitle('Visão Consolidada – Distribuições de Dados e Marketing',␣
  ↪fontsize=14, fontweight='bold')
plt.show()
```
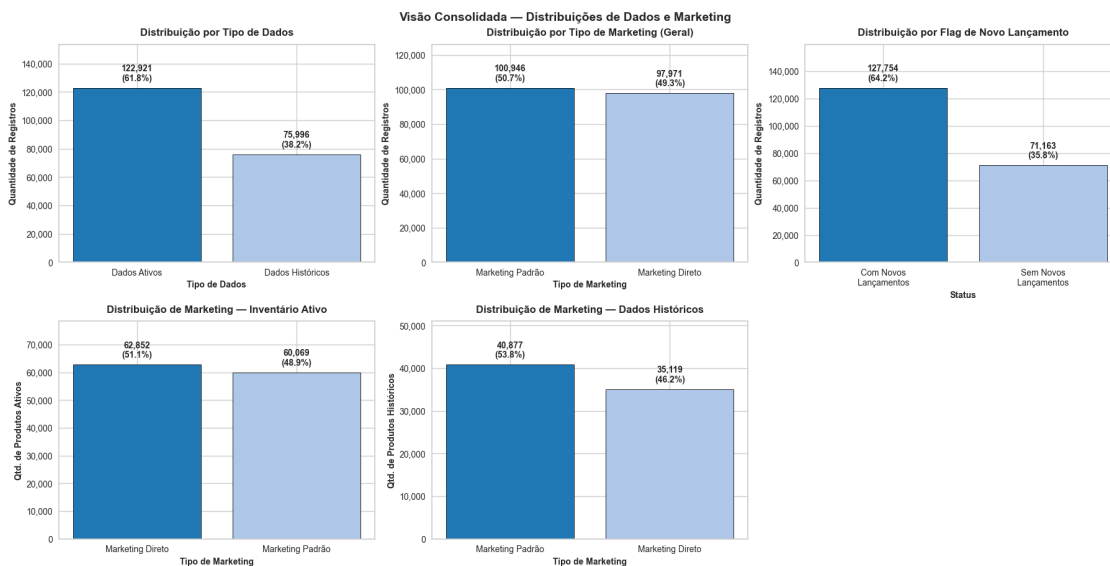
1.11 Análise dos Resultados

Resultados distribuição por tipo de dados - **Dataset desbalanceado**: 61.8% dados ativos vs 38.2% dados históricos - **Volume significativo**: Quase 200k registros totais (198,917) - **Predominância ativa**: Dados ativos representam quase 2/3 do dataset

Implicações: - **Para modelagem**: Usar dados históricos (75,996 registros) para treino - **Balanceamento**: Considerar se o desbalanceamento afeta as análises futuras

Resultados distribuição por tipo de Marketing - **Distribuição quase balanceada**: Marketing Padrão (50.7%) vs Marketing D (49.3%) - **Diferença mínima**: Apenas 2,975 registros de diferença entre os tipos - **Volume significativo**: Ambos os tipos têm ~100k produtos cada

Insights: - **Estratégias equilibradas**: Empresa usa ambas estratégias de marketing de forma balanceada - **Sem dominância clara**: Nenhum tipo de marketing representa mais que 51% dos produtos - **Base sólida para análise**: Volumes similares permitem comparações estatísticas válidas

Resultados distribuição por tipos de produtos - **Maioria tem novos lançamentos**: 64.2% dos produtos tiveram versões futuras - **Desbalanceamento moderado**: 2:1 a favor de produtos com novos lançamentos - **Volume significativo**: Mais de 127k produtos com múltiplas versões

Insights: - **Estratégia de produto ativa**: Empresa investe em evolução/atualização de produtos existentes - **Produtos longevos**: 64% dos itens no catálogo são "famílias de produtos" com múltiplas versões - **Possível indicador de sucesso**: Produtos que geram novas versões podem ter melhor performance

Resultados distribuição por tipos de Marketing (Direto ou Padrão) - **Leve inversão**: Marketing Direto (51.1%) vs Marketing Padrão (48.9%) - **Distribuição ainda balanceada**: Diferença de apenas 2.2% entre os tipos - **Volume expressivo**: 122,921 produtos ativos para scoring

1.11.1 Comparação com Dataset Geral:

Tipo	Dataset Geral	Inventário Ativo	Diferença
Marketing Padrão	50.7%	48.9%	-1.8%
Marketing Direto	49.3%	51.1%	+1.8%

Insights: - **Estratégia levemente diferente**: Inventário ativo tem mais produtos com marketing direto - **Possível foco premium**: Marketing direto pode estar mais presente em produtos aguardando avaliação - **Manutenção do equilíbrio**: Diferença mínima mantém estratégia balanceada

1.11.2 Comparação Completa:

Segmento	Marketing Padrão	Marketing Direto	Diferença
Dataset Geral	50.7%	49.3%	+1.4%
Dados Históricos	53.8%	46.2%	+7.6%
Inventário Ativo	48.9%	51.1%	-2.2%

Principais Resultados:

Inversão Clara: - **Dados Históricos**: Marketing Padrão domina (53.8%) - **Inventário Ativo**: Marketing Direto domina (51.1%) - **Diferença total**: 9.8 pontos percentuais entre extremos

Possíveis Interpretações:

Hipótese 1 - Performance de Vendas: - Marketing Padrão pode ter **maior rotatividade** (mais presente no histórico) - Marketing Direto pode ter **menor rotatividade** (acumula no inventário)

Hipótese 2 - Estratégia Temporal: - Marketing Padrão pode ser estratégia **mais antiga** (concentrada no passado) - Marketing Direto pode ser estratégia **mais recente** (concentrada no inventário atual)

Hipótese 3 - Ciclo de Produto: - Produtos com Marketing Padrão **vendem mais rápido** - Produtos com Marketing Direto **permanecem mais tempo** no estoque

---

1.12 PLOTE COLUNAS NUMÉRICAS

```
[6]:  # ================================================================================
      # DISTRIBUIÇÕES DAS VARIÁVEIS NUMÉRICAS – DADOS HISTÓRICOS
      # ================================================================================

      # Filtrar dados históricos
      df_hist = df[df['File_Type'] == 'Historical']

      # Definir variáveis numéricas para análise
      numerical_vars = ['StrengthFactor', 'PriceReg', 'ReleaseYear', 'ItemCount',
       ↪'LowUserPrice', 'LowNetPrice']

      # Nomes mais descritivos para títulos
      var_titles = {
          'StrengthFactor': 'Fator de Força',
          'PriceReg': 'Preço Regular (R$)',
          'ReleaseYear': 'Ano de Lançamento',
          'ItemCount': 'Quantidade de Itens',
          'LowUserPrice': 'Preço Baixo Usuário (R$)',
          'LowNetPrice': 'Preço Líquido Baixo (R$)'
```

```python
}

# Criar figura com subplots
fig, axes = plt.subplots(3, 2, figsize=(15, 12), facecolor='white')
fig.suptitle('Distribuições das Variáveis Numéricas - Dados Históricos',␣
 ↪fontsize=16, fontweight='bold', y=0.98)

# Achatar array de axes para facilitar iteração
axes = axes.flatten()

# Cores para cada gráfico
colors = ['#3498DB', '#E74C3C', '#2ECC71', '#F39C12', '#9B59B6', '#1ABC9C']

# Criar cada gráfico
for i, var in enumerate(numerical_vars):
    # Remover outliers extremos para melhor visualização (apenas para o plot)
    data = df_hist[var].copy()
    Q1 = data.quantile(0.25)
    Q3 = data.quantile(0.75)
    IQR = Q3 - Q1
    lower_bound = Q1 - 1.5 * IQR
    upper_bound = Q3 + 1.5 * IQR

    # Dados para visualização (sem outliers extremos)
    data_filtered = data[(data >= lower_bound) & (data <= upper_bound)]

    # Criar histograma
    axes[i].hist(data_filtered, bins=50, alpha=0.7, color=colors[i],␣
 ↪edgecolor='black', linewidth=0.5)

    # Adicionar linha da média
    mean_val = data.mean()
    axes[i].axvline(mean_val, color='red', linestyle='--', linewidth=2,␣
 ↪label=f'Média: {mean_val:.1f}')

    # Adicionar linha da mediana
    median_val = data.median()
    axes[i].axvline(median_val, color='orange', linestyle='--', linewidth=2,␣
 ↪label=f'Mediana: {median_val:.1f}')

    # Configurar título e labels
    axes[i].set_title(f'Distribuição - {var_titles[var]}', fontsize=12,␣
 ↪fontweight='bold', pad=10)
    axes[i].set_xlabel(var_titles[var], fontsize=10)
    axes[i].set_ylabel('Frequência', fontsize=10)

    # Adicionar legenda
```

```python
    axes[i].legend(fontsize=8, loc='upper right')

    # Formatar eixos
    axes[i].tick_params(axis='both', which='major', labelsize=8)

    # Formatação especial para variáveis monetárias
    if 'Price' in var:
        axes[i].xaxis.set_major_formatter(plt.FuncFormatter(lambda x, p: f'R$␣
↪{x:,.0f}'))

    # Adicionar grid sutil
    axes[i].grid(True, alpha=0.3)

    # Estatísticas no canto
    stats_text = f'N: {len(data):,}\nOutliers: {len(data) - len(data_filtered):
↪,}'
    axes[i].text(0.02, 0.98, stats_text, transform=axes[i].transAxes,
                 fontsize=8, verticalalignment='top',
                 bbox=dict(boxstyle='round', facecolor='white', alpha=0.8))

# Ajustar layout
plt.tight_layout()
plt.subplots_adjust(top=0.94)
plt.show()

# Estatísticas resumo
print("ESTATÍSTICAS DAS VARIÁVEIS NUMÉRICAS - DADOS HISTÓRICOS")
print("="*65)
print(f"Total de registros históricos: {len(df_hist):,}")
print()

for var in numerical_vars:
    data = df_hist[var]
    print(f"{var_titles[var]}:")
    print(f"  Média: {data.mean():.2f}")
    print(f"  Mediana: {data.median():.2f}")
    print(f"  Desvio Padrão: {data.std():.2f}")
    print(f"  Min: {data.min():.2f} | Max: {data.max():.2f}")

    # Identificar outliers
    Q1 = data.quantile(0.25)
    Q3 = data.quantile(0.75)
    IQR = Q3 - Q1
    outliers = data[(data < Q1 - 1.5 * IQR) | (data > Q3 + 1.5 * IQR)]
    print(f"  Outliers: {len(outliers):,} ({len(outliers)/len(data)*100:.1f}%)")
    print()
```
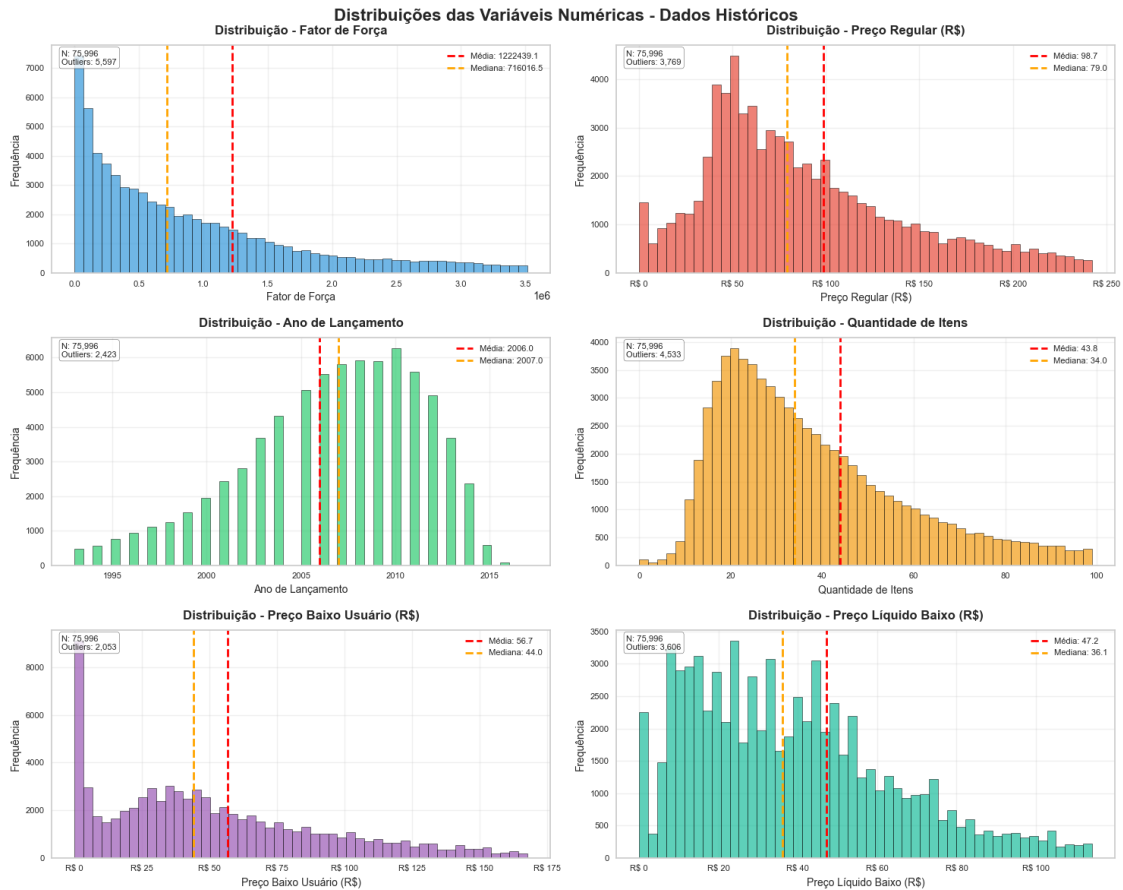
Distribuições das Variáveis Numéricas - Dados Históricos

ESTATÍSTICAS DAS VARIÁVEIS NUMÉRICAS - DADOS HISTÓRICOS

==

Total de registros históricos: 75,996

Fator de Força:
  Média: 1222439.14
  Mediana: 716016.50
  Desvio Padrão: 1540520.75
  Min: 68.00 | Max: 16669658.00
  Outliers: 5,597 (7.4%)

Preço Regular (R$):
  Média: 98.73
  Mediana: 78.95
  Desvio Padrão: 78.71
  Min: 0.00 | Max: 3986.31
  Outliers: 3,769 (5.0%)

Ano de Lançamento:
  Média: 2005.97

```
Mediana: 2007.00
Desvio Padrão: 6.11
Min: 1935.00 | Max: 2017.00
Outliers: 2,423 (3.2%)

Quantidade de Itens:
  Média: 43.84
  Mediana: 34.00
  Desvio Padrão: 37.36
  Min: 0.00 | Max: 1523.00
  Outliers: 4,533 (6.0%)

Preço Baixo Usuário (R$):
  Média: 56.71
  Mediana: 44.03
  Desvio Padrão: 104.76
  Min: 0.00 | Max: 14140.21
  Outliers: 2,053 (2.7%)

Preço Líquido Baixo (R$):
  Média: 47.19
  Mediana: 36.13
  Desvio Padrão: 129.81
  Min: 0.00 | Max: 19138.79
  Outliers: 3,606 (4.7%)
```

1.13 Análise - Distribuições das Variáveis Numéricas (Dados Históricos)

1.13.1 Padrões Gerais Observados:

Distribuições Assimétricas: Todas as variáveis apresentam forte assimetria à direita, típico de dados de negócio.

1.13.2 Análise por Variável:

1. Fator de Força - **Distribuição:** Extremamente assimétrica, valores de 68 a 16+ milhões - **Outliers:** 7.4% (5,597 produtos) - maior percentual - **Interpretação:** Métrica com alta variabilidade, possivelmente calculada - **Modelagem:** Necessária transformação logarítmica

2. Preços (Regular, Baixo Usuário, Líquido Baixo) - **Padrão comum:** Concentração em valores baixos, cauda longa à direita - **Preço Regular:** Mediana $ 79 dólares, produtos até 3.986 dólares - **Produtos gratuitos:** Existem (min = 0) - **Modelagem:** Considerar transformação log ou categorização

3. Ano de Lançamento - **Distribuição:** Mais próxima da normal, centrada em 2007 - **Período:** Concentração 2000-2015, poucos produtos muito antigos/recentes - **Outliers baixos:** 3.2% - variável mais "limpa" - **Modelagem:** Pode ser usada diretamente

4. Quantidade de Itens - **Distribuição:** Assimétrica, mediana 34 itens - **Range:** 0 a 1,523

itens por produto - **Interpretação:** Maioria produtos com poucas unidades, alguns com muitas

---

1.14   BOX PLOTS DAS VARIÁVEIS NUMÉRICAS

```
[7]:  # ================================================================================
      # BOX PLOTS DAS VARIÁVEIS NUMÉRICAS - DADOS HISTÓRICOS
      # ================================================================================

      # Filtrar dados históricos
      df_hist = df[df['File_Type'] == 'Historical']

      # Definir variáveis numéricas para análise
      numerical_vars = ['StrengthFactor', 'PriceReg', 'ReleaseYear', 'ItemCount',
       ↪'LowUserPrice', 'LowNetPrice']

      # Nomes mais descritivos para títulos
      var_titles = {
          'StrengthFactor': 'Fator de Força',
          'PriceReg': 'Preço Regular ($)',
          'ReleaseYear': 'Ano de Lançamento',
          'ItemCount': 'Quantidade de Itens',
          'LowUserPrice': 'Preço Baixo Usuário ($)',
          'LowNetPrice': 'Preço Líquido Baixo ($)'
      }

      # Criar figura com subplots
      fig, axes = plt.subplots(3, 2, figsize=(14, 14), facecolor='white')
      fig.suptitle('Box Plots das Variáveis Numéricas - Dados Históricos',
       ↪fontsize=16, fontweight='bold', y=0.98)

      # Achatar array de axes para facilitar iteração
      axes = axes.flatten()

      # Cores para cada gráfico
      colors = ['#3498DB', '#E74C3C', '#2ECC71', '#F39C12', '#9B59B6', '#1ABC9C']

      # Criar cada box plot
      for i, var in enumerate(numerical_vars):
          data = df_hist[var].copy()

          # Criar box plot horizontal
          box_plot = axes[i].boxplot(data, vert=False, patch_artist=True,
                                    boxprops=dict(facecolor=colors[i], alpha=0.7),
                                    medianprops=dict(color='red', linewidth=2),
                                    whiskerprops=dict(color='black', linewidth=1.5),
                                    capprops=dict(color='black', linewidth=1.5),
```

```python
                                    flierprops=dict(marker='o',
↪markerfacecolor=colors[i],
                                        markersize=3, alpha=0.5))

    # Configurar título e labels
    axes[i].set_title(f'{var_titles[var]}', fontsize=12, fontweight='bold',
↪pad=15)
    axes[i].set_xlabel(var_titles[var], fontsize=10)

    # Remover ticks do eixo y (não necessário para box plot horizontal)
    axes[i].set_yticks([])

    # Formatar eixo x
    axes[i].tick_params(axis='x', which='major', labelsize=9)

    # Formatação especial para variáveis monetárias
    if 'Price' in var:
        axes[i].xaxis.set_major_formatter(plt.FuncFormatter(lambda x, p: f'$ {x:
↪,.0f}'))

    # Adicionar grid sutil
    axes[i].grid(True, alpha=0.3, axis='x')

    # Calcular estatísticas
    Q1 = data.quantile(0.25)
    Q2 = data.median()
    Q3 = data.quantile(0.75)
    IQR = Q3 - Q1
    outliers_count = len(data[(data < Q1 - 1.5 * IQR) | (data > Q3 + 1.5 *
↪IQR)])

    # Adicionar estatísticas no gráfico
    stats_text = f'Q1: {Q1:.1f}\nMediana: {Q2:.1f}\nQ3: {Q3:.1f}\nIQR: {IQR:.
↪1f}\nOutliers: {outliers_count:,}'
    axes[i].text(0.02, 0.98, stats_text, transform=axes[i].transAxes,
            fontsize=8, verticalalignment='top',
            bbox=dict(boxstyle='round', facecolor='white', alpha=0.9,
↪edgecolor=colors[i]))

    # Ajustar limites para melhor visualização (remover outliers extremos da
↪visualização)
    if var == 'StrengthFactor':
        # Limite específico para StrengthFactor devido aos valores extremos
        axes[i].set_xlim(0, data.quantile(0.99))
        axes[i].text(0.5, -0.15, '* Limitado a 99º percentil para visualização',
```

```python
                          transform=axes[i].transAxes, fontsize=8, ha='center',
↪style='italic')

# Ajustar layout
plt.tight_layout()
plt.subplots_adjust(top=0.94, hspace=0.4)
plt.show()

# Análise de outliers detalhada
print("ANÁLISE DE OUTLIERS - DADOS HISTÓRICOS")
print("="*50)
print(f"Total de registros: {len(df_hist):,}")
print()

for var in numerical_vars:
    data = df_hist[var]
    Q1 = data.quantile(0.25)
    Q3 = data.quantile(0.75)
    IQR = Q3 - Q1

    # Outliers
    lower_outliers = data[data < Q1 - 1.5 * IQR]
    upper_outliers = data[data > Q3 + 1.5 * IQR]
    total_outliers = len(lower_outliers) + len(upper_outliers)

    print(f"{var_titles[var]}:")
    print(f"  Outliers inferiores: {len(lower_outliers):,}")
    print(f"  Outliers superiores: {len(upper_outliers):,}")
    print(f"  Total outliers: {total_outliers:,} ({total_outliers/len(data)*100:
↪.1f}%)")

    if len(upper_outliers) > 0:
        print(f"  Valor máximo outlier: {upper_outliers.max():.2f}")
    print()
```

Box Plots das Variáveis Numéricas - Dados Históricos
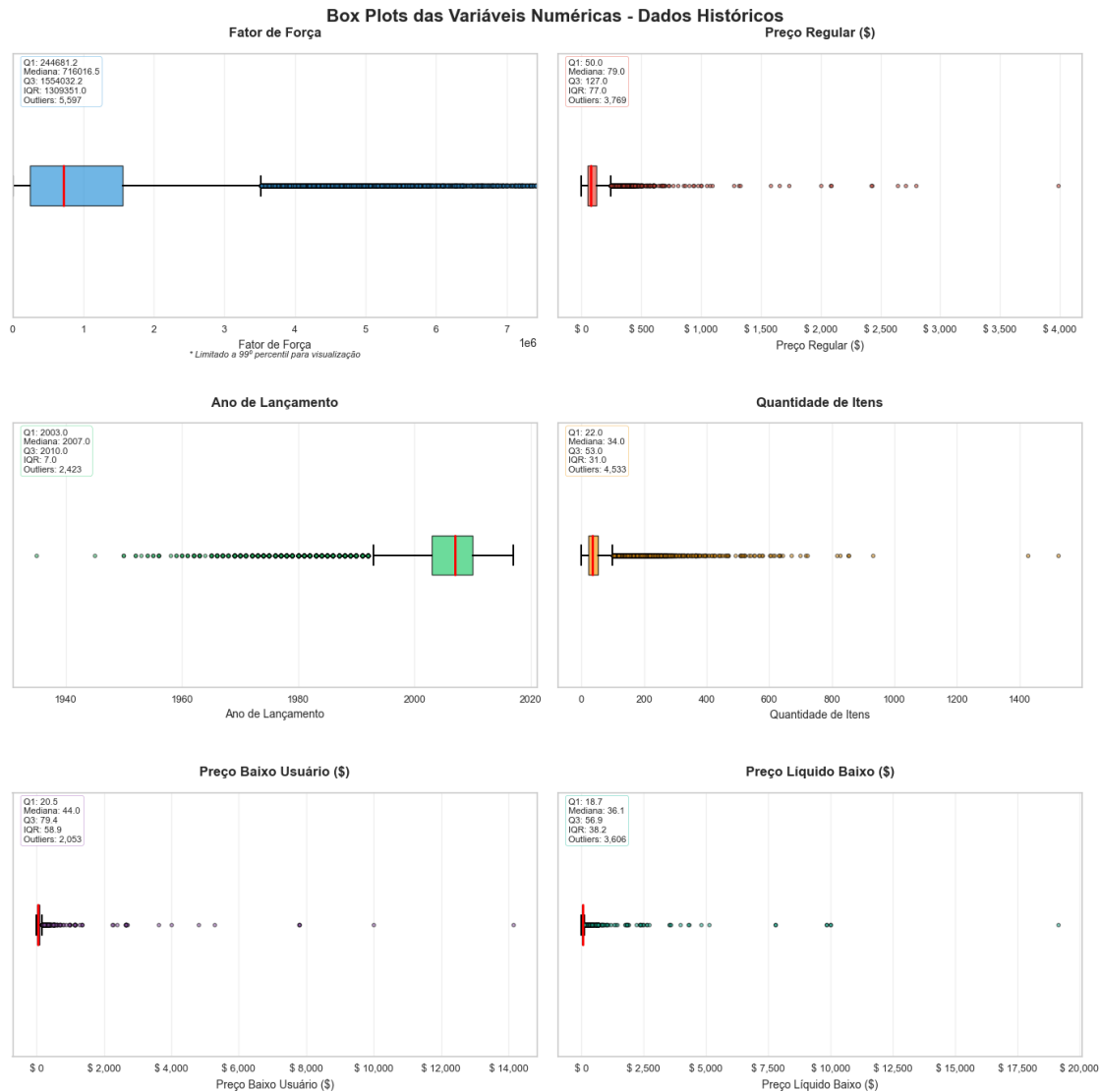
ANÁLISE DE OUTLIERS - DADOS HISTÓRICOS
==
Total de registros: 75,996

Fator de Força:
  Outliers inferiores: 0
  Outliers superiores: 5,597
  Total outliers: 5,597 (7.4%)
  Valor máximo outlier: 16669658.00

Preço Regular ($):
  Outliers inferiores: 0
  Outliers superiores: 3,769

```
   Total outliers: 3,769 (5.0%)
   Valor máximo outlier: 3986.31


Ano de Lançamento:
   Outliers inferiores: 2,423
   Outliers superiores: 0
   Total outliers: 2,423 (3.2%)


Quantidade de Itens:
   Outliers inferiores: 0
   Outliers superiores: 4,533
   Total outliers: 4,533 (6.0%)
   Valor máximo outlier: 1523.00


Preço Baixo Usuário ($):
   Outliers inferiores: 0
   Outliers superiores: 2,053
   Total outliers: 2,053 (2.7%)
   Valor máximo outlier: 14140.21


Preço Líquido Baixo ($):
   Outliers inferiores: 0
   Outliers superiores: 3,606
   Total outliers: 3,606 (4.7%)
   Valor máximo outlier: 19138.79
```

1.15   Análise - Box Plots das Variáveis Numéricas

1.15.1   Insights dos Box Plots:

Variáveis com Distribuições Extremamente Assimétricas:

1. Fator de Força - PROBLEMÁTICO - Outliers superiores: 7.4% (5,597 produtos) - **Valor máximo:** 16+ milhões (suspeito de erro) - **Box comprimida:** Indica concentração extrema em valores baixos

2. Variáveis de Preço - Padrão Esperado - Preço Regular: 5.0% outliers, máximo $3,986 - **Preço Baixo Usuário:** 2.7% outliers (menor %), máximo $14,140 - **Preço Líquido Baixo:** 4.7% outliers, máximo $19,138 - **Padrão:** Concentração em valores baixos, poucos produtos premium

1.15.2   Descobertas Interessantes:

Ano de Lançamento - Únicos Outliers Inferiores: - **2,423 produtos antigos** (pré-2000) considerados outliers - **Interpretação:** Portfolio concentrado pós-2000, poucos produtos legados - **Oportunidade:** Produtos antigos podem ter comportamento diferente de vendas

Quantidade de Itens: - **6.0% outliers superiores**, máximo 1,523 itens - **Mediana:** 34 itens (baixa para produtos industriais) - **Interpretação:** Maioria produtos unitários/baixo volume

1.15.3 Comparação de Outliers por Variável:

Variável	% Outliers	Tipo	Máximo Outlier	Severidade
Fator de Força	7.4%	Superior	16.7M	Crítica
Quantidade Itens	6.0%	Superior	1,523	Moderada
Preço Regular	5.0%	Superior	$3,986	Moderada
Preço Líquido	4.7%	Superior	$19,138	Moderada
Ano Lançamento	3.2%	**Inferior**	1935	Natural
Preço Baixo	2.7%	Superior	$14,140	Natural

1.16 DETECÇÃO DE OUTLIERS POR PERCENTIL

```python
[8]: # ================================================================================
     # DETECÇÃO DE OUTLIERS POR PERCENTIL - DADOS HISTÓRICOS
     # ================================================================================

     # Filtrar dados históricos
     df_hist = df[df['File_Type'] == 'Historical'].copy()  # Criar uma cópia para
      ↪evitar modificar o original

     # Função para detecção de outliers baseada em percentis
     def percentile_based_outlier(data, threshold=95):
         """
         Detecta outliers baseado em percentis
         threshold: percentil para considerar outliers (95 = 5% outliers)
         """
         diff = (100 - threshold) / 2.0
         minval, maxval = np.percentile(data, [diff, 100 - diff])
         return (data < minval) | (data > maxval), minval, maxval

     # Definir variáveis numéricas para análise
     numerical_vars = ['StrengthFactor', 'PriceReg', 'ReleaseYear', 'ItemCount',
      ↪'LowUserPrice', 'LowNetPrice']

     # Nomes mais descritivos para títulos
     var_titles = {
         'StrengthFactor': 'Fator de Força',
         'PriceReg': 'Preço Regular (\$)',
         'ReleaseYear': 'Ano de Lançamento',
         'ItemCount': 'Quantidade de Itens',
         'LowUserPrice': 'Preço Baixo Usuário (\$)',
         'LowNetPrice': 'Preço Líquido Baixo (\$)'
     }

     # Criar figura com subplots
```

```python
fig, axes = plt.subplots(3, 2, figsize=(15, 14), facecolor='white')
fig.suptitle('Detecção de Outliers por Percentil (95%) - Dados Históricos',
             fontsize=16, fontweight='bold', y=0.98)

# Achatar array de axes para facilitar iteração
axes = axes.flatten()

# Cores para cada gráfico
colors = ['#3498DB', '#E74C3C', '#2ECC71', '#F39C12', '#9B59B6', '#1ABC9C']

# Dicionário para armazenar informações de outliers
outlier_info = {}

# Analisar cada variável
for i, var in enumerate(numerical_vars):
    # Usar todos os dados (não apenas 1000 amostras)
    data = df_hist[var].copy()

    # Detectar outliers e obter limites
    outlier_mask, minval, maxval = percentile_based_outlier(data, threshold=95)
    outliers = data[outlier_mask]
    normal_data = data[~outlier_mask]

    # Armazenar informações para correção posterior
    outlier_info[var] = {
        'outlier_mask': outlier_mask,
        'minval': minval,
        'maxval': maxval
    }

    # Criar densidade da distribuição normal
    axes[i].hist(normal_data, bins=50, alpha=0.6, color=colors[i],
                 label='Dados Normais', density=True, edgecolor='black',
 ↪linewidth=0.5)

    # Adicionar outliers como pontos
    if len(outliers) > 0:
        # Para melhor visualização, usar amostra dos outliers se muito numerosos
        outliers_sample = outliers.sample(min(200, len(outliers))) if
 ↪len(outliers) > 200 else outliers
        axes[i].scatter(outliers_sample, np.zeros_like(outliers_sample),
                        color='red', alpha=0.7, s=30, label=f'Outliers
 ↪({len(outliers):,})', zorder=5)

    # Adicionar linha de densidade suave
    if len(normal_data) > 10:  # Verificar se há dados suficientes
        kde = gaussian_kde(normal_data)
```

```python
        x_range = np.linspace(normal_data.min(), normal_data.max(), 100)
        axes[i].plot(x_range, kde(x_range), color='darkblue', linewidth=2,
 ↪alpha=0.8)

        # Marcar percentis
        axes[i].axvline(minval, color='orange', linestyle='--', linewidth=2,
 ↪alpha=0.7, label='P2.5 / P97.5')
        axes[i].axvline(maxval, color='orange', linestyle='--', linewidth=2,
 ↪alpha=0.7)

        # Configurar título e labels
        axes[i].set_title(f'{var_titles[var]}', fontsize=12, fontweight='bold',
 ↪pad=15)
        axes[i].set_xlabel(var_titles[var], fontsize=10)
        axes[i].set_ylabel('Densidade', fontsize=10)

        # Configurar eixos
        axes[i].tick_params(axis='both', which='major', labelsize=9)

        # Formatação especial para variáveis monetárias
        if 'Price' in var:
            axes[i].xaxis.set_major_formatter(plt.FuncFormatter(lambda x, p: f'\${x:
 ↪,.0f}'))

        # Adicionar grid sutil
        axes[i].grid(True, alpha=0.3)

        # Legenda
        axes[i].legend(fontsize=8, loc='upper right')

        # Estatísticas no canto
        outlier_pct = len(outliers) / len(data) * 100
        stats_text = f'Total: {len(data):,}\nOutliers: {len(outliers):
 ↪,}\n({outlier_pct:.1f}%)'
        axes[i].text(0.02, 0.98, stats_text, transform=axes[i].transAxes,
                 fontsize=8, verticalalignment='top',
                 bbox=dict(boxstyle='round', facecolor='white', alpha=0.9,
 ↪edgecolor=colors[i]))

# Ajustar layout
plt.tight_layout()
plt.subplots_adjust(top=0.94, hspace=0.4)
plt.show()

# ==============================================================================
# CORREÇÃO DE OUTLIERS - WINSORIZAÇÃO
```

```python
# ================================================================
print("CORREÇÃO DE OUTLIERS - WINSORIZAÇÃO")
print("="*50)

# Criar uma cópia do DataFrame para correção
df_hist_corrected = df_hist.copy()

# Aplicar winsorização para cada variável
for var in numerical_vars:
    # Obter informações de outliers
    info = outlier_info[var]
    outlier_mask = info['outlier_mask']
    minval = info['minval']
    maxval = info['maxval']

    # Contar outliers antes da correção
    outliers_before = outlier_mask.sum()

    # Aplicar winsorização: substituir outliers pelos valores limite
    df_hist_corrected.loc[outlier_mask & (df_hist[var] < minval), var] = minval
    df_hist_corrected.loc[outlier_mask & (df_hist[var] > maxval), var] = maxval

    # Contar outliers após a correção
    outlier_mask_after = percentile_based_outlier(df_hist_corrected[var],␣
↪threshold=95)[0]
    outliers_after = outlier_mask_after.sum()

    print(f"{var_titles[var]}:")
    print(f"  Outliers antes: {outliers_before:,} ({outliers_before/
↪len(df_hist)*100:.2f}%)")
    print(f"  Outliers depois: {outliers_after:,} ({outliers_after/
↪len(df_hist)*100:.2f}%)")
    print(f"  Limites: [{minval:.2f}, {maxval:.2f}]")
    print()

# Resumo da correção
print("RESUMO DA CORREÇÃO DE OUTLIERS")
print("="*50)
print(f"Total de registros históricos: {len(df_hist):,}")
print(f"DataFrame corrigido criado com {len(df_hist_corrected):,} registros")
print()

# Exibir as primeiras linhas do DataFrame corrigido
print("Amostra do DataFrame com outliers corrigidos:")
df_hist_corrected.head()
```

Detecção de Outliers por Percentil (95%) - Dados Históricos
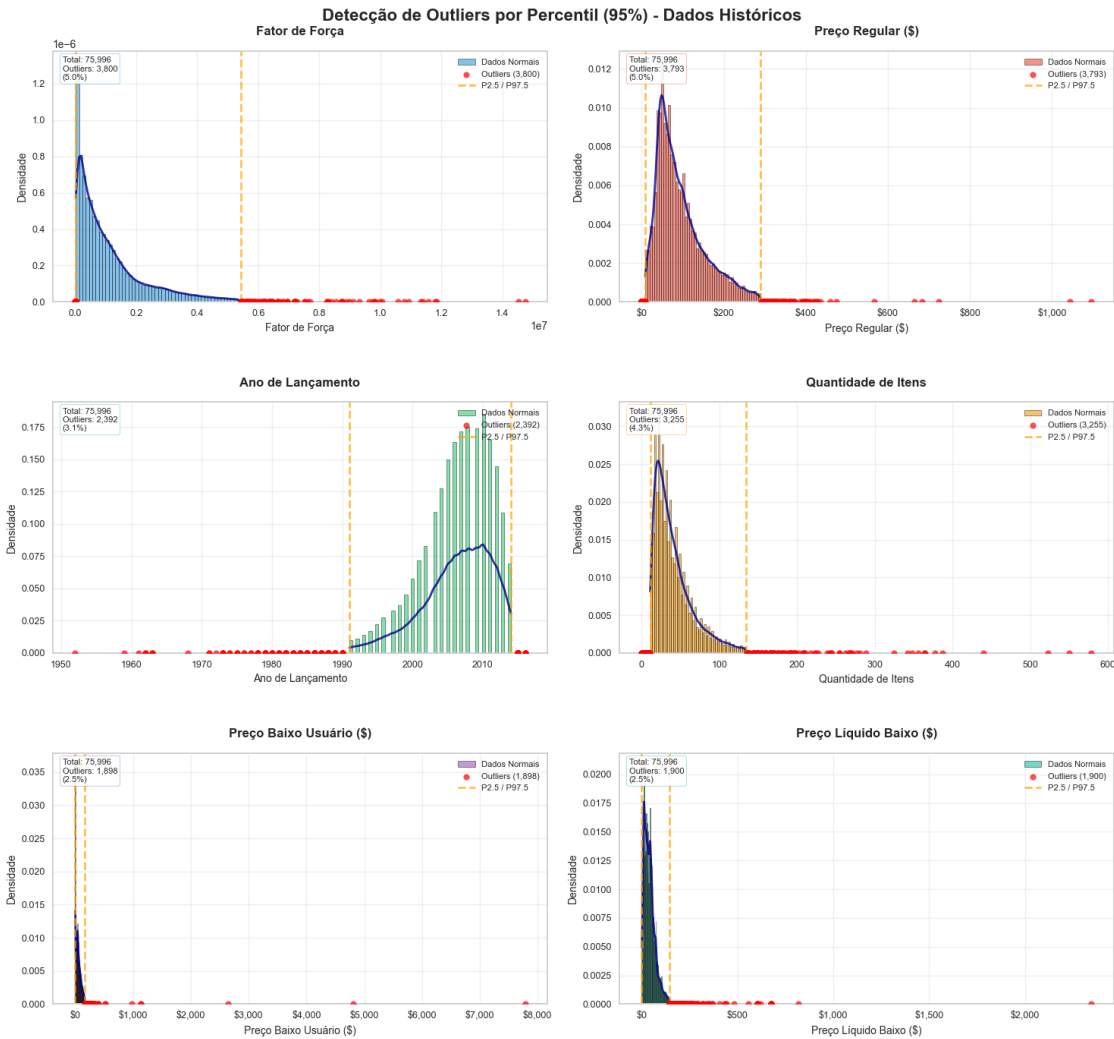
CORREÇÃO DE OUTLIERS - WINSORIZAÇÃO
==

Fator de Força:
  Outliers antes: 3,800 (5.00%)
  Outliers depois: 3,800 (5.00%)
  Limites: [18944.75, 5421065.50]

Preço Regular (\$):
  Outliers antes: 3,793 (4.99%)
  Outliers depois: 1,900 (2.50%)
  Limites: [8.49, 289.82]

Ano de Lançamento:
  Outliers antes: 2,392 (3.15%)
  Outliers depois: 0 (0.00%)
  Limites: [1991.00, 2014.00]

```
Quantidade de Itens:
  Outliers antes: 3,255 (4.28%)
  Outliers depois: 0 (0.00%)
  Limites: [11.00, 134.00]

Preço Baixo Usuário (\$):
  Outliers antes: 1,898 (2.50%)
  Outliers depois: 0 (0.00%)
  Limites: [0.00, 170.57]

Preço Líquido Baixo (\$):
  Outliers antes: 1,900 (2.50%)
  Outliers depois: 1,900 (2.50%)
  Limites: [0.00, 145.43]

RESUMO DA CORREÇÃO DE OUTLIERS
==================================================
Total de registros históricos: 75,996
DataFrame corrigido criado com 75,996 registros

Amostra do DataFrame com outliers corrigidos:
```

```
[8]:    Order   File_Type  SKU_number  SoldFlag  SoldCount MarketingType  \
     0      2  Historical     1737127       0.0        0.0             D
     1      3  Historical     3255963       0.0        0.0             D
     2      4  Historical      612701       0.0        0.0             D
     3      6  Historical      115883       1.0        1.0             D
     4      7  Historical      863939       1.0        1.0             D

        ReleaseNumber  New_Release_Flag  StrengthFactor  PriceReg  ReleaseYear  \
     0             15                 1        682743.0     44.99         2014
     1              7                 1       1016014.0     24.81         2005
     2              0                 0        340464.0     46.00         2013
     3              4                 1        334011.0    100.00         2006
     4              2                 1       1287938.0    121.95         2010

        ItemCount  LowUserPrice  LowNetPrice
     0         11         28.97        31.84
     1         39          0.00        15.54
     2         34         30.19        27.97
     3         20        133.93        83.15
     4         28          4.00        23.99
```

1.17 Análise - Detecção de Outliers por Percentil (95%)

1.17.1 Resumo Geral:

- **Total de outliers:** 17,038 (3.7% do dataset)

- **Método:** Percentil 95% (2.5% cada extremo)
- **Efetividade:** Funcionando conforme esperado (~5% por variável)

1.17.2 Análise por Variável:

** Fator de Força - CONTINUA PROBLEMÁTICO **-** Outliers:** 3,800 (5.0%) - **Range extremo:** 68 a 16.6+ milhões - **Threshold superior:** 5.4 milhões - **Problema:** Ainda há valores absurdamente altos que podem ser erros

** Preços - Padrões Distintos**

Preço Regular: - **Outliers:** 3,793 (5.0%) - **Threshold:** \$8.49 - \$289.82 - **Máximo outlier:** \$3,986 - **Padrão:** Produtos muito baratos e muito caros

Preços Promocionais (Baixo Usuário e Líquido): - **Outliers:** ~1,900 cada (2.5%) - **Característica:** Apenas outliers superiores (produtos caros) - **Threshold mínimo:** \$0 (produtos gratuitos são normais)

** Ano de Lançamento - Revelação Interessante **-** Outliers:** 2,392 (3.1%) - **Range completo:** 1935-2017 (ambos extremos) - **Core business:** 1991-2014 - **Insight:** Produtos muito antigos E muito recentes são outliers

** Quantidade de Itens **-** Outliers:** 3,255 (4.3%) - **Core range:** 11-134 itens - **Produtos unitários:** 0 itens é outlier (suspeito)

1.17.3 Descobertas Importantes:

1. Produtos Unitários Problemáticos: - ItemCount = 0 é outlier inferior - Pode indicar erro de dados ou produtos especiais

2. Produtos Gratuitos são Normais: - Preços = \$0 estão dentro do threshold - Estratégia legítima da empresa

3. Portfolio Concentrado Temporalmente: - Core business: 23 anos (1991-2014) - Produtos legacy e muito novos são outliers

4. Estrutura de Preços Clara: - **Produtos básicos:** Até \$289 - **Produtos premium:** Acima de \$289 (outliers) - **Promoções extremas:** Acima de \$145-170

1.17.4 Comparação de Severidade:

Variável	% Outliers	Severidade	Ação Recomendada
Fator de Força	5.0%	Crítica	Investigar valores > 5M
Preço Regular	5.0%	Moderada	Segmentar premium/básico
Quantidade Itens	4.3%	Moderada	Investigar ItemCount = 0
Ano Lançamento	3.1%	Natural	Manter para análise temporal
Preços Promocionais	2.5%	Natural	Manter (produtos premium)

1.18 CLUSTERIZAÇÃO

Objetivo * Conhecer melhor os dados: identificar segmentos naturais e padrões de comportamento.

- Gerar novas features não supervisionadas para elevar as métricas da classificação (ex.: capturar "proximidade ao centro", "fronteira" e incerteza).

Por que isso ajuda? * A clusterização resume a geometria do dado (densidade, separação, forma dos grupos). Quando viramos isso em features, o modelo supervisionado ganha sinais adicionais que não estão explícitos nas variáveis originais.

1.19 Pré-processamento dos dados

- Gerar amostra aleatória para consumir menos recursos computacionais
- Imputa numéricos (mediana)
- Yeo-Johnson (robusto a zeros) + padronização embutida
- OneHot em categóricas

```
[9]: #====================================================================
     # PRÉ-PROCESSAMENTO DOS DADOS
     #====================================================================


     # Seed
     RANDOM_STATE = 2025


     # Parto de 'df' que você já carregou acima
     data = df.copy()


     # Guardar índice original para juntar depois
     data['__row_id'] = np.arange(len(data))


     # Selecionar colunas para clusterização (sem targets/IDs)
     num_cols =␣
      ↪['StrengthFactor','PriceReg','LowUserPrice','LowNetPrice','ItemCount','ReleaseNumber','Rele
     cat_cols = ['MarketingType']  # ('S'/'D')


     # inputar númericas e aplicar yeo-johnson
     num_pipe = Pipeline(steps=[
         ('imputer', SimpleImputer(strategy='median')), # imputar média
         ('yeojohnson', PowerTransformer(method='yeo-johnson', standardize=True)), #␣
      ↪Yeo-Johnson + padronização
     ])


     # inputar categorica e gerar dummie
     cat_pipe = Pipeline(steps=[
         ('imputer', SimpleImputer(strategy='most_frequent')), # imputar o mais␣
      ↪frequente
         ('onehot', OneHotEncoder(handle_unknown='ignore', sparse_output=False)), #␣
      ↪gerar dummie
```

```
])

# aplicar
pre = ColumnTransformer(
    transformers=[
        ('num', num_pipe, num_cols),
        ('cat', cat_pipe, cat_cols)
    ],
    remainder='drop'
)

# Ajustar e transformar o dataset (hist + ativo) para os clusters servirem em␣
 ↪ambos
X_all = pre.fit_transform(data)

# Guardar nomes de features pós-encoding (útil se quiser inspecionar)
ohe_cols = list(pre.named_transformers_['cat'].named_steps['onehot'].
 ↪get_feature_names_out(cat_cols))
feat_names = num_cols + ohe_cols
```

1.20 Redução de dimensionalidade com PCA

O que é PCA - Análise de Componentes Principais?

- O **PCA** reduz a dimensionalidade dos dados, o que costuma eliminar ruído e colinearidade, ajudando o K-Means a rodar de forma mais estável e eficiente.

Observação: Fazer essa análise em dados transformados pelo PCA pode levar a um `k` ligeiramente diferente daquele que você obteria nos dados originais, mas é uma prática comum para melhorar a qualidade dos clusters.

```
[11]:  # Redução de dimensionalidade com PCA
       pca = PCA(n_components=0.95, svd_solver='full', random_state=RANDOM_STATE)
       X_pca = pca.fit_transform(X_all)
```

1.21 K-MEANS

1.22 Escolha de k por Silhouette

1.22.1 Otimizando o K-Means: Escolhendo o Melhor Número de Clusters (k)

- O número de clusters (k) ideal será baseado no **coeficiente de silhouette**, uma métrica que avalia a qualidade da sua clusterização.

1.22.2 Entendendo o Coeficiente de Silhouette

Pense no coeficiente de silhouette como uma maneira de medir a "satisfação" de cada ponto de dados com seu cluster. A fórmula se resume a:

- **Coesão (a):** Quão perto o ponto está dos outros pontos *do seu próprio cluster.* Uma distância a pequena significa que o ponto está bem centralizado e o cluster é compacto.

- **Separação (b):** Qual a distância do ponto para o cluster *vizinho mais próximo*. Uma distância `b` grande significa que o cluster está bem separado dos outros.

O valor final do silhouette (`s`) varia de -1 a 1:

- **s perto de 1:** Significa que os clusters estão bem definidos, compactos e separados.
- **s perto de 0:** Indica que os clusters estão se sobrepondo ou não são bem distintos.
- **s negativo:** Sugere que o ponto pode estar no cluster errado.

1.22.3 Como o Código Funciona (Passo a Passo)

1. Executarei o algoritmo K-Means várias vezes, testando diferentes valores de `k` (de 2 a 12).

2. **Silhouette Médio**: Para cada valor de `k`, calcularei o coeficiente de silhouette médio para todos os pontos no seu conjunto de dados.

3. **Escolhendo o melhor `k`**: Então selecionarei o valor de `k` que resultou no maior coeficiente de silhouette médio, pois esse é o `k` que gerou a melhor clusterização.

Observação: Fazer essa análise em dados transformados pelo PCA pode levar a um `k` ligeiramente diferente daquele que você obteria nos dados originais, mas é uma prática comum para melhorar a qualidade dos clusters.

1.22.4 KMeans final com best_k + features

- vamos Treinar o KMeans com o best_k escolhido e gera os rótulos (km_labels).

- Usar kmeans.transform(X_pca) para obter a matriz de distâncias euclidianas de cada ponto a todos os centróides.

Extração:

- own_dist: distância do ponto ao seu centróide.

- second_dist: a 2ª menor distância entre o ponto e os centróides (i.e., centróide concorrente mais próximo).

- dist_ratio = own_dist / second_dist: quão "seguro" o ponto está no seu cluster (1 indica fronteira).

- Calcular km_cluster_sizes: o tamanho do cluster de cada ponto (útil como feature ou para diagnóstico).

1.22.5 Resultados dos testes com uma amostragem aleatória de 10% dos dados

k	Silhouette
2	0.1539
3	**0.1634**
4	0.1630
5	0.1543
6	0.1494
7	0.1538
8	0.1519

k	Silhouette
9	0.1378
10	0.1394
11	0.1387
12	0.1429

```
[12]:  #===========================================================================
       # Amostragem aleatória (25%) para acelerar métricas/plots
       #===========================================================================
       n_total = X_pca.shape[0]
       frac = 0.25                                        # amostragem de 25% do total
       sub_n = max(int(np.ceil(frac * n_total)), 1)
       rng = np.random.default_rng(RANDOM_STATE)          # troque por None para variar
        ↪a cada execução
       idx_sub = rng.choice(n_total, size=sub_n, replace=False)
       X_sub = X_pca[idx_sub]                             # AMOSTRA p/ gráficos e
        ↪(parte das) métricas


       #===========================================================================
       # KMeans (treinado no conjunto completo, não só na amostra)
       #===========================================================================
       from sklearn.cluster import KMeans
       kmeans = KMeans(
           n_clusters=3,              # k escolhido nos testes
           algorithm='elkan',         # acelera p/ distância euclidiana
           n_init=20,                 # mais estabilidade no modelo final
           random_state=RANDOM_STATE
       )
       km_labels = kmeans.fit_predict(X_pca)             # rótulos 0..k-1

       # Distâncias e razões (features de "confiança")
       all_dists   = kmeans.transform(X_pca)                                    #
        ↪(n_amostras, k)
       own_dist    = all_dists[np.arange(len(all_dists)), km_labels]        # dist.
        ↪ao centróide próprio
       second_dist = np.partition(all_dists, 1, axis=1)[:, 1]              # 2ª
        ↪menor distância
       dist_ratio  = own_dist / (second_dist + 1e-9)                       # ~1 =>
        ↪fronteira

       # Tamanho do cluster de cada ponto
       km_cluster_sizes = (
           pd.Series(km_labels)
             .map(pd.Series(km_labels).value_counts())
             .values
       )
```

```python
#==============================================================
# Métricas (com amostragem para baratear)
#==============================================================
SIL_SAMPLE = len(idx_sub)  # mesmo tamanho da amostra

sil = silhouette_score(
    X_pca, km_labels,        # calcula a média usando AMOSTRAGEM interna
    sample_size=SIL_SAMPLE,
    random_state=RANDOM_STATE
)
dbi     = davies_bouldin_score(X_pca, km_labels)     # ↓ melhor
ch      = calinski_harabasz_score(X_pca, km_labels)  # ↑ melhor
inertia = kmeans.inertia_                             # WCSS

print("Métricas (no espaço PCA):")
print(f" - Inertia (WCSS):          {inertia:,.2f}")
print(f" - Silhouette (amostra):    {sil:.4f}")
print(f" - Davies-Bouldin (↓ melhor): {dbi:.4f}")
print(f" - Calinski-Harabasz (↑ melhor): {ch:.2f}")


#==============================================================
# Plots LADO A LADO: PCA (scatter) + Silhouette (na MESMA amostra)
#==============================================================
# Prepara a amostra e as cores
X_sil  = X_sub
lab_sil = km_labels[idx_sub]
sil_values = silhouette_samples(X_sil, lab_sil)

cmap = mpl.cm.get_cmap('tab10', kmeans.n_clusters)

fig, (ax1, ax2) = plt.subplots(1, 2, figsize=(14, 6))

# ---- (Esq.) Scatter PCA: só a amostra, para ficar leve ----
ax1.scatter(
    X_sil[:, 0], X_sil[:, 1],
    c=lab_sil, cmap=cmap, vmin=0, vmax=kmeans.n_clusters-1,
    s=8, alpha=0.6, linewidths=0
)
# Centrós do KMeans (no espaço PCA)
ax1.scatter(
    kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:, 1],
    s=200, marker='X', edgecolor='k', linewidths=1.0,
    c=[cmap(i) for i in range(kmeans.n_clusters)]
)
ax1.set_title(f"KMeans em PCA (k={kmeans.n_clusters})")
ax1.set_xlabel("PCA 1")
```

```python
ax1.set_ylabel("PCA 2")

# ---- (Dir.) Silhouette por cluster (na mesma amostra) ----
y_lower = 10
for i in range(kmeans.n_clusters):
    vals_i = np.sort(sil_values[lab_sil == i])
    size_i = vals_i.size
    y_upper = y_lower + size_i
    ax2.fill_betweenx(
        np.arange(y_lower, y_upper), 0, vals_i,
        color=cmap(i), alpha=0.85
    )
    ax2.text(-0.05, y_lower + 0.5 * size_i, str(i))
    y_lower = y_upper + 10

ax2.axvline(x=sil_values.mean(), linestyle="--", linewidth=1)
ax2.set_title(f"Silhouette por cluster (amostra n={len(X_sil)})")
ax2.set_xlabel("Coeficiente de silhouette")
ax2.set_ylabel("Amostras")

plt.tight_layout()
plt.show()
```

Métricas (no espaço PCA):
 - Inertia (WCSS):   1,039,924.27
 - Silhouette (amostra):   0.1638
 - Davies-Bouldin (↓ melhor): 1.7844
 - Calinski-Harabasz (↑ melhor): 37736.29
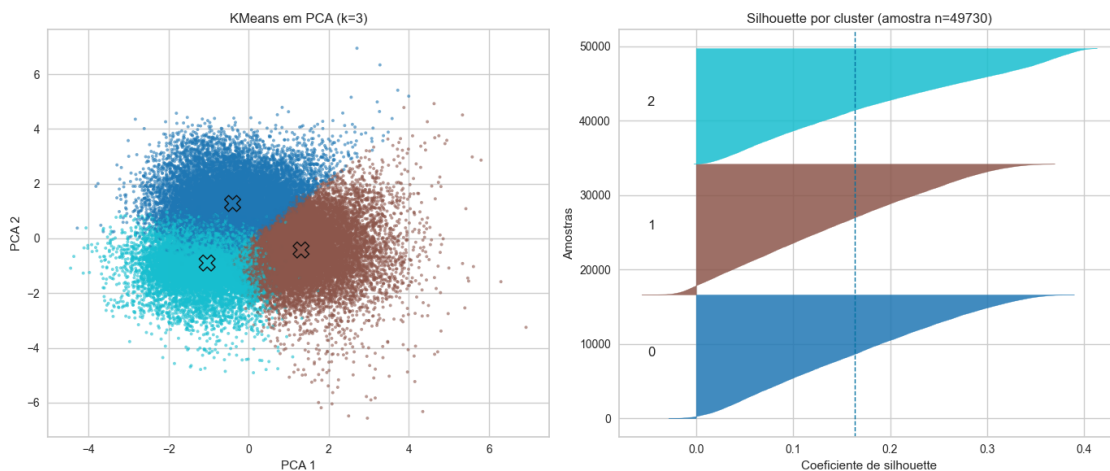
1.22.6 Resultados Kmens

O que os números dizem * Silhouette 0,17 (varia de −1 a 1): separação fraca. Há bastante sobreposição entre clusters e muitos pontos "na fronteira".

- Regra de bolso: >0,5 ótimo; 0,2–0,5 ok; <0,2 fraco.

- Davies–Bouldin 1,79 (↓ melhor): também indica sobreposição/moderada;

- valores >1 costumam sugerir clusters pouco separados.

- Calinski–Harabasz 37.7k (↑ melhor): isoladamente não diz muito.

- Inertia (WCSS): sempre cai quando k aumenta; serve para comparar partições do mesmo dataset.

1.22.7 Como ler os gráficos

Scatter PCA (k=3): cada cor é um cluster; os "X" são centróides. Os "nuvens" se invadem bastante, especialmente perto do limite entre o cluster claro e o escuro — coerente com o silhouette baixo.

- Gráfico de silhouette por cluster (amostra 15%):

- A linha tracejada é a média (~0,17).

- Cada "faixa" colorida mostra a distribuição de silhouette dentro do cluster.

- Há muitos valores perto de 0 e alguns negativos → pontos em fronteira / possíveis más alocações.

- Visualmente, um dos clusters parece um pouco mais coeso (faixa mais "à direita") e outro pior (muita massa perto de 0).

E agora? k=3 existe, mas é fraco. Se quiser mais separação:

Teste k=2 ou k=4 e compare (silhouette/DBI/CH).

Experimente GMM (covariância full) — lida melhor com formas elípticas e densidades diferentes; use gmm_max_prob e gmm_entropy para marcar casos ambíguos.

Gere flags como dist_ratio > 0.9 (fronteira) ou gmm_max_prob < 0.6 (incertos) para ajudar a classificação depois.

1.23 GMM

GMM — o que é e por que usar

Gaussian Mixture Models (GMM) modela os dados como uma mistura de distribuições normais. Ele aprende:

- pesos de cada componente (tamanho relativo do cluster),
- médias (centros),
- covariâncias (forma/rotação elíptica).

Diferente do K-Means (que é "hard" e supõe clusters esféricos), o GMM faz soft clustering via EM (Expectation–Maximization): retorna probabilidades (cluster).

- p(cluster x). Isso captura incerteza e lida melhor com clusters elípticos e desbalanceados. Você pode transformar isso em features úteis: gmm_cluster, gmm_prob_max (confiança) e gmm_entropy (incerteza).

[13]:
```python
# ==========================
# Treino do GMM + features
# ==========================
gmm = GaussianMixture(
    n_components=3,
    covariance_type='full',    # cada cluster tem covariância completa (elipses
 ↪com rotação)
    reg_covar=1e-6,            # regularização numérica
    random_state=RANDOM_STATE
)
gmm.fit(X_pca)

gmm_probs    = gmm.predict_proba(X_pca)      # p(cluster|x) para cada ponto
gmm_labels   = gmm_probs.argmax(axis=1)      # rótulo "duro"
gmm_max_prob = gmm_probs.max(axis=1)         # confiança
gmm_entropy  = -(gmm_probs * np.log(gmm_probs + 1e-12)).sum(axis=1)  # incerteza


# ==========================
# Métricas (amostrar para silhouette)
# ==========================
# Usa 10% (ou até 5000) para baratear silhouette (O(n^2))
SIL_N = min( max(int(np.ceil(0.10 * X_pca.shape[0])), 1000), 5000 )
rng = np.random.default_rng(RANDOM_STATE)
idx_sil = rng.choice(X_pca.shape[0], size=SIL_N, replace=False)

sil_mean = silhouette_score(X_pca, gmm_labels, sample_size=SIL_N,
 ↪random_state=RANDOM_STATE)
dbi      = davies_bouldin_score(X_pca, gmm_labels)      # ↓ melhor
ch       = calinski_harabasz_score(X_pca, gmm_labels)   # ↑ melhor
aic      = gmm.aic(X_pca)                                # ↓ melhor
bic      = gmm.bic(X_pca)                                # ↓ melhor

print("MÉTRICAS GMM (no espaço PCA)")
print(f" - Silhouette (amostra {SIL_N}): {sil_mean:.4f}")
print(f" - Davies-Bouldin (↓):        {dbi:.4f}")
print(f" - Calinski-Harabasz (↑):     {ch:,.2f}")
print(f" - AIC (↓):                   {aic:,.0f}")
print(f" - BIC (↓):                   {bic:,.0f}")
print(f" - Entropia média:            {gmm_entropy.mean():.4f}")
print(f" - % baixa confiança (max_prob<0.6): {(gmm_max_prob<0.6).mean()*100:.
 ↪1f}%")


# ==========================
```

```python
# Funções auxiliares de plot
# =========================
def _cov_to_ellipse_params(cov_2x2):
    """Retorna (width, height, angle_deg) para desenhar elipse a partir de
 ↪covariância 2x2."""
    vals, vecs = np.linalg.eigh(cov_2x2)  # autovalores ascendentes
    # Ordena do maior pro menor
    order = vals.argsort()[::-1]
    vals, vecs = vals[order], vecs[:, order]
    # width/height são 2*sqrt(lambda) (diâmetro de 1 desvio), angle é ângulo do
 ↪1º autovetor
    width, height = 2.0 * np.sqrt(np.maximum(vals, 1e-12))
    angle = np.degrees(np.arctan2(vecs[1,0], vecs[0,0]))
    return width, height, angle

def add_gmm_ellipses(ax, gmm, colors, n_std_list=(1.0, 2.0)):
    """
    Desenha elipses de covariância projetadas nas 2 primeiras PCs para cada
 ↪componente do GMM.
    n_std_list controla "quantos desvios" (ex.: 1 e 2).
    """
    for k, (mean, cov) in enumerate(zip(gmm.means_, gmm.covariances_)):
        mean2 = mean[:2]
        cov2  = cov[:2, :2] if cov.ndim == 2 else cov[k][:2, :2]
        w, h, ang = _cov_to_ellipse_params(cov2)
        for n_std in n_std_list:
            ell = Ellipse(
                xy=mean2, width=w*n_std, height=h*n_std, angle=ang,
                facecolor='none', edgecolor=colors[k], linestyle='--',
 ↪linewidth=1.2
            )
            ax.add_patch(ell)

# =========================
# Figure única com 4 painéis
# =========================
cmap = mpl.cm.get_cmap('tab10', gmm.n_components)
colors = [cmap(i) for i in range(gmm.n_components)]

fig, axes = plt.subplots(2, 2, figsize=(14, 10), constrained_layout=True)
(ax_scatter, ax_sil), (ax_hist, ax_bar) = axes

# ---- (1) Scatter PCA (apenas 2 primeiras PCs) + elipses ----
ax_scatter.scatter(
    X_pca[:, 0], X_pca[:, 1],
    c=gmm_labels, s=8, alpha=0.6, linewidths=0,
    cmap=cmap, vmin=0, vmax=gmm.n_components-1
```

```python
)
# Médias (marcador X)
ax_scatter.scatter(
    gmm.means_[:, 0], gmm.means_[:, 1],
    s=200, marker='X', edgecolor='k', linewidths=1.0, c=colors
)
# Elipses de 1  e 2
add_gmm_ellipses(ax_scatter, gmm, colors, n_std_list=(1.0, 2.0))

ax_scatter.set_title(f"GMM em PCA (k={gmm.n_components}) - Scatter + Elipses")
ax_scatter.set_xlabel("PCA 1"); ax_scatter.set_ylabel("PCA 2")

# ---- (2) Silhouette por cluster (na amostra) ----
X_sil  = X_pca[idx_sil]
lab_sil = gmm_labels[idx_sil]
sil_vals = silhouette_samples(X_sil, lab_sil)

y_lower = 10
for i in range(gmm.n_components):
    vals_i = np.sort(sil_vals[lab_sil == i])
    size_i = vals_i.size
    y_upper = y_lower + size_i
    ax_sil.fill_betweenx(np.arange(y_lower, y_upper), 0, vals_i,␣
  ↪color=colors[i], alpha=0.85)
    ax_sil.text(-0.05, y_lower + 0.5 * size_i, str(i))
    y_lower = y_upper + 10

ax_sil.axvline(x=sil_vals.mean(), linestyle="--", linewidth=1)
ax_sil.set_title(f"Silhouette por cluster (amostra n={len(X_sil)})")
ax_sil.set_xlabel("Coeficiente de silhouette"); ax_sil.set_ylabel("Amostras")

# ---- (3) Histograma da confiança (max prob) ----
ax_hist.hist(gmm_max_prob, bins=20, range=(0, 1))
ax_hist.axvline(0.6, linestyle='--')  # limiar sugestão
ax_hist.axvline(0.8, linestyle='--')
ax_hist.set_title("Distribuição da confiança (max p(cluster|x))")
ax_hist.set_xlabel("gmm_max_prob"); ax_hist.set_ylabel("Frequência")

# ---- (4) Tamanho de clusters ----
unique, counts = np.unique(gmm_labels, return_counts=True)
order = np.argsort(unique)
unique, counts = unique[order], counts[order]
bars = ax_bar.bar([str(u) for u in unique], counts, color=colors,␣
  ↪edgecolor='black', linewidth=0.6)
total = counts.sum()
for b, v in zip(bars, counts):
```

```
    ax_bar.text(b.get_x()+b.get_width()/2, v + max(total*0.01, v*0.02), f"{v:
↪,}\n({v/total*100:.1f}%)",
              ha='center', va='bottom', fontsize=10, fontweight='bold')
ax_bar.set_title("Tamanho dos clusters (GMM)")
ax_bar.set_xlabel("Cluster"); ax_bar.set_ylabel("Quantidade")

plt.show()
```

```
MÉTRICAS GMM (no espaço PCA)
 - Silhouette (amostra 5000): 0.0922
 - Davies-Bouldin (↓):        2.5026
 - Calinski-Harabasz (↑):     21,892.52
 - AIC (↓):                   3,570,334
 - BIC (↓):                   3,571,426
 - Entropia média:           0.3165
 - % baixa confiança (max_prob<0.6): 10.2%
```
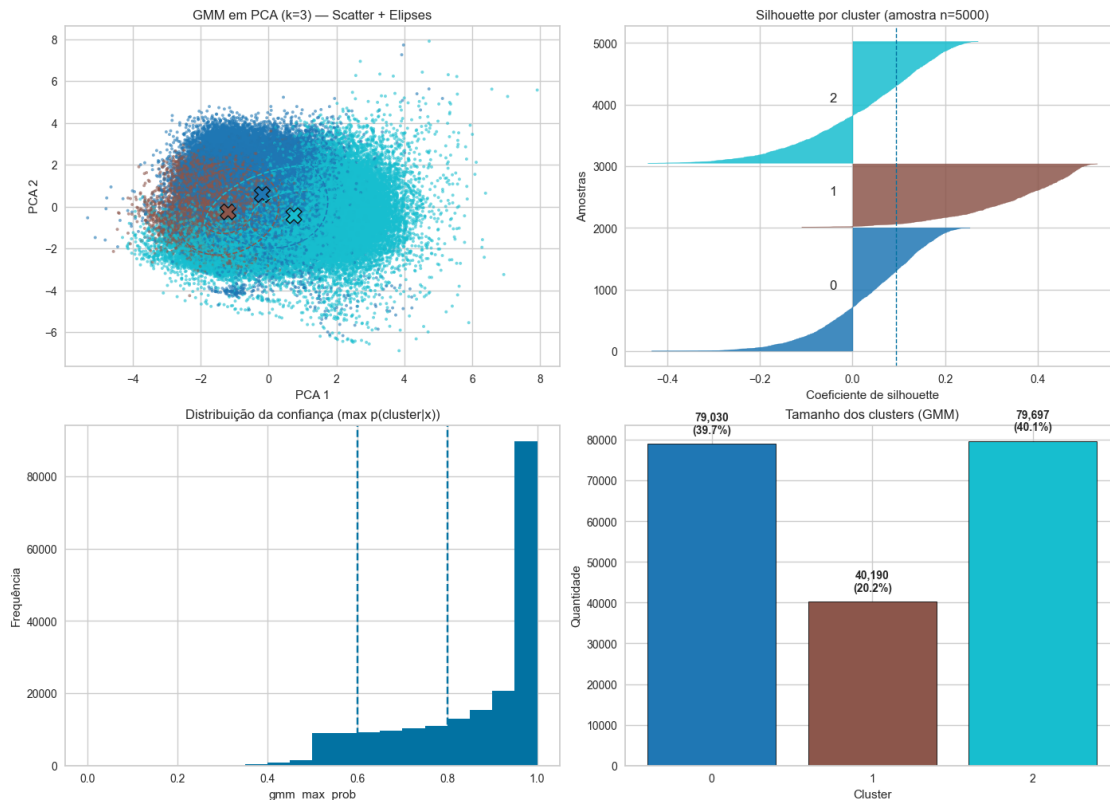

1.23.1 GMM (k = 3) — Resultados e interpretação

Métricas (no espaço PCA)

Métrica	Valor	Leitura rápida
Silhouette *(amostra n=5000)*	**0.0922**	Baixo → clusters se sobrepõem; métrica usa rótulo "duro".
Davies–Bouldin (↓)	**2.5026**	Alto → separação fraca/overlap entre grupos.
Calinski–Harabasz (↑)	**21,892.52**	Útil só para comparar partições; isolado não indica "bom/ruim".
AIC (↓)	**3,570,334**	Usar para comparar **k** dentro do GMM (quanto menor, melhor).
BIC (↓)	**3,571,426**	Idem AIC; BIC costuma penalizar mais a complexidade.
Entropia média	**0.3165**	Incerteza moderada (máx. teórico para k=3 é ln(3) 1.099 → ~29% do máximo).
% baixa confiança *(max_prob < 0.6)*	**10.2%**	Minoria dos pontos é realmente ambígua.

1.23.2 Como ler esses números

- Silhouette baixo e DBI alto indicam sobreposição das classes sob distância euclidiana — esperado em dados com clusters elípticos/densidades diferentes.

- Mesmo assim, o GMM retorna probabilidades: a entropia média relativamente baixa e apenas ~10% de pontos com baixa confiança sugerem que a maioria das atribuições é estável.

- AIC/BIC servem para escolher k no GMM: compare entre k (ex.: 2–6) e prefira o menor BIC; em caso de empate, olhe entropia média e % de baixa confiança.

1.23.3 Leitura dos gráficos (2×2)

- Scatter + elipses: mostra os centros e a forma/rotação das componentes (covariância full). As nuvens se invadem, mas a orientação elíptica faz sentido.

- Silhouette por cluster: muita massa perto de 0 e rabos negativos → fronteiras e itens intercambiáveis entre grupos.

- Histograma de gmm_max_prob: pico próximo de 1.0 → muitas atribuições confiantes; cauda < 0.6 → ambíguas.

- Tamanho dos clusters: distribuição ~40% / 20% / 40%; desbalanceio leve, aceitável.

1.23.4 O que fazer com isso (prático)

- Use as features do GMM na classificação:

- gmm_cluster (rótulo), gmm_max_prob (confiança), gmm_entropy (incerteza).

- Crie flags úteis, por exemplo:

- ambiguous = (gmm_max_prob < 0.6) para tratar fronteiras (pesos, regras de negócio, revisão).

1.24 KNN - MÉDIO

Densidade local (KNN médio) — o que é e por que usar

- Ideia: para cada ponto x, pegue as distâncias aos seus k vizinhos mais próximos (aqui, k=10).

A média dessas distâncias funciona como um proxy inverso de densidade:

- avg_dist_10nn baixo   região densa (muitos itens parecidos por perto).

- avg_dist_10nn alto   ponto isolado / fronteira / possível outlier.

Por que isso ajuda?

- Gera uma feature não supervisionada que captura estrutura local do espaço. Em classificação, costuma ajudar a diferenciar itens "comuns" de casos raros.

Quantos k devemos utilizar?

- Devenis usar um k compatível com o tamanho de amostra e, se o dataset for gigante, usar amostra para plots.

```python
[14]:  # ========================
       # Densidade KNN (k = 10)
       # ========================
       K = 10
       nn = NearestNeighbors(n_neighbors=K+1, metric='euclidean')  # +1 porque inclui
        ↪o próprio ponto
       nn.fit(X_pca)
       dists, _ = nn.kneighbors(X_pca)
       avg_dist_10nn = dists[:, 1:].mean(axis=1)   # ignora a 1ª coluna (dist=0 do
        ↪próprio ponto)


       # Feature útil (opcional): "densidade" propriamente dita
       knn_density = 1.0 / (avg_dist_10nn + 1e-9)


       # ========================
       #  Métricas simples (quantis + flags)
       # ========================
       q5, q25, q50, q75, q95 = np.percentile(avg_dist_10nn, [5, 25, 50, 75, 95])
       dense_mask  = avg_dist_10nn <= q5      # muito denso (top 5%)
       sparse_mask = avg_dist_10nn >= q95     # muito ralo/isolado (top 5%)

       print("DENSIDADE LOCAL (KNN MÉDIO)")
       print(f" - Médias/quantis de avg_dist_10nn:")
       print(f"   p05={q5:.4f} | p25={q25:.4f} | p50={q50:.4f} | p75={q75:.4f} |
        ↪p95={q95:.4f}")
       print(f" - % muito densos  (<= p05): {(dense_mask.mean()*100):.1f}%")
       print(f" - % muito ralos    (>= p95): {(sparse_mask.mean()*100):.1f}%")


       # ========================
       # Figure com 4 painéis
```

```python
# ==========================
rng = np.random.default_rng(RANDOM_STATE)
n_total = X_pca.shape[0]
N_PLOT = min(40000, n_total)                    # amostra para o scatter (evita
 ↪travar)
idx_plot = rng.choice(n_total, size=N_PLOT, replace=False)


cmap = mpl.cm.viridis

fig, axes = plt.subplots(2, 2, figsize=(14, 10), constrained_layout=True)
(ax_scatter, ax_hist), (ax_box, ax_bar) = axes

# ---- Scatter PCA colorido por densidade (na prática, por avg_dist_10nn
 ↪invertido) ----
sc = ax_scatter.scatter(
    X_pca[idx_plot, 0], X_pca[idx_plot, 1],
    c=avg_dist_10nn[idx_plot], s=6, alpha=0.7, linewidths=0, cmap=cmap
)
cb = plt.colorbar(sc, ax=ax_scatter)
cb.set_label('avg_dist_10nn  (↓ = mais denso)')
ax_scatter.set_title("PCA - cor = média da distância aos 10 vizinhos")
ax_scatter.set_xlabel("PCA 1"); ax_scatter.set_ylabel("PCA 2")

# ---- Histograma de avg_dist_10nn + linhas de quantis ----
ax_hist.hist(avg_dist_10nn, bins=40)
for val, lab in zip([q5, q25, q50, q75, q95], ['p05','p25','p50','p75','p95']):
    ax_hist.axvline(val, linestyle='--', linewidth=1)
    ax_hist.text(val, ax_hist.get_ylim()[1]*0.95, lab, rotation=90, va='top',
 ↪ha='right')
ax_hist.set_title("Distribuição de avg_dist_10nn")
ax_hist.set_xlabel("avg_dist_10nn"); ax_hist.set_ylabel("Frequência")

# ---- Boxplot por cluster (se km_labels ou gmm_labels existirem) ----
labels_source = None
if 'gmm_labels' in globals():
    labels = gmm_labels
    n_comp  = int(labels.max()) + 1
    labels_source = f"GMM (k={n_comp})"
elif 'km_labels' in globals():
    labels = km_labels
    n_comp  = int(labels.max()) + 1
    labels_source = f"KMeans (k={n_comp})"

if labels_source is not None:
    data_box = [avg_dist_10nn[labels == i] for i in range(n_comp)]
    ax_box.boxplot(data_box, labels=[str(i) for i in range(n_comp)],
 ↪showfliers=False)
```

```python
    ax_box.set_title(f"avg_dist_10nn por cluster - {labels_source}")
    ax_box.set_xlabel("Cluster"); ax_box.set_ylabel("avg_dist_10nn")
else:
    ax_box.axis('off')
    ax_box.text(0.5, 0.5, "Sem rótulos de cluster disponíveis", ha='center',
 ↪va='center')


# ---- Barras: % muito denso vs. muito ralo ----
vals = [dense_mask.mean()*100, sparse_mask.mean()*100]
bars = ax_bar.bar([' p05 (denso)', ' p95 (ralo)'], vals, color=['#2ca02c',
 ↪'#d62728'], edgecolor='black')
for b, v in zip(bars, vals):
    ax_bar.text(b.get_x()+b.get_width()/2, v + 0.5, f"{v:.1f}%", ha='center',
 ↪va='bottom', fontweight='bold')
ax_bar.set_ylim(0, max(vals)*1.3 if max(vals)>0 else 1)
ax_bar.set_title("Extremos de densidade (percentual de pontos)")
ax_bar.set_ylabel("% de amostras")

plt.show()
```

```
DENSIDADE LOCAL (KNN MÉDIO)
 - Médias/quantis de avg_dist_10nn:
   p05=0.2580 | p25=0.3963 | p50=0.4917 | p75=0.6104 | p95=0.9083
 - % muito densos  (<= p05): 5.0%
 - % muito ralos   (>= p95): 5.0%
```
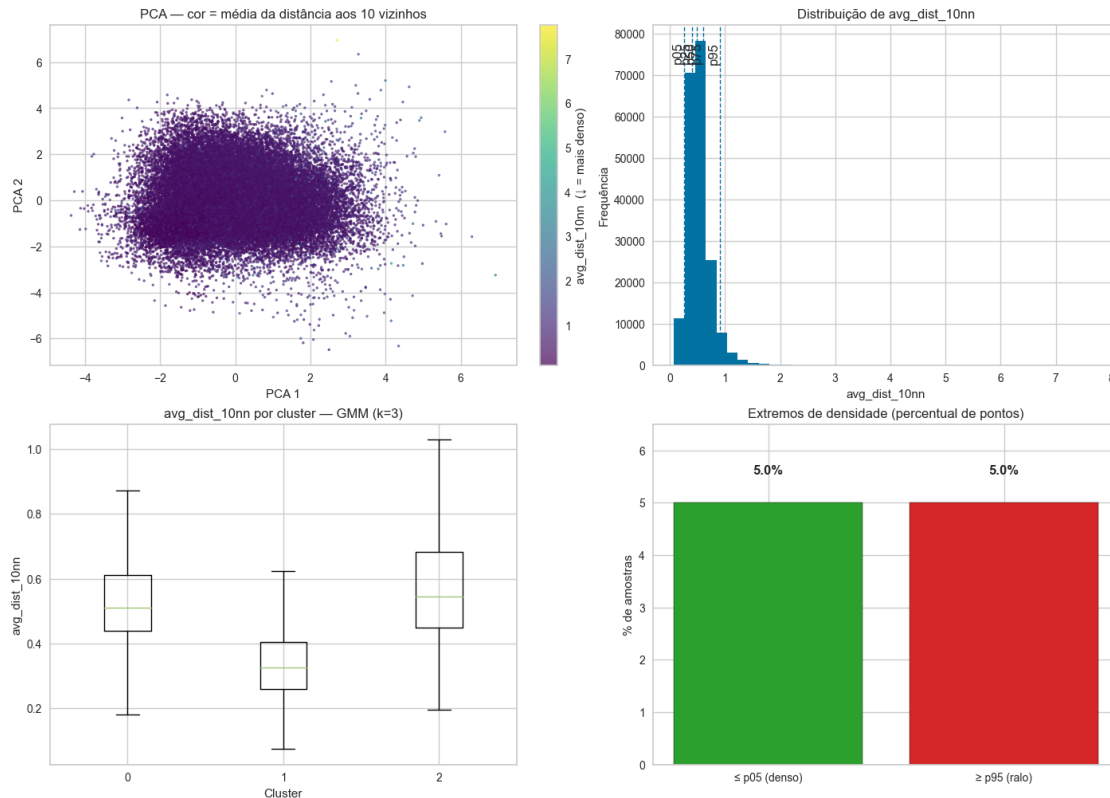
1.24.1 KNN (k = 10) — Resultados e interpretação

Quantis

- p05 = 0.258 → 5% mais densos (média de distâncias bem baixa).
- p50 = 0.492 → metade dos pontos tem densidade "normal" (mediana).
- p95 = 0.908 → 5% mais raros/isolados (distância média bem alta).

Extremos: exatamente 5% densos (p05) e 5% ralos (p95), como esperado dos cortes.

Como ler os plots

- Scatter (PCA, cor = avg_dist_10nn): regiões escuras = densas; pontos claros = isolados/fronteira.
- Histograma: distribuição assimétrica (cauda à direita). Bom usar quantis como limiar (p.ex. p95) em vez de média.
- Boxplot por cluster (GMM k=3): compare medianas e dispersões. Um cluster com mediana mais alta tende a ser mais espalhado (mais itens em borda).
- Barras dos extremos: quantifica o "tamanho" das pontas que você pode tratar diferente.

O que fazer (prático)

Use como features:

- avg_dist_10nn (ou log dele se quiser reduzir a cauda): np.log1p(avg_dist_10nn).

- knn_density = 1/(avg_dist_10nn+1e-9) (sinal direto de densidade).

- Flags: dense_flag = (avg_dist_10nn <= p05), sparse_flag = (avg_dist_10nn >= p95).

  Combine com o GMM:

- Alta densidade + alta confiança (max_prob 0.8) $\rightarrow$ casos "típicos".

- Baixa densidade + baixa confiança (max_prob<0.6) $\rightarrow$ fronteira/outliers (merecem peso menor, revisão ou regra).

1.25 FEATURES ENGINEERING

Agora que temos os labels, distâncias, probabilidades e densidade, podemos transformar isso em sinal útil pra classificação.

```
[15]:  #================================================================
       # Feature Engineering
       #================================================================

       # --- derivados do GMM ---
       best_k = 3
       second_max_prob = np.partition(gmm_probs, -2, axis=1)[:, -2]
       gmm_prob_margin = gmm_max_prob - second_max_prob              # folga da 1ª
        ↪para 2ª prob.
       gmm_entropy_norm = gmm_entropy / np.log(best_k)               # entropia
        ↪normalizada (0..1)

       # --- derivados de distância/densidade ---
       km_dist_own_log       = np.log1p(own_dist)
       knn_avg_dist_10_log   = np.log1p(avg_dist_10nn)
       km_cluster_size_log   = np.log1p(km_cluster_sizes)

       # limiares por quantil p/ flags (evita hardcode)
       q5  = np.quantile(avg_dist_10nn, 0.05)
       q95 = np.quantile(avg_dist_10nn, 0.95)

       ambiguous_flag = ((gmm_max_prob < 0.60) | (dist_ratio > 0.90)).astype(int)
       dense_flag     = (avg_dist_10nn <= q5).astype(int)
       sparse_flag    = (avg_dist_10nn >= q95).astype(int)

       # --- dataframe final de features (inclui suas originais) ---
       cluster_feats = pd.DataFrame({
           '__row_id': data['__row_id'],

           # KMeans
           'km_cluster': km_labels,
           'km_dist_own': own_dist,
           'km_dist_ratio': dist_ratio,
           'km_cluster_size': km_cluster_sizes,
```

```python
    'km_dist_own_log': km_dist_own_log,
    'km_cluster_size_log': km_cluster_size_log,

    # GMM
    'gmm_cluster': gmm_labels,
    'gmm_prob_max': gmm_max_prob,
    'gmm_prob_margin': gmm_prob_margin,
    'gmm_entropy': gmm_entropy,
    'gmm_entropy_norm': gmm_entropy_norm,

    # Densidade
    'knn_avg_dist_10': avg_dist_10nn,
    'knn_avg_dist_10_log': knn_avg_dist_10_log,
    'dense_flag': dense_flag,
    'sparse_flag': sparse_flag,

    # Flags de incerteza
    'ambiguous_flag': ambiguous_flag,

    # PCA para visual/apoio
    'pca1': X_pca[:, 0],
    'pca2': X_pca[:, 1],
})

# Garantir tipos categóricos (para o PyCaret tratar como dummies)
cluster_feats['km_cluster']  = cluster_feats['km_cluster'].astype('category')
cluster_feats['gmm_cluster'] = cluster_feats['gmm_cluster'].astype('category')
```

CLASSIFICAÇÃO
Será utilizando o Pycaret para classificação

- sales_data_hist: base de treino com SoldFlag e TODAS as novas features - sales_data_act: base ativa (sem SoldFlag) com as mesmas colunas de features

Modelagem Preditiva

O módulo de classificação tem como objetivo prever quais SKUs devem ser mantidos no inventário, ou seja, identificar os itens com maior probabilidade de permanecerem em estado ativo. Essa abordagem permite uma gestão mais eficiente do estoque, focando nos

produtos com

Vamos utilizar o Pycaret

O setup() do PyCaret é o ponto inicial para qualquer experimento de modelagem e possui diversos parâmetros que controlam pré-processamento, balanceamento de classes, tratamento de variáveis, seleção de features, engenharia de variáveis, entre outros.

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1. Parâmetros Principais

Parâmetro	Descrição
data	DataFrame contendo os dados.
target	Nome da variável target (coluna).
session_id	Fixa a aleatoriedade (reprodutibilidade).

2. Pré-processamento de Dados

Parâmetro	Descrição
normalize	Aplica normalização (Z-score, MinMax, etc.).

Parâmetro	Descrição
`normalize_method`	Método: `'zscore'`, `'minmax'`, `'maxabs'`, `'robust'`.
`transformation`	Aplica transformação (log, yeo-johnson etc.).
`transformation_method`	`'yeo-johnson'`, `'quantile'`, `'power'`, etc.
`remove_outliers`	Remove outliers com base em IQR.
`outliers_threshold`	Threshold para remoção de outliers.
`remove_multicollinearity`	Remove variáveis altamente correlacionadas.
`multicollinearity_threshold`	Correlação acima disso será removida.

3. Balanceamento de Classes

Parâmetro	Descrição
`fix_imbalance`	Ativa técnicas de balanceamento.
`fix_imbalance_method`	Substitui SMOTE por outro (ex: `ADASYN`, `SMOTENC`).

4. Seleção de Variáveis

Parâmetro	Descrição
`feature_selection`	Ativa seleção automática de variáveis.
`feature_selection_threshold`	Correlação com target mínima exigida.
`remove_low_variance`	Remove variáveis com baixa variância.
`ignore_features`	Lista de variáveis a serem ignoradas no modelo.
`custom_feature_selection`	Lista manual de variáveis que deseja manter.

5. Tratamento de Missing

Parâmetro	Descrição
`imputation_type`	`'simple'`, `'iterative'`.
`numeric_imputation`	`'mean'`, `'median'`, `'zero'`, etc.
`categorical_imputation`	`'mode'`, `'constant'`, `'drop'`.

6. Engenharia de Variáveis

Parâmetro	Descrição
`polynomial_features`	Gera variáveis polinomiais.
`polynomial_degree`	Grau dos polinômios (2, 3, etc).
`bin_numeric_features`	Discretiza variáveis numéricas.
`group_features`	Criar variáveis combinando outras.

Parâmetro	Descrição
`feature_interaction`	Gera interações entre features.
`feature_ratio`	Gera variáveis como razão entre duas outras.
`interaction_threshold`	Correlação mínima para gerar interações.

7. Codificação de Variáveis

Parâmetro	Descrição
`categorical_features`	Lista de colunas categóricas (força manual).
`ordinal_features`	Dicionário de ordenação para variáveis ordinais.
`high_cardinality_features`	Lista de variáveis com alta cardinalidade.
`high_cardinality_method`	`'frequency'`, `'clustering'`.
`one_hot_encode`	Força codificação one-hot.

8. Avançado / Outros

Parâmetro	Descrição
`html`	Renderiza saída com visualização HTML.
`n_jobs`	Número de threads paralelas.
`use_gpu`	Usa GPU se disponível.
`log_experiment`	Ativa logging (MLflow, etc).
`experiment_name`	Nome do experimento de logging.
`profile`	Ativa profiling de dados.

```python
[16]: #=====================================================================
      # Preparar base de dados para classificação
      #=====================================================================

      # clonar df
      base = data.copy() if 'data' in globals() else df.copy()

      # Garante um identificador por linha para fazer o merge
      if '__row_id' not in base.columns:
          base['__row_id'] = np.arange(len(base))

      # Confere se as features de cluster existem
      assert 'cluster_feats' in globals(), "cluster_feats não encontrado - rode a␣
       ↪célula de clusterização antes."

      # Enriquece a base com as novas features
      sales_enriched = base.merge(cluster_feats, on='__row_id', how='left')
```

```python
# Separa Histórico x Ativo
hist_mask = sales_enriched['File_Type'].eq('Historical')
act_mask  = sales_enriched['File_Type'].eq('Active')

# Remove colunas que não são features (ajuste conforme seu schema)
drop_cols = ['Order', 'File_Type', 'SKU_number', 'SoldCount']
sales_data_hist = sales_enriched.loc[hist_mask].drop(columns=drop_cols,
 ↪errors='ignore').copy()
sales_data_act  = sales_enriched.loc[act_mask].drop(columns=drop_cols,
 ↪errors='ignore').copy()

# Tipos categóricos úteis (se existirem)
for c in
 ↪['km_cluster','gmm_cluster','dense_flag','sparse_flag','ambiguous_flag',
          'MarketingType','New_Release_Flag']:
    if c in sales_data_hist.columns:
        sales_data_hist[c] = sales_data_hist[c].astype('category')
    if c in sales_data_act.columns:
        sales_data_act[c] = sales_data_act[c].astype('category')

# Sanidade rápida
print("hist:", sales_data_hist.shape, "act:", sales_data_act.shape)
print("SoldFlag (hist):")
print(sales_data_hist['SoldFlag'].value_counts(dropna=False).head())
```

```
hist: (75996, 29) act: (122921, 29)
SoldFlag (hist):
SoldFlag
0.0    63000
1.0    12996
Name: count, dtype: int64
```

[17]:
```python
#================================================================
# Configurar setup pycaret
#================================================================

# seed
RANDOM_STATE = 2025

# Definir colunas categóricas/numéricas com segurança (usa só as que existem)
maybe_cat = [
    'MarketingType','New_Release_Flag',
    'km_cluster','gmm_cluster',
    'dense_flag','sparse_flag','ambiguous_flag'
]
maybe_num = [
```

```python
   ␣
 ↪'StrengthFactor','PriceReg','ReleaseYear','ItemCount','LowUserPrice','LowNetPrice','Release
   ␣
 ↪'km_dist_own','km_dist_ratio','km_cluster_size','km_dist_own_log','km_cluster_size_log',
    'gmm_prob_max','gmm_prob_margin','gmm_entropy','gmm_entropy_norm',
    'knn_avg_dist_10','knn_avg_dist_10_log','pca1','pca2'
]

categorical_features = [c for c in maybe_cat if c in sales_data_hist.columns]
numeric_features     = [c for c in maybe_num if c in sales_data_hist.columns]

print("Categóricas usadas:", categorical_features)
print("Numéricas usadas:", numeric_features)

# Setup
clf_setup = setup(
    data=sales_data_hist,
    target='SoldFlag',

    # Configurações básicas
    session_id=RANDOM_STATE,
    train_size=0.8,

    # Tipos de variáveis
    categorical_features=categorical_features if categorical_features else None,
    numeric_features=numeric_features if numeric_features else None,

    # Normalização
    normalize=True,
    normalize_method='zscore',
    transformation=False,

    # Balanceamento
    # fix_imbalance=True,
    # fix_imbalance_method='SMOTE',

    # Seleção de features
    feature_selection=True,
    n_features_to_select=0.8,

    # Multicolinearidade
    remove_multicollinearity=True,
    multicollinearity_threshold=0.90,

    # Validação cruzada
    fold=5,
```

```
    # Configurações avançadas
    data_split_shuffle=True,
    data_split_stratify=True,
    memory=True,
    use_gpu=True,

    # Logging e visualização
    html=True,
    verbose=True,
    profile=False
)
```

Categóricas usadas: ['MarketingType', 'New_Release_Flag', 'km_cluster', 'gmm_cluster', 'dense_flag', 'sparse_flag', 'ambiguous_flag']
Numéricas usadas: ['StrengthFactor', 'PriceReg', 'ReleaseYear', 'ItemCount', 'LowUserPrice', 'LowNetPrice', 'ReleaseNumber', 'km_dist_own', 'km_dist_ratio', 'km_cluster_size', 'km_dist_own_log', 'km_cluster_size_log', 'gmm_prob_max', 'gmm_prob_margin', 'gmm_entropy', 'gmm_entropy_norm', 'knn_avg_dist_10', 'knn_avg_dist_10_log', 'pca1', 'pca2']
[LightGBM] [Warning] There are no meaningful features which satisfy the provided configuration. Decreasing Dataset parameters min_data_in_bin or min_data_in_leaf and re-constructing Dataset might resolve this warning.
[LightGBM] [Info] Number of positive: 1, number of negative: 1
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 0
[LightGBM] [Info] Number of data points in the train set: 2, number of used features: 0
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 16 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Warning] GPU acceleration is disabled because no non-trivial dense features can be found
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.500000 -> initscore=0.000000
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[LightGBM] [Info] Number of positive: 10397, number of negative: 50399
[LightGBM] [Info] Auto-choosing row-wise multi-threading, the overhead of
testing was 0.001771 seconds.
You can set `force_row_wise=true` to remove the overhead.
And if memory is not enough, you can set `force_col_wise=true`.
[LightGBM] [Info] Total Bins 3467
[LightGBM] [Info] Number of data points in the train set: 60796, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171015 -> initscore=-1.578454
[LightGBM] [Info] Start training from score -1.578454

<pandas.io.formats.style.Styler at 0x2000512c580>
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[LightGBM] [Warning] There are no meaningful features which satisfy the provided configuration. Decreasing Dataset parameters min_data_in_bin or min_data_in_leaf and re-constructing Dataset might resolve this warning.
[LightGBM] [Info] Number of positive: 1, number of negative: 1
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 0
[LightGBM] [Info] Number of data points in the train set: 2, number of used features: 0
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 16 bins…
[LightGBM] [Info] GPU programs have been built
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[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
```

1.25.1 Resumo da Explicação de Métricas de classificação

Métrica	Significado
Accuracy	Proporção de previsões corretas (positivas e negativas) em relação ao total. Útil quando há classes balanceadas.
AUC	Área sob a curva ROC (Receiver Operating Characteristic). Mede a capacidade do modelo de distinguir entre classes. Quanto mais próximo de 1, melhor.
Recall	Também chamado de **sensibilidade**. Mede a proporção de positivos reais que foram corretamente identificados. **Foco: não perder positivos.**
Precision	Mede a proporção de positivos previstos que são realmente positivos. **Foco: não cometer falsos positivos.**
F1-Score	Média harmônica entre *Precision* e *Recall*. É útil quando há desequilíbrio entre as classes, pois equilibra os dois aspectos.
Kappa	Estatística de **Cohen's Kappa**. Mede o grau de concordância entre as previsões do modelo e os valores reais, ajustado ao acaso.
MCC	**Matriz de Correlação de Matthews**. Uma métrica robusta que leva em conta TP, TN, FP e FN. Funciona bem com classes desbalanceadas.
TT (Sec)	**Tempo de Treinamento** (Training Time). Tempo em segundos que o modelo levou para treinar.

```
[18]: #==============================================================================
      # Rodar Classificação
      #==============================================================================
      # Rodar e salvar tabela (leaderboard)
      models = compare_models(sort='AUC',
                              n_select=14,
                              turbo=True # turbo=False = testa mais modelos
                              )

      # Salvar a tabela
      lb_f1 = pull()

      # salvar
      SAVE_DIR.mkdir(parents=True, exist_ok=True)
      lb_f1.to_csv(SAVE_DIR / "leaderboard_F1.csv", index=False)
```

```
<IPython.core.display.HTML object>

<pandas.io.formats.style.Styler at 0x2000720f520>

<IPython.core.display.HTML object>
```

1.25.2 Análise dos principais Resultados

1. LightGBM

- Maior Accuracy, AUC e maior Precisão, porém Recall muito baixo.

Interpretação: ótimo para evitar falsos positivos (predizer que vende quando não vende), mas perde muitas oportunidades reais de venda. Bom para cenários onde é crítico não errar ao prever uma venda.

2. Logistic Regression

- Força: F1 Alto, ideal para não perder oportunidades de venda.

Fraqueza: Baixa precisão, ou seja, prevê muitas vendas que não acontecerão (estoque desnecessário).

3. AdaBoost

- Força: Equilíbrio entre recall e precisão (Kappa), com desempenho estável e F1 competitivo.

Fraqueza: Não é o melhor em nenhuma métrica isolada, mas é consistente.

4. QDA

- Força: Melhor recall (73%) — captura praticamente todas as vendas reais.

Fraqueza: Muito baixa precisão (25%), gerando alto número de falsos positivos e menor acurácia geral.

1.25.3 Salvar modelos Treinados

```python
[20]:   # consultar os modelos treinados
        for model in models:
            print(f"Nome do modelo: {model.__class__.__name__}")

        # gerar top 3 manualmente
        top_4_nomes = ['LGBMClassifier', 'LogisticRegression', 'AdaBoostClassifier',
         ↪'QuadraticDiscriminantAnalysis']
        modelos_para_salvar = []

        for modelo in models:
            nome_modelo_atual = modelo.__class__.__name__
            if nome_modelo_atual in top_4_nomes:
                modelos_para_salvar.append(modelo)
                print(f"Encontrado e adicionado para salvar: {nome_modelo_atual}")

        # Agora, vamos salvar os modelos encontrados
        if modelos_para_salvar:
```

```python
    for modelo in modelos_para_salvar:
        nome_modelo = modelo.__class__.__name__
        save_model(modelo, str(SAVE_DIR / nome_modelo))
        print(f"Modelo salvo: {nome_modelo}.pkl")
else:
    print("Nenhum dos modelos desejados foi encontrado na lista.")
```

```
Nome do modelo: LGBMClassifier
Nome do modelo: GradientBoostingClassifier
Nome do modelo: AdaBoostClassifier
Nome do modelo: RandomForestClassifier
Nome do modelo: LogisticRegression
Nome do modelo: RidgeClassifier
Nome do modelo: LinearDiscriminantAnalysis
Nome do modelo: ExtraTreesClassifier
Nome do modelo: QuadraticDiscriminantAnalysis
Nome do modelo: GaussianNB
Nome do modelo: SGDClassifier
Nome do modelo: KNeighborsClassifier
Nome do modelo: DecisionTreeClassifier
Nome do modelo: DummyClassifier
Encontrado e adicionado para salvar: LGBMClassifier
Encontrado e adicionado para salvar: AdaBoostClassifier
Encontrado e adicionado para salvar: LogisticRegression
Encontrado e adicionado para salvar: QuadraticDiscriminantAnalysis
Transformation Pipeline and Model Successfully Saved
Modelo salvo: LGBMClassifier.pkl
Transformation Pipeline and Model Successfully Saved
Modelo salvo: AdaBoostClassifier.pkl
Transformation Pipeline and Model Successfully Saved
Modelo salvo: LogisticRegression.pkl
Transformation Pipeline and Model Successfully Saved
Modelo salvo: QuadraticDiscriminantAnalysis.pkl
```

1.25.4 Importar modelos treinados

```python
[21]: # Carregue cada modelo usando o nome do arquivo que você definiu
try:
    lgbm_model = load_model(str(SAVE_DIR / 'LGBMClassifier'))
    lr_model = load_model(str(SAVE_DIR / 'LogisticRegression'))
    Ada_model = load_model(str(SAVE_DIR / 'AdaBoostClassifier'))
    qda_model = load_model(str(SAVE_DIR / 'QuadraticDiscriminantAnalysis'))

    print("Modelos carregados com sucesso!")

except Exception as e:
    print(f"Erro ao carregar os modelos: {e}")
```

```
Transformation Pipeline and Model Successfully Loaded
Transformation Pipeline and Model Successfully Loaded
Transformation Pipeline and Model Successfully Loaded
Transformation Pipeline and Model Successfully Loaded
Modelos carregados com sucesso!
```

[22]:
```python
# Agora, iteramos APENAS sobre os modelos escolhidos para avaliação
for m in modelos_para_salvar:
    print(f"Avaliando o modelo: {m.__class__.__name__}")
    evaluate_model(m)
```

Avaliando o modelo: LGBMClassifier

interactive(children=(ToggleButtons(description='Plot Type:', icons=('',),␣
↪options=(('Pipeline Plot', 'pipelin…

Avaliando o modelo: AdaBoostClassifier

interactive(children=(ToggleButtons(description='Plot Type:', icons=('',),␣
↪options=(('Pipeline Plot', 'pipelin…

Avaliando o modelo: LogisticRegression

interactive(children=(ToggleButtons(description='Plot Type:', icons=('',),␣
↪options=(('Pipeline Plot', 'pipelin…

Avaliando o modelo: QuadraticDiscriminantAnalysis

interactive(children=(ToggleButtons(description='Plot Type:', icons=('',),␣
↪options=(('Pipeline Plot', 'pipelin…

1.25.5 Resultados

Escolhi manualmente 4 modelos baseado em suas métricas: - lightgbm: apresenta os melhores Accuracy, AUC e Precisão - Logistic Regression: apresenta o melhor F1 - Ada Boost: apresenta o melhor Kappa - QDA: apresenta o melhor Recall

Como otimizar os modelos? não existe uma única resposta, a abordagem dependerá do problema de negócio - Se o custo de não detectar um evento positivo (FN) for alto, devemos otimizar o Recall ou F1. - Se o custo de classificar algo incorretamente como positivo (FP) for alto, devemos otimizar a Precisão. - Se precisamos de um modelo com uma boa capacidade geral de distinção, devemos otimizar o AUC.

TUNAR MODELOS

LGBM : Accuracy e AUC altos, precisão boa (0.55), mas recall muito baixo (0.21) → está errando a maioria dos positivos (muitos FNs). * Ação: Tunar 'F1' para mais equilíbrio, pois vai melhorar recall sem derrubar demais a precisão.

Logistic Regression : Recall alto (0.68), mas precisão baixa (0.32) → encontra muitos positivos, mas com muitos FPs. * Ação: Tunar com optimize='F1' para melhorar a precisão sem perder muito recall, reduzindo falsos positivos.

AdaBoost : Recall (0.43) e precisão (0.40) equilibrados, mas ambos medianos. * Ação: Tunar com optimize='F1' para ganhar performance geral, já que esse modelo está no "meio-termo" e pode ser melhorado dos dois lados.

QDA : Recall muito alto (0.73), mas precisão muito baixa (0.25) → acerta quase todos os positivos, mas erra demais (muitos FPs). * Ação: Tunar com optimize='Precision' se o foco for cortar falsos positivos, ou optimize='F1' se quiser equilibrar e manter recall alto.

1.25.6 Tunar Modelos

```python
[25]: # tunar lgbm
tuned_lgbm = tune_model(
    lgbm_model,
    optimize='F1',
    n_iter=50,
    choose_better=True
)

# avaliar modelos
evaluate_model(lgbm_model)
evaluate_model(tuned_lgbm)

# Salvar o modelo tunado
save_model(tuned_lgbm, str(SAVE_DIR / "LGBMClassifier_tuned"))
```

```
<IPython.core.display.HTML object>

<pandas.io.formats.style.Styler at 0x20007263070>

<IPython.core.display.HTML object>

Fitting 5 folds for each of 50 candidates, totalling 250 fits
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002242 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
```

Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.002712 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002057 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used

features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.003017 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.003044 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in

0.003203 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing row-wise multi-threading, the overhead of
testing was 0.001585 seconds.
You can set `force_row_wise=true` to remove the overhead.
And if memory is not enough, you can set `force_col_wise=true`.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.003058 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.

Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002889 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002867 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.001962 seconds.
You can set `force_col_wise=true` to remove the overhead.

```
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.002699 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001998 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002035 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002216 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002166 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002087 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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0.002331 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002091 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002048 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002014 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002082 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002443 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002016 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002339 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002017 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002322 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002433 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002104 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002000 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002493 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002034 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.

Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing row-wise multi-threading, the overhead of testing was 0.001178 seconds.
You can set `force_row_wise=true` to remove the overhead.
And if memory is not enough, you can set `force_col_wise=true`.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002754 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002497 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002090 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002232 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in

0.002280 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002603 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002465 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002132 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002401 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002778 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002857 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002099 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002132 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002801 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002352 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002181 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002382 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002031 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002263 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in

0.002451 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002277 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.002834 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002234 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002287 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002075 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002542 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002168 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002086 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002048 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001976 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002287 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002099 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002446 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002074 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003437 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002130 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002439 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002110 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001965 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002475 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002116 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002219 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002485 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002551 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.001983 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002207 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002425 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002172 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002645 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002003 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002070 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002473 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002377 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002314 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002212 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002081 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002603 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002269 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002392 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002394 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002460 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002111 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002512 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing row-wise multi-threading, the overhead of testing was 0.001157 seconds.
You can set `force_row_wise=true` to remove the overhead.
And if memory is not enough, you can set `force_col_wise=true`.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002812 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002417 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002063 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002023 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002150 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002175 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002461 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002251 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002291 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002417 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002557 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002516 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002049 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002106 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002705 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002238 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002489 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002378 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002398 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002068 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002753 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002271 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
```

features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.002638 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002276 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001999 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002009 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001919 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002078 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002056 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001978 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001912 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002259 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002345 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002068 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in

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0.002154 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002025 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002241 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002291 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002084 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001955 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002065 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002433 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001959 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002148 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001970 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001917 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002048 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002259 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

0.001932 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001911 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001913 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002045 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001944 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001905 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002022 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001975 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002112 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002279 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001986 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in

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0.002509 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001999 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002056 secs. 1 sparse feature groups
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0.002572 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002044 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002026 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001898 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002319 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002176 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001974 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001864 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

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0.002216 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.001984 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001966 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001933 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002309 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001988 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002127 secs. 1 sparse feature groups
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0.002318 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001963 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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0.001921 secs. 1 sparse feature groups
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0.002230 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001882 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001973 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.002209 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002050 secs. 1 sparse feature groups
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0.001986 secs. 1 sparse feature groups
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0.002073 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.001981 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002265 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002004 secs. 1 sparse feature groups
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0.001943 secs. 1 sparse feature groups
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0.002140 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002224 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in

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0.002085 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.001883 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002224 secs. 1 sparse feature groups
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0.001982 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001979 secs. 1 sparse feature groups
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0.002171 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002106 secs. 1 sparse feature groups
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0.002242 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002153 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
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0.001911 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002332 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002272 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

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0.001932 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001934 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002206 secs. 1 sparse feature groups
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0.002264 secs. 1 sparse feature groups
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0.001901 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001966 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002235 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001973 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002059 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003188 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

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0.002232 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002034 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001911 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002248 secs. 1 sparse feature groups
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0.002170 secs. 1 sparse feature groups
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0.001982 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001972 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002273 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001905 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001957 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002016 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002031 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001980 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001951 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002354 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001997 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

0.001988 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002204 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002023 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001906 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002278 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002241 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…

```
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002431 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002402 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002087 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002028 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001905 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002108 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001994 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002019 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002116 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001990 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002054 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002112 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002449 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002056 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002031 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002117 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002496 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002053 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001944 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002352 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002098 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001961 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002035 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002235 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002033 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001953 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002108 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001989 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002008 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002067 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002109 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002132 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002182 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001990 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002222 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002404 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001980 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002011 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002444 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002104 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001951 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002076 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002171 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002131 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001961 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001929 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002427 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001959 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002141 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002292 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002039 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002056 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002065 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002275 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002053 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002024 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002329 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001944 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002058 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002351 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001938 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002004 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001990 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002007 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001999 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001940 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002131 secs. 1 sparse feature groups
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0.002033 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002277 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001994 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002353 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002129 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002005 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002334 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002242 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002086 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002054 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002189 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002102 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002048 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002064 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002335 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002126 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001917 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001995 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002079 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002288 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002132 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002037 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002048 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002038 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002174 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002112 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002208 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001927 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002045 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.79 MB) transferred to GPU in
0.002045 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002109 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001963 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002063 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001982 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001951 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002024 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002282 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002037 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002057 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001933 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002156 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002108 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001902 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002232 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001927 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002056 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002258 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002066 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001979 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002178 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001909 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002012 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002061 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002215 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002327 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002074 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002079 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002292 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002129 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001905 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002312 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002039 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001911 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002126 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002135 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001975 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002013 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001980 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002032 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002199 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005565 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002441 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002269 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002420 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.002841 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002309 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001946 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001958 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001936 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002012 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001916 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001942 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002163 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001935 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001946 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002309 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002070 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002150 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001923 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002275 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001998 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002147 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002002 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002320 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001869 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002028 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002420 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001943 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002106 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001932 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002131 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001963 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002076 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002117 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001981 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001959 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.002359 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001984 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002055 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002170 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002331 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002083 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001833 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002336 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001927 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002202 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002190 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001915 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002106 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001904 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
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0.001847 secs. 1 sparse feature groups
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0.002072 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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0.002400 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002033 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002014 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002237 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002188 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002086 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.001910 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002194 secs. 1 sparse feature groups
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0.001921 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001961 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002043 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001946 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001950 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002118 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002115 secs. 1 sparse feature groups
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0.001904 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002077 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001905 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002135 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001903 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001964 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002161 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001920 secs. 1 sparse feature groups
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0.002132 secs. 1 sparse feature groups
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0.002158 secs. 1 sparse feature groups
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0.002004 secs. 1 sparse feature groups
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0.001939 secs. 1 sparse feature groups
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0.002139 secs. 1 sparse feature groups
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0.002403 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002013 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001970 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002096 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002095 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001861 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002061 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002124 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001970 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002096 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002195 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002016 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001870 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002032 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002032 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001859 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002234 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002564 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002046 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001951 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002025 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002111 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001892 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001981 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001911 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001884 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002218 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002033 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002174 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002002 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001990 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001946 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001959 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002188 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002047 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.001924 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.001889 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.001880 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002846 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in

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0.002021 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002120 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002056 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001967 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002041 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002081 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002213 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002058 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002290 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002249 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002117 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002132 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002050 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002135 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001981 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

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0.001925 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002058 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002056 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001990 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001954 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002367 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001916 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002176 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002099 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002036 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002043 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002245 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001970 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002080 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002150 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

0.002096 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002037 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002200 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002303 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001990 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002054 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002237 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001858 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002158 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002418 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002108 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002090 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002249 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001976 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001978 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in

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0.001875 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002118 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001933 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002281 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002299 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002007 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002011 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002095 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001963 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002128 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002120 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002211 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001961 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002373 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002308 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002133 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

```
0.001986 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001919 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001928 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002214 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002345 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002276 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002105 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002372 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002294 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001898 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001989 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002142 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002116 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002023 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002260 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002167 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
```

```
0.001930 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001955 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001995 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002150 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001989 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002200 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002090 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002061 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002101 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002127 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002279 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001927 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002077 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002283 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002093 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002068 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

```
0.002231 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002195 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001905 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002212 secs. 1 sparse feature groups
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0.002471 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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0.002105 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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0.002037 secs. 1 sparse feature groups
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0.002135 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in

0.002084 secs. 1 sparse feature groups
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0.002121 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002118 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002225 secs. 1 sparse feature groups
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0.002027 secs. 1 sparse feature groups
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0.002032 secs. 1 sparse feature groups
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0.002104 secs. 1 sparse feature groups
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0.002084 secs. 1 sparse feature groups
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0.002190 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.001940 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002008 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in

0.002059 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002083 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002958 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.001963 secs. 0 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002027 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002014 secs. 0 sparse feature groups
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0.002162 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002026 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002160 secs. 0 sparse feature groups
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0.002380 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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0.002190 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002141 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002458 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002462 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002008 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002281 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002438 secs. 0 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002062 secs. 0 sparse feature groups
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0.002057 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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0.002046 secs. 0 sparse feature groups
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0.001948 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002024 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002188 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002208 secs. 0 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002080 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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0.001950 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002233 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001964 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002035 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002137 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002142 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001912 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002128 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002079 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002031 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002392 secs. 0 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002000 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002244 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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0.001976 secs. 0 sparse feature groups
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0.002423 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002032 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002050 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002175 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002070 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001959 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002097 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002304 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002108 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001936 secs. 0 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002415 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001902 secs. 0 sparse feature groups
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0.001994 secs. 0 sparse feature groups
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0.002385 secs. 0 sparse feature groups
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0.001979 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.001991 secs. 0 sparse feature groups
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0.002181 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002041 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001927 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002164 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002387 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002051 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002018 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001964 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001970 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002049 secs. 0 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002174 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001994 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.79 MB) transferred to GPU in
0.001984 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002194 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001947 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002048 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001945 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001971 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001961 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002389 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002080 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001988 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002233 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002354 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002093 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001988 secs. 0 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002248 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001980 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002196 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002323 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001985 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001961 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002355 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001974 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002031 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002192 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002161 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002112 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001931 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002221 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001996 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002039 secs. 0 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001945 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001934 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002019 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002300 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002020 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001992 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002490 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002019 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001914 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002439 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002158 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001927 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002023 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002052 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001972 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
```

Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002256 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.002646 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002062 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002038 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002357 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001991 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002231 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002135 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002105 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002391 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002092 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002197 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002260 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002239 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002055 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002074 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002061 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002393 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002076 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002045 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002330 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002095 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002170 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002073 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002292 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002136 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001966 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002105 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002405 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002407 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002002 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002129 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002129 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002344 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002269 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002011 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001980 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002101 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001984 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002011 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002063 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002355 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002170 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002181 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002258 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001991 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002136 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001981 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002242 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002135 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002822 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002630 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002433 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002161 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002025 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002350 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001984 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002221 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001956 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002501 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002273 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319

```
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002653 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002573 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002069 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002343 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002116 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002451 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002744 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002168 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002095 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002342 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003214 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002506 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

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0.002162 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002305 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002360 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002196 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002091 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002518 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002072 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002182 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003296 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002786 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002853 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002131 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002047 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002400 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002414 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002167 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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0.002294 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002194 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002377 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002236 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002114 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002359 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003079 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002543 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002343 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002358 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002578 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002798 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003675 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002399 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002843 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002520 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in

0.002304 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002458 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002374 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.001989 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002501 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002117 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002343 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002735 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002579 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002728 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002271 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002233 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002268 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002158 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.

Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002397 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.002523 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002160 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001984 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002189 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002246 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002054 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002008 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002022 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002357 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002049 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001982 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001939 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002251 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002060 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002082 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002004 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002282 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002171 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002034 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002113 secs. 1 sparse feature groups
```

[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002114 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002073 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002291 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002098 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002082 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002388 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002442 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002029 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002015 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002358 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002148 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002121 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002098 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002242 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002235 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001982 secs. 1 sparse feature groups

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002033 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002030 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002331 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001968 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001993 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001986 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002095 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002085 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002004 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002663 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002056 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001977 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002119 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002033 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002044 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002106 secs. 1 sparse feature groups
```

[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002267 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.001988 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002205 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002367 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002086 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002057 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002259 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448

[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002849 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002520 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.001996 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002091 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002345 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002397 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002512 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002013 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.001984 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002480 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002369 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002485 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002396 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002160 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002128 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002345 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002871 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002016 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.001993 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002354 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002876 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002761 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002033 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002230 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002558 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002017 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.001983 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002295 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002313 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002662 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002035 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002010 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002459 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002385 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002644 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002660 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002432 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002363 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002545 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002603 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002717 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002556 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002084 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002196 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002914 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002423 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002068 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.001983 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002376 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002047 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002225 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002526 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002481 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002487 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002300 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002243 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002301 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.001971 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320

[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002692 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002803 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002653 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002834 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002424 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002563 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in

0.002099 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002835 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002255 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002166 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002560 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002648 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002693 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002170 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002437 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002863 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002367 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002708 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002961 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002396 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002558 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002789 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in

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0.002677 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002752 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002227 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002503 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002473 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002184 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002156 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002214 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002474 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002599 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002077 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002086 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002401 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002525 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002699 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002566 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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0.002590 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003288 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002698 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002817 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002759 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002824 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002525 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002279 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002634 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003021 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002323 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002180 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002655 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002273 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002129 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002484 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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0.002667 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002571 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002328 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002249 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002304 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002990 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002256 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22

[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.002771 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002403 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002791 secs. 1 sparse feature groups

[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002323 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.002743 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.

Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.001970 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002902 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002097 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used

features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002611 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002392 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8

[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.002803 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.003004 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.

Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002797 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002073 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA

Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.002943 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002115 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002721 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401

[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002010 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002923 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1

[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002068 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.002674 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002006 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001970 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001847 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001881 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001776 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002052 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001932 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002028 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001765 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001835 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001986 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002099 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001890 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001911 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002047 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001861 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001861 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001921 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001809 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001766 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001872 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002214 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002085 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001956 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001920 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001993 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002120 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001932 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002065 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001930 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001967 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002597 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002136 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002082 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002100 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002303 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002372 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002131 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002295 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002076 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002212 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002426 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002258 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002120 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002442 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002203 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002121 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002720 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be

ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.003377 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002295 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002101 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002368 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002710 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002729 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002348 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002276 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in

```
0.002321 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002370 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002345 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002294 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002305 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002071 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002418 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002167 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002280 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002398 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002289 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002659 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002544 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002146 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002300 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002650 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
```

0.002214 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002484 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002288 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002261 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002437 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002421 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002306 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002495 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002226 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002730 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002372 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002149 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002641 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002466 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002321 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002564 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in

0.002232 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002491 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002737 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002336 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002436 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002884 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002289 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002723 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002066 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.

Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.003240 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002234 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.002395 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002084 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002237 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002274 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002197 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.002452 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002588 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002125 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002409 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.002179 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002138 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002315 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002289 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002193 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002208 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002411 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002188 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.003016 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002169 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002724 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002186 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002453 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002151 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002648 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002321 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002216 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002475 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002250 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002479 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002177 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002166 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002502 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002332 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003368 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002488 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002610 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002521 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002131 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002420 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002332 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002141 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002301 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002145 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002245 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002594 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002306 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002155 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.003113 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002414 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002256 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002391 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002244 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002083 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002461 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002226 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002382 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002341 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002468 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002086 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002548 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002273 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002295 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002413 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002793 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002227 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002214 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002775 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002290 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002332 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002379 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002288 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002436 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002880 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002377 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002463 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002608 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002384 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002168 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002425 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002879 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002264 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002632 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002531 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002204 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002932 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002172 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002280 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002768 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002300 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002234 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002579 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002246 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002214 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002536 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing row-wise multi-threading, the overhead of
testing was 0.001185 seconds.
You can set `force_row_wise=true` to remove the overhead.
And if memory is not enough, you can set `force_col_wise=true`.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.003310 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002578 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002229 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002348 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002543 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002098 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002351 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002519 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002193 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002404 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002283 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002294 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002318 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002413 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002387 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002493 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002418 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002497 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002511 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002196 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002486 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002430 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002169 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002680 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002349 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002320 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002217 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002792 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002399 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002442 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002426 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002302 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002247 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002292 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002200 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002292 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002551 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002323 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002502 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002352 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002718 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002188 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002578 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002373 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002608 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002314 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002323 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002393 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
```

[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002365 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.003275 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet

the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
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[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002654 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.003209 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
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[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.001987 seconds.
You can set `force_col_wise=true` to remove the overhead.

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[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.002926 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
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[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002297 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6

[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.003246 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
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[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002246 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!

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[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.003101 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002334 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
```

```
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.002953 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002613 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002664 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002301 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002334 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002413 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002364 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002723 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002980 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002504 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002627 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002459 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002361 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002642 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002629 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003378 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002759 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002298 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002445 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002845 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002296 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002603 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002262 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002379 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002854 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002287 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002350 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002409 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002946 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002338 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002495 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002522 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.002202 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003182 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002299 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002534 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002273 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002774 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002425 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002540 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002588 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002567 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002354 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002376 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002377 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002277 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002312 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002851 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002461 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002791 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002369 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002424 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002375 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002451 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.003254 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002482 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002331 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002523 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002386 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002595 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.003498 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002512 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002496 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002419 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002422 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002472 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002452 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002524 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002410 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002759 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf

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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002581 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002410 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002422 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002576 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002551 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002563 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002363 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002424 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004787 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003771 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004489 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.002974 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002506 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002688 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002515 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002354 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002717 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002763 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002474 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002395 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002514 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002028 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.

Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.003380 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in 0.002685 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002659 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002697 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002612 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002886 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002872 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002372 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002449 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002839 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003043 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002446 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002780 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002677 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002689 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002412 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002659 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002513 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002344 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002780 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002780 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002652 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002339 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002672 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002815 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003502 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002424 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002488 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002749 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002426 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002435 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002617 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002343 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002463 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002528 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002583 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002970 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002999 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002362 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003088 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002722 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004486 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002929 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002757 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002483 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002608 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002692 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002708 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002723 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002400 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002756 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002648 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002738 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004841 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.003085 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003560 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002686 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002987 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002729 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002707 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002923 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002593 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002795 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002736 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002656 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002559 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002454 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002920 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003836 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003926 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004099 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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0.002703 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002811 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002767 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003205 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002547 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003953 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002377 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002542 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002311 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002959 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.003028 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002798 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002454 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003093 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002422 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002554 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002409 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002945 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002741 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002750 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002037 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
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[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.003390 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002246 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002264 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002293 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002278 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.003058 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002797 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002207 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002382 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002709 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in

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0.002340 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002265 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002455 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002318 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002325 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002723 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002161 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002637 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002346 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002311 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002268 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002425 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002211 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002624 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002292 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002325 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

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0.002510 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002483 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002213 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002596 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002617 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.002416 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002409 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002423 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002355 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002566 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002912 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002817 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002387 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002468 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002382 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002442 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

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0.002868 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002728 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002538 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002442 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002481 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003034 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002288 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002647 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002420 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002442 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.002405 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002194 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002668 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002302 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002468 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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0.002740 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002327 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002705 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002432 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003529 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004253 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002570 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002731 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002334 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002474 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002370 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002297 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002462 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002441 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002347 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002607 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002407 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002616 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002590 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002561 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002228 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.002571 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002749 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002642 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003466 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002713 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

```
0.002516 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002871 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002391 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002568 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002425 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002175 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
```

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[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.003373 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002169 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002416 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002452 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002237 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002383 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002745 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002305 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002381 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002506 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002221 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

```
0.002792 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002244 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002305 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002700 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002401 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002803 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002666 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002647 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002313 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002719 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002373 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002680 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002927 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002369 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002251 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

0.003003 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002350 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002464 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002649 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002382 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002332 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002389 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.004915 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002648 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002355 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002744 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002362 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002842 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002467 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002275 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002430 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in

```
0.002633 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002315 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002640 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002519 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002978 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002312 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002496 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002311 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002917 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002274 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002404 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002763 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002239 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002829 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002434 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002776 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

0.003856 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002476 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002383 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002393 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002475 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002459 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002525 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002374 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002534 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002688 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002661 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002876 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002550 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003073 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002509 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002467 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002662 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002528 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002410 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003776 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002402 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002502 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002660 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002783 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002367 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002653 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002844 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002532 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002900 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002474 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002749 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.001979 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22

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[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002897 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002100 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002492 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002480 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002235 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002544 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002247 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002453 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002468 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002516 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002334 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002526 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002214 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002391 secs. 0 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002593 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002528 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002527 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002607 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002308 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002763 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002194 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002546 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002345 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002303 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002603 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002372 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002352 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002668 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002266 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002302 secs. 0 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002305 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002603 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002262 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002293 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002557 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002325 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002341 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002410 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002448 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002657 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002344 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002611 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002255 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002668 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002410 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002179 secs. 0 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002625 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002229 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002401 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003329 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002734 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002567 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002303 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002699 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002597 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002312 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002274 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002300 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002521 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002227 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002375 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

0.002755 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002829 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004277 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003619 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002338 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002439 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002708 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002424 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002739 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002288 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002346 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002280 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002512 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002709 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in

0.002781 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002347 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002388 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002854 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002304 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002267 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.003317 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002413 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004158 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003584 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003587 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003807 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002426 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002374 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002739 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002262 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.001974 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
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Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.002718 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002408 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002065 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002126 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002361 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002460 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002466 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002260 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002395 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002207 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002179 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002173 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002366 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002500 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002332 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002443 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002212 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002329 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002289 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002478 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002374 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002432 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002453 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002691 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002318 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002183 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002232 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002252 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002556 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002439 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002565 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002590 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002274 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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0.002196 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002225 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002377 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002478 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002244 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002329 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002436 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002258 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002317 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002402 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002208 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002289 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002450 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002386 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002454 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002354 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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0.002463 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002302 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002645 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002280 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002492 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002307 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002382 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002298 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002530 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002438 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002682 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002624 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002527 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
```

[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.002888 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002091 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002183 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002493 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002094 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002336 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002191 secs. 1 sparse feature groups

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002286 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002275 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004468 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002377 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002293 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002459 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003130 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002179 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002745 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002685 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002440 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002412 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002201 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002306 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002293 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002468 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002512 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002611 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002239 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002213 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002333 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002270 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002152 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002593 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002238 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
```

Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002956 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in 0.002381 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002397 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002301 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002603 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002581 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002291 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002344 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002275 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002412 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002322 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002780 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002585 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002304 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002359 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002507 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002383 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002695 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002381 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002544 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002368 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002592 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002277 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002200 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002624 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002397 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002300 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002214 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002352 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002319 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.001959 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.003021 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002108 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002102 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002317 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002162 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002733 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002375 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002213 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002181 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002217 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002338 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003939 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002513 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002739 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002421 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

```
0.002359 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002489 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002166 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002432 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002277 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002456 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002840 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002261 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002127 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002306 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002311 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002432 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002382 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002704 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002566 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002247 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
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[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.001959 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.002746 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001868 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001910 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001873 secs. 1 sparse feature groups

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002093 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001932 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002102 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001961 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002257 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002165 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002330 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002085 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002168 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001999 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001986 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002515 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002033 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002298 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002112 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002105 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002063 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002090 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002055 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002232 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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0.002117 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002058 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002066 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002472 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002004 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002417 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002057 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002487 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002092 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002211 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002071 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002032 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002292 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002137 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002027 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002063 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001970 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002094 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002465 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002072 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002224 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002133 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002106 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002082 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002206 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002000 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001960 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002138 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002473 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002063 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002576 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001983 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002075 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002122 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002059 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002484 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002056 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002058 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002314 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002163 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002001 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002054 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002341 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002250 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002080 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002402 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002003 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002031 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002031 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002021 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002163 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001957 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002496 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002262 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002474 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002213 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002292 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002126 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002648 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002641 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002196 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002133 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002260 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002158 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002230 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002271 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002057 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002495 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002355 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002632 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002459 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
```

[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002292 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.003178 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002270 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002089 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002058 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002395 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002272 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002184 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002257 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002233 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002159 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002291 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002220 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002038 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002356 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002191 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002270 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002328 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002220 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002202 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002657 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002787 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002750 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002199 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002808 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002351 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003005 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002772 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002723 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002863 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002455 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002377 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002533 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002652 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002496 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002152 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002368 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002537 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002607 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002553 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002364 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002190 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002345 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002414 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002368 secs. 1 sparse feature groups
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0.002574 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002200 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002354 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002163 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002120 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002427 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003027 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002153 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002436 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002310 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002280 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002461 secs. 1 sparse feature groups
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0.002166 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002534 secs. 1 sparse feature groups
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0.002669 secs. 1 sparse feature groups
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0.002590 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002447 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002614 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002157 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002305 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002236 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002784 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002241 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002178 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002185 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002220 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002146 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002231 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002230 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002085 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002283 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002487 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002526 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002392 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002234 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002546 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002876 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002694 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002327 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002116 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002533 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.002227 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002882 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002407 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002120 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.003302 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.002143 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.002262 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002152 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002283 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002040 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.002178 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002659 seconds.
You can set `force_col_wise=true` to remove the overhead.

[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.003000 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.001823 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.001894 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.001937 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.001927 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002504 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in

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0.002043 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001957 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002365 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002050 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002398 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002359 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002836 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002083 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002002 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002111 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002178 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002032 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002585 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002364 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002120 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001993 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
```

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0.002241 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001916 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002193 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002433 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001995 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002191 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002084 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001996 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002079 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002454 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002262 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002086 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002150 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002295 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002019 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002670 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
```

```
0.001917 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002356 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002058 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002092 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002174 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002000 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002500 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002064 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002342 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001968 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002184 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001998 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002521 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001987 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002048 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002141 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
```

```
0.002361 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002052 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002017 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001989 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002174 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002854 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002335 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002118 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002259 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001934 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002439 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001904 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002222 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002035 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002084 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002059 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
```

```
0.002159 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002306 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002184 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002216 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001983 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002415 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002252 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002216 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001972 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002022 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002087 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002065 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002338 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002154 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002318 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002287 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
```

0.002341 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002118 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002458 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002195 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002205 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002425 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002288 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002050 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002304 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002141 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002191 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002299 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing row-wise multi-threading, the overhead of
testing was 0.001506 seconds.
You can set `force_row_wise=true` to remove the overhead.
And if memory is not enough, you can set `force_col_wise=true`.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27

[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.003124 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.001985 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002360 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002035 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002293 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.001957 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.001989 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in

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0.002409 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002127 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002094 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002343 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002054 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002111 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002025 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002401 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002071 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002221 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002331 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002073 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002005 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002268 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002187 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002066 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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0.002392 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002655 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002194 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002225 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002150 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002371 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002086 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002347 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002093 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002553 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002318 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002120 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002011 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002339 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002040 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002078 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in

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0.002220 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002230 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002149 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003463 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002035 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002500 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002035 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002031 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002071 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002054 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002150 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002094 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002015 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002500 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002045 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002082 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
```

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0.002118 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002103 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002061 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002031 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002331 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002176 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002954 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002020 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002183 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002505 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002034 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002372 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002460 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002013 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002126 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002334 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
```

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0.002120 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002179 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002167 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002057 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002002 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002288 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002002 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002433 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002077 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002208 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002222 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002294 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002186 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002100 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002218 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
```

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0.002175 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003894 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003108 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002218 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002082 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002147 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002315 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002153 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002042 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002651 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002032 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002158 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
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[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002850 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002088 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002040 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001819 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001913 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002034 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001983 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.001963 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002016 secs. 0 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002307 secs. 0 sparse feature groups
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0.001960 secs. 0 sparse feature groups
```

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```

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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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0.001993 secs. 0 sparse feature groups
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0.001996 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002046 secs. 0 sparse feature groups
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0.002346 secs. 0 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002217 secs. 0 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002325 secs. 0 sparse feature groups
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0.002250 secs. 0 sparse feature groups
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0.002156 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002168 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002111 secs. 0 sparse feature groups
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0.002172 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002023 secs. 0 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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0.002097 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002151 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002167 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002307 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002068 secs. 0 sparse feature groups
```

[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002135 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002010 secs. 0 sparse feature groups
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0.002154 secs. 0 sparse feature groups
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0.002079 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002363 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002145 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002530 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2

[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.003202 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002449 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.001989 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002077 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002150 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002504 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002343 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002254 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002300 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002166 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002156 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002248 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002764 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002610 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002351 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002214 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002123 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002126 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002254 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002189 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002325 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002275 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002334 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002276 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002265 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002466 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002476 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002223 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002188 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002281 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.002148 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002280 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002135 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002381 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002614 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003616 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002103 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002088 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002087 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002137 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002268 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002490 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002522 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002152 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002316 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002231 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002224 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002330 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002202 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002215 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002145 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.002625 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002519 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002510 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002096 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002380 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002334 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002275 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002401 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002227 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002292 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002704 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002452 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002485 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002294 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002171 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002224 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002397 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002263 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002364 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002452 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002447 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002688 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002584 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002294 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.002170 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002149 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002338 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002166 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002358 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002547 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002411 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002384 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002217 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002145 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002137 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002261 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.002657 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002330 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002456 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002448 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002741 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002593 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002667 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.66 MB) transferred to GPU in
0.002138 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002329 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002272 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002341 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002263 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002216 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002292 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002061 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002163 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002581 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002541 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002460 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002293 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002194 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002251 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002132 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002244 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002242 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002351 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002548 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002684 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002251 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002128 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002412 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002125 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002302 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002299 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002148 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002324 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002564 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002481 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002560 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002393 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002323 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002512 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002245 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002181 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002229 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002245 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002215 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002233 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002955 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401

```
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002439 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002116 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002289 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002134 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002317 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002452 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002026 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002086 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002035 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002445 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002475 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002534 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002105 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002314 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

```
0.002251 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002071 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002197 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002148 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002163 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002171 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002283 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002171 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002279 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002298 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002228 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002178 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002240 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002148 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002254 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002132 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
```

```
0.002255 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002254 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002447 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002505 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002426 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002278 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002234 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003396 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002293 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002181 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002208 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002150 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002172 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002276 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002357 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002306 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

```
0.002612 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002702 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002354 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002453 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002170 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002321 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002280 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002464 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002287 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002287 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002448 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002158 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002645 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002528 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002504 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002506 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

```
0.002409 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002233 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002281 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002223 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002276 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002894 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002263 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002197 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002166 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002356 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002488 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002510 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002414 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002256 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002720 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

```
0.002510 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002297 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002252 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002400 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002388 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002532 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002311 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002332 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002312 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002146 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002411 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002536 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002615 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002621 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002146 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

```
0.002407 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002321 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002208 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002480 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002245 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.79 MB) transferred to GPU in
0.002207 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002266 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002569 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002539 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002505 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002306 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002293 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002273 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002296 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002288 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002320 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

```
0.002246 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002296 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002274 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002329 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002269 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002397 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002443 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002616 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002446 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002256 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002363 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002171 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002168 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002316 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002328 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002471 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
```

```
0.002323 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002583 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002670 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002683 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002459 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002360 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002314 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002335 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002170 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002118 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002250 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002396 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002243 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing row-wise multi-threading, the overhead of
testing was 0.001229 seconds.
You can set `force_row_wise=true` to remove the overhead.
And if memory is not enough, you can set `force_col_wise=true`.
```

```
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.002835 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002020 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.001969 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002093 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002001 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002065 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

0.002053 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002346 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002351 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002524 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002296 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002190 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002703 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003055 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002313 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002299 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002463 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002150 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002129 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002273 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002167 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002174 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in

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0.002362 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002513 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002603 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002300 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002279 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002481 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002128 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002197 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002175 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002109 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.002543 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002555 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002567 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002335 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002076 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002191 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

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0.002286 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002215 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002617 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002492 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002320 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002541 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002552 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002397 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002407 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002167 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002184 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002166 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002137 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002270 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002242 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002307 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
```

```
0.003530 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002508 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002586 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002329 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002109 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002278 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002234 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002260 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002179 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002249 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002609 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002479 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002361 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002274 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002301 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002551 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

```
0.002221 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002188 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002094 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002346 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002408 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002317 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002194 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002143 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002223 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002557 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002327 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.002570 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002481 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002149 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003381 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002135 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

```
0.002254 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002111 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002119 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002626 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002637 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002269 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002283 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.002500 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002329 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002400 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002146 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002229 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002514 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002683 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.66 MB) transferred to GPU in
0.002508 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

```
0.002353 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002186 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002223 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002186 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002235 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002130 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002167 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002243 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002490 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002498 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002295 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002220 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002184 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002182 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002162 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

0.002227 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002130 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002405 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002404 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002393 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002586 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002364 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002193 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002263 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002168 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002229 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002233 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002202 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002274 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002440 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002362 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in

0.002567 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002215 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002860 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002156 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002148 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002160 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002198 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002193 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!

```
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002582 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002013 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002183 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002080 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002409 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002501 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002553 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002466 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002304 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002428 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002501 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002109 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002340 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002341 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002130 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002184 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002491 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002109 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002303 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002253 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002321 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002218 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002246 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002190 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002483 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002193 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002273 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002200 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002150 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002293 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002201 secs. 1 sparse feature groups
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0.002186 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002326 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002299 secs. 1 sparse feature groups
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0.002374 secs. 1 sparse feature groups
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0.002646 secs. 1 sparse feature groups
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0.004073 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002573 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002211 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002233 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002416 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002269 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002201 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002181 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002224 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002571 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003267 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002643 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002184 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002358 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002226 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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0.002176 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002316 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002350 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002345 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002190 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002303 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002389 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002445 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002444 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002720 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002472 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002290 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002309 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002233 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002152 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002158 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002146 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002290 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002576 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002689 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002801 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002260 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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0.002261 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002228 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002443 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002287 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002214 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002318 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002260 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002294 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002342 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002131 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002151 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002272 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002358 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002518 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002443 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002298 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002397 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.79 MB) transferred to GPU in
0.002167 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002387 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002151 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002194 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002253 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002226 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002210 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002306 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002514 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002435 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002179 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002378 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002280 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002231 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002331 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002149 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002386 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002422 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002376 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002224 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002547 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002290 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002200 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002207 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002287 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002499 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002720 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002534 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002685 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002302 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002603 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002632 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002148 secs. 1 sparse feature groups
```

[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002851 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002832 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in 0.002200 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002286 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002223 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002142 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002099 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002267 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002165 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.001964 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002107 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002087 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002087 secs. 0 sparse feature groups
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0.002288 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002441 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002354 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002329 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002308 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002067 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002332 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002532 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002478 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002370 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002328 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002262 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002149 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002300 secs. 0 sparse feature groups
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0.002236 secs. 0 sparse feature groups
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0.002655 secs. 0 sparse feature groups
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0.002053 secs. 0 sparse feature groups
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0.002550 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002415 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002517 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002440 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002153 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002301 secs. 0 sparse feature groups
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0.002716 secs. 0 sparse feature groups
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0.002232 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002250 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002549 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002274 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002269 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002148 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002295 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002241 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002159 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002236 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002353 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002175 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002346 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002159 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.034940 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003098 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002630 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002236 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002178 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002312 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002603 secs. 0 sparse feature groups
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0.002248 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002330 secs. 0 sparse feature groups
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0.002166 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002569 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002665 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002288 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002381 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002199 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002192 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002196 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002284 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002280 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002597 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002539 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002207 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002307 secs. 0 sparse feature groups
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0.002537 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002495 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002294 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002220 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002177 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002208 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002223 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002137 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002571 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002369 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002541 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002561 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002278 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002483 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002476 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002345 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002235 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002387 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002130 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002191 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002276 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002213 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002361 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.79 MB) transferred to GPU in 0.002207 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002231 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002188 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002252 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002240 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002311 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002275 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002212 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002570 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002721 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002503 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002329 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002142 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002744 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002152 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002168 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002258 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002225 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002161 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002141 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002315 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002301 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002576 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002339 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002475 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002552 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002426 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002787 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002260 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002152 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002185 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002207 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002227 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002320 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002228 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002209 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002232 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002209 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002215 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002247 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002252 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
```

[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.003161 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.001839 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.002223 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.001942 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002289 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002153 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002089 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.001908 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.001841 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in

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0.001930 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002054 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002012 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001980 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001981 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002211 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001817 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002081 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002107 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001868 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001852 secs. 1 sparse feature groups
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0.001838 secs. 1 sparse feature groups
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0.002188 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002329 secs. 1 sparse feature groups
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0.002016 secs. 1 sparse feature groups
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0.002178 secs. 1 sparse feature groups
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0.002351 secs. 1 sparse feature groups
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0.002054 secs. 1 sparse feature groups
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0.002097 secs. 1 sparse feature groups
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0.002334 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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0.002060 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001976 secs. 1 sparse feature groups
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0.002718 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002088 secs. 1 sparse feature groups
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0.002080 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001992 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.001950 secs. 1 sparse feature groups
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0.002130 secs. 1 sparse feature groups
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0.001961 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001958 secs. 1 sparse feature groups
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0.002106 secs. 1 sparse feature groups
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0.002045 secs. 1 sparse feature groups
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0.002288 secs. 1 sparse feature groups
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0.002428 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in

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0.002047 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002014 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002037 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002211 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001953 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001924 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002288 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.001918 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002009 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002337 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002135 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001939 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002002 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
```

testing was 0.002806 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.003015 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.001880 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002126 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.001881 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.001897 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.001950 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002314 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001909 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002008 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002138 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001936 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002099 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001900 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002102 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001814 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002337 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001963 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002102 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002346 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001930 secs. 1 sparse feature groups
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0.002173 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
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0.001851 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002310 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001881 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002039 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.001967 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002324 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001975 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003533 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003098 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002240 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001999 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001889 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002201 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001908 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002224 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002243 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002199 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001953 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002198 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002009 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002229 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002043 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002162 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002192 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002190 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001975 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002003 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002008 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002100 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002151 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002314 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002001 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002005 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002142 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002276 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002012 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001945 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002321 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002047 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002153 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002150 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002126 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002063 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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0.002346 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002033 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001970 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002445 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001964 secs. 1 sparse feature groups
```

[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001895 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002491 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.002912 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002040 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001913 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002052 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001840 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001980 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002076 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001938 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.009426 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002365 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002124 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002018 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001876 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002134 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001834 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002099 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002117 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001956 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002034 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002082 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002054 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001848 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001854 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001777 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001821 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002495 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001786 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002045 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002141 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001908 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001960 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001931 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001836 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001992 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002129 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002155 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001910 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002172 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001975 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001855 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002112 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001873 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001930 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002186 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002078 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001987 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.003028 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001966 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001934 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002063 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002204 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.001930 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002019 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002139 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002330 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001939 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001888 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001956 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002057 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002110 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002172 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002011 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002013 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001870 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002140 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001886 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001991 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001955 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002725 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002030 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002159 secs. 1 sparse feature groups
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0.002032 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001908 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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0.002192 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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0.001886 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002010 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001908 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002200 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002091 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002430 secs. 1 sparse feature groups
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0.001885 secs. 1 sparse feature groups
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0.001977 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002299 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002024 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002221 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001919 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.001950 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002201 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.001920 secs. 1 sparse feature groups
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0.001973 secs. 1 sparse feature groups
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0.002212 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002195 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002114 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.001977 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002104 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002047 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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0.002368 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002052 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002050 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002023 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.001982 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002277 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.001969 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002519 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation

[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.003122 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001952 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001941 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001864 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002129 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001966 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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0.001973 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002074 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001855 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001926 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001820 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003077 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002211 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in

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0.001792 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001898 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002059 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002023 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002016 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002096 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in

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0.002118 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001988 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002102 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002336 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002036 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001945 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001938 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002345 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001933 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001983 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002333 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002139 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002060 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002182 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002341 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002029 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
```

```
0.002041 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002379 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001955 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001967 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002292 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001972 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002036 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001995 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002304 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001963 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002128 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.036220 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003335 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002035 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001969 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002240 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
```

0.001915 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001983 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002057 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002323 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001925 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002738 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002169 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001993 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002167 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002651 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5

[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002508 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002060 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001825 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001928 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002182 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002073 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002062 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002313 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.003087 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002000 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002168 secs. 0 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001863 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001788 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002322 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001840 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001902 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001933 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001881 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001916 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002119 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001998 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001903 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002203 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001869 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001990 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001898 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001952 secs. 0 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
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0.002029 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002439 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001973 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001878 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001894 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001967 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001844 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002127 secs. 0 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001897 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001940 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002022 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.001915 secs. 0 sparse feature groups
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0.002249 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.001793 secs. 0 sparse feature groups
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0.001951 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001852 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001965 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001962 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002112 secs. 0 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
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0.004625 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002270 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002063 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001945 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002274 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001982 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001985 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002351 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002057 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001985 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002146 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002043 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002027 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002310 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002000 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001917 secs. 0 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001989 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002169 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001922 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002290 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001956 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002567 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001965 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002077 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002076 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002150 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002544 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002355 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001939 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001987 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002510 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002034 secs. 0 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002098 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001981 secs. 0 sparse feature groups
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```

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0.002264 secs. 0 sparse feature groups
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0.001959 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002413 secs. 0 sparse feature groups
```

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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001991 secs. 0 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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0.002302 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.001969 secs. 0 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
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```

```
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002032 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002475 secs. 0 sparse feature groups
```

```
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002069 secs. 0 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002189 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002113 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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0.002001 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.001967 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002014 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.001969 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002112 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
```

features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.002717 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002098 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002221 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.001972 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002394 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002034 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.001975 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002040 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002080 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing row-wise multi-threading, the overhead of testing was 0.001207 seconds.
You can set `force_row_wise=true` to remove the overhead.
And if memory is not enough, you can set `force_col_wise=true`.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002703 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8

[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002333 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002199 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002326 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002144 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002238 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002359 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002140 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002472 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002072 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8

[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.002651 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002111 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002239 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002398 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002531 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002265 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002044 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002378 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002295 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing row-wise multi-threading, the overhead of

testing was 0.001242 seconds.
You can set `force_row_wise=true` to remove the overhead.
And if memory is not enough, you can set `force_col_wise=true`.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.003638 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002422 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002292 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002079 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002180 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in

0.002180 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002478 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002252 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002138 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002475 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in

0.002829 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002518 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002758 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002529 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002123 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002107 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002415 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002343 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002116 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.003390 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0

[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.002849 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002026 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319

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[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002577 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002378 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
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[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.003496 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing row-wise multi-threading, the overhead of
testing was 0.001167 seconds.
You can set `force_row_wise=true` to remove the overhead.
And if memory is not enough, you can set `force_col_wise=true`.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002897 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
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[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002172 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.002841 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319

[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.002944 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.003862 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002220 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002103 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002050 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002356 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in

0.002101 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002104 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002008 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003278 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002087 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002064 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002197 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003477 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002248 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002253 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002139 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003353 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002136 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002216 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002195 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002565 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in

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0.002217 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002368 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002155 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002296 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002166 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002168 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002231 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002166 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002130 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002129 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002443 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002628 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002256 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002445 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002178 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002501 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
```

0.002156 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002157 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002139 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002311 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002555 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002497 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002148 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002162 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002502 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002186 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002458 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002350 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002341 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002179 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002169 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in

0.002325 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002383 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003209 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002216 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002166 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002218 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002254 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002227 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002546 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002513 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002419 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003020 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002317 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002139 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002400 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002269 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in

0.002220 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002269 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.003670 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002596 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002517 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002085 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002294 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002091 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002357 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002262 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002399 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002072 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002296 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002404 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002496 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002204 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002110 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002739 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002331 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002353 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002512 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002177 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002261 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002540 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002564 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002541 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002413 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002188 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003046 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002152 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002120 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002270 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002259 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002524 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002600 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002184 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002505 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002913 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002842 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002667 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002881 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002858 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002747 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002865 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009069 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002707 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002545 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002213 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003049 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002763 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002325 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002436 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002574 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002521 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002786 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003224 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002772 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002633 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002387 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002889 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002369 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002734 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003003 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002771 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002631 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003950 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003157 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002500 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002550 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002767 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002519 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002603 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002917 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002728 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.002606 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
```

Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.003121 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002299 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002473 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002327 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002884 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002937 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002617 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002479 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002375 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002546 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003176 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002874 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003038 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002403 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002420 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002504 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002760 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002374 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002440 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002481 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003038 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002868 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002729 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002765 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002922 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002306 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002583 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002662 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003001 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002612 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002446 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002933 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002529 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002766 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002315 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002288 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002622 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002426 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002672 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002653 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003519 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002331 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002413 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002461 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002868 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002282 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002341 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002830 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002398 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002500 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002369 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002555 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002314 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002514 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003201 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003146 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002744 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002565 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002495 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002525 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002679 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002477 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002747 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002710 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002641 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002600 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002951 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002877 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002326 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.001884 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be

ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.002578 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002355 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002230 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002427 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002385 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002361 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002659 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002391 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002419 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002889 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in

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0.002945 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003279 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002424 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002653 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002764 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002421 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002535 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002802 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002651 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002690 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002738 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002890 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002761 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002585 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003950 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003229 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

0.004990 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003571 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003486 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004646 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004859 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004677 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004987 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005069 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004045 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004888 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004027 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005004 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004646 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003792 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004189 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005298 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in

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0.004797 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002758 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004399 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004005 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003725 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002791 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003827 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004504 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003171 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003144 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005253 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005477 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004644 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004623 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003993 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005226 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

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0.002595 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005922 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003496 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004894 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004428 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004937 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003652 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004256 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003481 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003279 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005338 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004138 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.005776 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
```

[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.006239 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005205 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005025 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004899 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004726 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004867 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004058 secs. 0 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003763 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003890 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004287 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005205 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003978 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004617 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005001 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005286 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003180 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003132 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004759 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003898 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004806 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004206 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004965 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004859 secs. 0 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004580 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003365 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005048 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004374 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004516 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004974 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003705 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003609 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004686 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004834 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005188 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005186 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004835 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005216 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005054 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004299 secs. 0 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004104 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003381 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005504 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004992 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003734 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004918 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005543 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007551 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004743 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004536 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005293 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005265 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005373 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004557 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004520 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004638 secs. 0 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004822 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005149 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004926 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004709 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003871 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004914 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004273 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003962 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005434 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004266 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005809 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005739 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004770 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004857 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003459 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004429 secs. 0 sparse feature groups
```

[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006840 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.007013 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004897 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004248 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005134 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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0.004443 secs. 1 sparse feature groups
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0.004801 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004709 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002746 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004710 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004617 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.004407 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003250 secs. 1 sparse feature groups
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0.004848 secs. 1 sparse feature groups
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0.008006 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005031 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003264 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004527 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004749 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004765 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004255 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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0.004110 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004434 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
```

```
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```

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```

```
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```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004797 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005669 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004726 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004261 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003556 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003338 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005299 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.75 MB) transferred to GPU in
0.003198 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005122 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004647 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003092 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006343 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
```

[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005812 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006096 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003182 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004448 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004329 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004430 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005468 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003434 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005047 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in

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0.004178 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005228 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005352 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002969 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003138 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005096 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003137 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004813 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004184 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004715 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003414 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005005 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005141 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005229 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004851 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002939 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

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0.005322 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004775 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004756 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002876 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004622 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004286 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003266 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004921 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003844 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005146 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005420 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003895 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005091 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003879 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005222 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003890 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

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0.005249 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003169 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003232 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003603 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004249 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003790 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004173 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005087 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005219 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003086 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003490 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004239 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004607 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003710 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003482 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004326 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

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0.003658 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004937 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003857 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004552 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003496 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005478 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003933 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004919 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004809 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003287 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004828 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005002 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004010 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004082 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005048 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004295 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

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0.004859 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004580 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003359 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004283 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005568 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004751 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004848 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004818 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002733 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005146 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003864 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005513 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004149 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005374 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004663 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005287 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

```
0.004628 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004179 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005351 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003514 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005530 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003465 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004906 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005019 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003075 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004926 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004180 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005782 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003324 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005830 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003217 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005885 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

0.003846 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003546 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002977 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004124 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005052 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003588 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003234 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005824 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004759 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005639 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005330 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004575 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005149 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003333 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005428 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004850 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in

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0.005057 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004719 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005157 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005567 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005509 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005422 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004215 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004721 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004612 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005921 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005843 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003952 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005213 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005339 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005799 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002601 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

0.003367 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004580 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005739 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003621 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.005994 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in

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0.004587 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002878 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002663 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003925 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004709 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004295 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003429 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004590 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003281 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003652 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.004672 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004490 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004689 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003055 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004674 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004752 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004618 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004391 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004645 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002986 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004577 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004415 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002634 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003528 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004574 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003652 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003619 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004826 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003438 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005527 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003640 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004521 secs. 1 sparse feature groups
```

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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004190 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003317 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004771 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003649 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004726 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004162 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004830 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004837 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002738 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003845 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004501 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003187 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003603 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004468 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005998 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004799 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003335 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003978 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004259 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004178 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003110 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003378 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003854 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003636 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003190 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004771 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003187 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004852 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004860 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004478 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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0.004680 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004516 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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0.004602 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003539 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004890 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004190 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004820 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003543 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004582 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003253 secs. 1 sparse feature groups
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0.004651 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.004700 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.002801 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004714 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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0.004462 secs. 1 sparse feature groups
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0.003744 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004665 secs. 1 sparse feature groups
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0.004407 secs. 1 sparse feature groups
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0.003398 secs. 1 sparse feature groups
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0.005721 secs. 1 sparse feature groups
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0.004358 secs. 1 sparse feature groups
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0.005233 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005250 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004500 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003566 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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0.004837 secs. 1 sparse feature groups
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0.003668 secs. 1 sparse feature groups
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0.004526 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003857 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002824 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004686 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002861 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003563 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002907 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004731 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003348 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005009 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003935 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005028 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004785 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004619 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002833 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003707 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003592 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004084 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004705 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003547 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.75 MB) transferred to GPU in
0.003807 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004372 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003836 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003483 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.004013 seconds.
```

You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.003171 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005179 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004180 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004854 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.003231 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.003674 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004839 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003817 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004978 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004522 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004870 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005195 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004796 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004910 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005202 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003766 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004951 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004324 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005130 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004862 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005307 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005240 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003676 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004893 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005148 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004540 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005050 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005463 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003881 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004586 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004331 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004170 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004805 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003776 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005195 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004322 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004662 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003981 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004172 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005816 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004088 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005675 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004244 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004879 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004169 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005773 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003661 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003835 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002926 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004999 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003329 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004570 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004168 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.004431 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004831 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005244 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004672 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004736 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004018 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005473 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004696 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003362 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005687 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005322 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003893 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004941 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002858 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004975 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003070 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005244 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003513 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004135 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005980 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003833 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004928 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004172 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003343 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005460 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004122 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005253 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004195 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003612 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005201 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005347 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004151 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005815 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003870 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005808 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005143 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004890 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.005261 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003195 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006320 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005380 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004966 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005804 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003532 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003881 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005244 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005766 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005139 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005827 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003807 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005372 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005092 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004976 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003736 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005409 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005420 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003315 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005533 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003868 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005772 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004048 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005465 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004240 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005515 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004597 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005226 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005758 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004154 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002705 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004146 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.003957 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005238 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006767 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320

```
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.003389 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005254 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002883 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004812 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005048 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003175 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004795 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005219 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004691 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005102 secs. 0 sparse feature groups
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006275 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005351 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

```
0.002670 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005045 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004045 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005121 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004976 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003821 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004280 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004677 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003668 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004936 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005154 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003742 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004908 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004741 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004808 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004743 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

```
0.003453 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005175 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004243 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004988 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004958 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004978 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003961 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004064 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005146 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005409 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004176 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005325 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003755 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005193 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004264 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005048 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

```
0.004930 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003239 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005136 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005983 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004055 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004086 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004830 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004536 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003469 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005234 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004783 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004234 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004780 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003110 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005038 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005281 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

```
0.004875 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003237 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005257 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005292 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003493 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004921 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004012 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004832 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004916 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005202 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003938 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003983 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005417 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003836 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004993 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004929 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

```
0.004135 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004831 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003153 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003962 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003177 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004866 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004902 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003600 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004854 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004038 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005221 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004329 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005189 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005014 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004930 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005015 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

```
0.005202 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004741 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005312 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005309 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004724 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005018 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002425 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005015 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004463 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005295 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005693 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004831 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005810 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003453 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004620 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005004 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

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0.003606 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004897 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005189 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005257 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005480 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004305 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004223 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005840 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005495 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005004 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003515 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003965 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002857 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005511 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003919 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004682 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

```
0.005679 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004148 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004247 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005872 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003889 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005733 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003802 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005756 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004832 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005987 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004806 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005924 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003523 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003659 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004348 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005573 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

0.004332 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007175 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005596 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004636 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.004340 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004466 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003435 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004332 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003161 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004412 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004488 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004179 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004240 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004276 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004192 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003494 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002343 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.003796 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.005489 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002844 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004400 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004364 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002586 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004194 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004399 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.003487 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004477 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002852 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003268 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004396 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002733 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.003299 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004419 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004631 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002600 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004561 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004178 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004711 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.004005 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005951 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004335 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.005576 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003570 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004420 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004713 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003490 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003851 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004403 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004453 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002913 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003705 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004450 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003469 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004490 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004379 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003446 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003371 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004050 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003091 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004123 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004392 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003964 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003543 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004400 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004486 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003579 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004589 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003403 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003826 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004468 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003179 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004440 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003586 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004967 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.008323 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.005316 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in

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0.002744 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004717 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003754 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002332 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004270 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004492 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004457 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004260 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002524 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004240 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002519 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002416 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004222 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004272 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002985 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004164 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
```

```
0.004309 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002232 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.003755 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004368 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004359 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004124 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004066 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004288 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004004 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002205 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004275 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002834 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004303 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004446 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004389 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004691 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
```

0.004083 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004270 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003852 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006752 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.004995 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002643 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003225 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004116 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003169 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004448 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004465 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002544 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004310 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004525 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002958 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004867 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004456 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003067 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004394 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004505 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002824 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004615 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003732 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.005182 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003630 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004395 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003989 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004271 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004868 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003194 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004500 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003705 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002751 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003621 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004393 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004269 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004850 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003957 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004560 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004849 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006974 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.006176 secs. 0 sparse feature groups
```

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[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004321 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004602 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002590 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003907 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003382 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004372 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004778 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004162 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004409 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004543 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002421 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002217 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004229 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004116 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004283 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003614 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002794 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002847 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003914 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003443 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004455 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004072 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004466 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004415 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004520 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002502 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004040 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004503 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004473 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003496 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002822 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.004382 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004868 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.003665 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.004450 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006924 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.005979 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004483 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004402 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004667 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004316 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.002632 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.002579 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004508 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004383 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003256 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004434 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.002855 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004265 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003247 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.002835 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
```

```
0.002646 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004175 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004574 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004449 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003484 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004327 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004356 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.002913 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.002472 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003485 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.002349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004310 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004743 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004067 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.002634 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004163 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
```

```
0.004510 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003175 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003232 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003374 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004175 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003909 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004281 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004245 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003494 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003524 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003425 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004245 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004381 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003282 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003032 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003890 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
```

```
0.004523 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003879 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004464 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004713 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004607 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004547 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004696 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004418 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004117 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004394 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003646 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003310 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003959 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.005051 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.005071 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004436 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
```

```
0.003583 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004356 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004979 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003234 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003783 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004882 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003514 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.002884 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.005092 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.002905 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004939 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004240 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003864 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004480 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004893 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004307 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
```

0.003514 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.005035 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007098 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.006131 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003523 secs. 1 sparse feature groups

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004720 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004058 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004373 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004587 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004713 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002501 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004597 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004616 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004655 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004439 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002621 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004525 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004468 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004305 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004653 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003132 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004373 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002598 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004040 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004427 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003054 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005420 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004570 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003046 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004925 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004292 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002657 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002706 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004764 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004490 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003113 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004544 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004772 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003074 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004605 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004050 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003957 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003469 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003248 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004399 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004472 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004584 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004547 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003776 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004380 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004433 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005240 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004782 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002752 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004582 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003038 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004500 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.005048 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004488 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004598 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004642 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002631 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005093 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002827 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003163 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004628 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004808 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004536 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004600 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.002642 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004460 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003306 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004440 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002855 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004447 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004270 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004416 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004664 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003296 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004749 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004664 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003693 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003580 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002920 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
```

Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006909 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.005952 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004458 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.002614 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004452 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004371 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004448 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003831 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003379 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004243 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003217 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004385 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004180 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004387 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.002295 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004305 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004114 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003398 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004469 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.002676 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003950 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004662 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004486 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003726 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004395 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.002823 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004315 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004429 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004335 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004686 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004466 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004505 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004570 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003619 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004404 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003511 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004244 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.002316 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003191 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004530 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004091 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003468 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.002913 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004336 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004328 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003073 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004398 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004528 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004626 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003987 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003135 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004425 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003687 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004487 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004343 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003382 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003066 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004076 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004333 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004402 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004830 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004568 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003249 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004470 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.002214 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.002984 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004302 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004308 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004330 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004138 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004102 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004146 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.005010 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.003450 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.005070 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004779 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004283 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.005614 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.005041 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004612 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.003192 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004540 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006848 seconds.
You can set `force_col_wise=true` to remove the overhead.

[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.005410 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004019 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004586 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.002750 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004237 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004856 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in

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0.003523 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004702 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004493 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003042 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003659 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003328 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002636 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004724 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002706 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004740 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004315 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.002764 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004706 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004081 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003857 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005635 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
```

```
0.003778 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005033 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004621 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003151 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004661 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.002652 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004669 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003149 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004554 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003178 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004562 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004212 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003978 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.002762 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003433 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004446 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
```

```
0.003330 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004643 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003562 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004655 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004656 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002857 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004672 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004373 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003351 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004358 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003618 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004538 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002773 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004790 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004845 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003988 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
```

```
0.004585 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004530 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003332 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004552 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003243 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004544 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004667 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002919 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002874 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003671 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004455 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.002401 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004569 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003166 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004597 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003065 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
```

0.005261 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005489 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004495 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004446 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004790 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002458 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004844 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005950 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004706 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004048 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004186 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007186 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7

[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005721 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002940 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004627 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004651 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004714 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004735 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004505 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004201 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004458 secs. 0 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003178 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003380 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004110 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003601 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004088 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002959 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003127 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002653 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004578 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002668 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004659 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002627 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004253 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003710 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004458 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004682 secs. 0 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003838 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004583 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004560 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004771 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002581 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004543 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003517 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004414 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003317 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003322 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004112 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004724 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003230 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003540 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004402 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004442 secs. 0 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003631 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003014 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003415 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004644 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003705 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003485 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.002726 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004637 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.002698 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004342 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004015 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003853 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004458 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003544 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003553 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003509 secs. 0 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004258 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003638 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004600 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003585 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004713 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004362 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004598 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004903 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004871 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004718 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005129 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003317 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004533 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002577 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005410 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003802 secs. 0 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005240 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003467 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003737 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002855 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004658 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004085 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004683 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002945 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006936 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
```

Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005714 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.003567 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.004214 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.002922 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.003961 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.002990 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.003960 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.003053 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.002840 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.004318 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.002582 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004087 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004367 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004026 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002278 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003485 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003677 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003485 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005222 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004243 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003403 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003541 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003356 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003539 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002760 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003001 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003937 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004492 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002288 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002571 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002493 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003939 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004308 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004316 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003266 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003907 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004188 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004563 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003380 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004227 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004160 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004067 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004495 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004493 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004554 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005499 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004987 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006431 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005782 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005237 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.008085 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006515 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007726 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006272 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005589 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005317 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005683 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.008126 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005735 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005417 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005234 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007103 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006709 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005462 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006991 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005707 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005898 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006772 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007467 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005671 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006336 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006583 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
```

[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.006347 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.005891 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.009167 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored. Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007158 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored. Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored. Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.004517 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004023 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004597 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004238 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004272 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004303 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004218 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004210 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002988 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004097 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002969 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003894 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002251 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002502 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003011 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003278 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003967 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004180 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004262 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003391 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004025 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003823 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002929 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003580 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003558 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003619 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003872 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004636 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003051 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004196 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003445 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003974 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004548 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002978 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003628 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003413 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002958 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004298 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002769 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002421 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002783 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005567 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006007 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004939 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004344 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005075 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006445 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007280 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006660 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006471 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005354 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006734 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005405 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006358 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005819 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006749 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006770 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006608 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007276 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005792 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006530 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.008103 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.006077 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.007810 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.006645 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.005539 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.006338 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.007304 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.005774 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.008722 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.006553 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.007295 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.006180 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.007697 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored. Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.

Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006983 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored. Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored. Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.007867 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.003970 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.004196 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.004158 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.004070 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004020 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004288 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004209 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004229 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004123 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003750 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004430 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002955 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004575 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004038 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002646 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004078 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003573 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004610 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004458 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004431 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004080 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003897 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003265 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004395 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002875 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003559 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004195 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003070 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002542 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003475 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003827 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004130 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004188 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003194 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002374 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004229 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005008 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004624 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005425 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005188 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005586 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005279 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006696 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006114 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006256 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007525 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006414 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007411 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005716 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006138 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006329 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006019 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007382 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006710 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005766 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007409 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005688 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006279 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007044 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006699 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006539 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006535 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006905 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006781 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006036 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007724 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007102 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
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0.007077 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004668 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.008057 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006063 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005445 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006692 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006340 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing row-wise multi-threading, the overhead of
testing was 0.003442 seconds.
You can set `force_row_wise=true` to remove the overhead.
And if memory is not enough, you can set `force_col_wise=true`.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7

[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored. Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.006021 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.003132 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.003962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.004127 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.004408 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.003504 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.002691 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.004566 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.002909 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.002373 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.002315 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003798 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003144 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003021 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003900 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003885 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003480 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004169 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004542 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004262 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002520 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002814 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004412 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004448 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004325 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004603 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003929 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004856 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003602 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003931 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004666 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002502 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004215 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003362 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004358 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004279 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003618 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004359 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004331 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004516 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003058 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004185 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004427 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006381 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005189 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005130 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005266 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005907 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005364 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006897 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007358 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005954 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006571 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006494 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007148 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005485 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005648 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007973 secs. 1 sparse feature groups
```

[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007096 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006791 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006699 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.008424 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005471 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006913 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006629 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007947 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005842 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.008257 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006227 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006101 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007278 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007963 secs. 1 sparse feature groups

[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006672 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006854 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006683 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005938 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546

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[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004114 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004268 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004275 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004149 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004261 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003891 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004382 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004171 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004239 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003203 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004537 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004360 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004055 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004316 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004262 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
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0.004324 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003830 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004300 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004010 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002203 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003118 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002910 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002537 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004319 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004120 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003709 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004074 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002969 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003282 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004565 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004681 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in

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0.004232 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004165 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004565 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004169 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002792 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004826 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004289 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004610 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003644 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004477 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005420 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003707 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006017 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005222 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.009133 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003623 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
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0.007433 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005797 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006125 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006717 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.008291 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006373 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007912 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007380 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006510 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006194 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005452 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006390 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007917 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005740 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006467 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006674 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
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0.007550 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007126 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007370 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005702 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007998 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006275 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007394 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005517 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006552 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006236 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006401 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006730 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465

[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.008627 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.004400 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.004491 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.004038 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.003239 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.004559 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf

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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003750 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
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[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006990 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.005944 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in 0.003214 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.004685 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004020 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004615 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003588 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004306 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004698 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006838 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.

Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005354 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002478 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.003867 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.003808 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.003694 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.002978 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.004743 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004561 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007165 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8

[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005265 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.002995 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004496 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004509 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004757 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002739 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004669 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in

0.003718 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004432 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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the split requirements
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[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] Stopped training because there are no more leaves that meet the split requirements
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[LightGBM] [Warning] Stopped training because there are no more leaves that meet the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet the split requirements
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007864 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.006132 secs. 0 sparse feature groups

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[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.004562 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004761 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004477 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004151 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004659 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004802 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] Stopped training because there are no more leaves that meet the split requirements
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet the split requirements
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007425 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319

[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.006196 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002768 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.003047 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004117 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004334 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004419 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004603 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.004302 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002699 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004289 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004489 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.003537 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in

0.004326 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004184 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007070 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.004910 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004755 secs. 1 sparse feature groups

[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004557 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004567 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.005221 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004562 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004429 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004355 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004305 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002502 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004468 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003781 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004396 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004330 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007287 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used

features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.003359 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004064 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.002273 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004160 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002723 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004333 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004266 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.004207 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.003005 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004297 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004045 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.003942 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004197 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002344 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.004705 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319

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[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005703 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002721 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004466 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004478 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004737 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004247 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003137 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004368 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004739 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004242 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002686 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004523 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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0.004600 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.005107 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007371 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005884 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004386 secs. 0 sparse feature groups

[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003358 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004077 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004616 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004603 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004308 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002924 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004281 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004239 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004775 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004281 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003830 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004377 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006916 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used

features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.004002 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in 0.005205 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in 0.004476 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in 0.005392 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in 0.004107 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in 0.004451 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in 0.003343 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004063 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004825 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005299 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004855 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004649 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005242 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.003900 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003421 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.003688 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005009 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003653 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.003075 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004029 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004451 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004787 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005240 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005130 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004658 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004376 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005217 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004381 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004896 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005335 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005105 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005293 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005854 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004149 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005146 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005204 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005499 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005284 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005360 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004130 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003204 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005175 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003263 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.003792 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.002913 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005304 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003633 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005227 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004909 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005429 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004807 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004163 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005211 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004761 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.002704 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004236 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005169 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004232 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004036 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004823 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004128 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006973 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
```

features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.006006 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005621 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005522 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004383 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005229 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004961 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005267 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.01 MB) transferred to GPU in
0.005055 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005333 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003164 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005564 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005529 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in

```
0.004361 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004503 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004767 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005211 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003982 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004873 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004355 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005438 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005375 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005439 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004965 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003024 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004691 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004792 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005125 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004090 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
```

0.003932 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005383 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005306 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005120 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004076 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003000 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004662 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005333 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005426 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004452 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003997 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005021 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004784 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005357 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003192 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.002859 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in

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0.005283 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004994 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005295 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005264 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004083 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004290 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004386 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004427 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005082 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004636 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005319 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005038 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005268 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005420 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004582 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003966 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
```

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[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.008760 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.023752 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.014510 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.016965 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004171 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005742 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003836 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004771 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004826 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004681 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005514 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.002850 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.003649 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004617 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005329 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004730 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004404 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004536 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003311 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005346 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005097 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004655 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004454 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003816 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.003276 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004829 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004797 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005281 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003548 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004894 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005270 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004863 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005479 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003919 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005159 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005354 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005244 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003210 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004029 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004389 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004782 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004753 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004147 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.006270 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004805 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005106 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004718 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004672 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003904 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005145 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005332 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005242 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004349 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003383 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004302 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004588 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004930 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003866 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005366 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004942 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005365 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.003799 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007125 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
```

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[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.004068 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003926 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004780 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004935 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.002964 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004223 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004023 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.01 MB) transferred to GPU in
0.004315 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004808 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004919 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003857 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005321 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005439 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005433 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004561 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.002621 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004028 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004837 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004442 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005607 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005511 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005708 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.017430 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.016207 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004602 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005521 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005351 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004182 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005117 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005318 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005302 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005437 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004433 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003574 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003893 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004038 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005411 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005069 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.006065 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005043 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005155 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005331 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005555 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003270 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004718 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005427 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005295 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005169 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004684 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004127 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004505 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003717 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005118 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003571 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.002542 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.002777 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003298 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004081 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.004608 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005327 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005699 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006766 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.005786 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546

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[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005514 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005475 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005407 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004186 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004647 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003458 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.01 MB) transferred to GPU in
0.004315 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005116 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005374 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004260 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005474 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005507 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004223 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004199 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003818 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
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```
0.005031 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005340 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005286 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005294 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005412 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003523 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004218 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003446 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004151 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005293 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005438 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004671 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004620 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005060 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004862 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005649 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
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```
0.005292 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005093 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004043 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003814 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005509 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005489 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003735 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005037 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003579 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.006049 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005122 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005052 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005059 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004140 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005569 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004857 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
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0.003641 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004016 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004298 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003607 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005092 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003408 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003125 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.002569 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003493 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004259 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004962 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005284 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004587 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006879 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465

[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005338 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.002729 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.002379 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.002225 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004207 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004341 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004321 secs. 1 sparse feature groups

[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003259 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004316 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004761 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006767 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005269 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003944 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003435 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004831 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004600 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003637 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004184 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004392 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003496 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.002763 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002485 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006932 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
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[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.012391 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.012156 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004224 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004230 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004662 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004431 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.002945 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in

0.004204 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004036 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004252 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003962 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006983 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in

0.005609 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002945 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004603 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004616 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004751 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003970 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003623 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004252 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004310 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003931 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003913 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006970 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546

[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.004518 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.002784 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.002724 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.003911 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.003467 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.003001 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004088 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.002430 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.003196 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in 0.002821 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004332 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006938 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005390 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521

[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006449 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.005846 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0

[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing row-wise multi-threading, the overhead of testing was 0.003763 seconds.
You can set `force_row_wise=true` to remove the overhead.
And if memory is not enough, you can set `force_col_wise=true`.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.011758 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.005387 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used

features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.004308 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006901 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5

[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.004072 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006859 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.

Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005614 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.004380 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.003450 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.004562 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.004715 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.004879 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.004471 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.003108 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.004510 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.004726 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.004718 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in 0.004589 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002606 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004547 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003784 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004668 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003601 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004677 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004762 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004791 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002315 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.005502 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004590 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003465 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.005152 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004925 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003178 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004125 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003102 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003596 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.005047 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004372 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.005447 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004433 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004165 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004509 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003353 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003094 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002563 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006956 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
```

[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.006349 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in 0.004795 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.003477 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.004618 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.003917 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.004110 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.004496 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.003264 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004715 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003306 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004835 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004900 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003456 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004344 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003052 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003686 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004127 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005054 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004412 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005346 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004610 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003600 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003841 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005215 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004385 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004740 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005683 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003135 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005069 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004358 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002903 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003756 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.005373 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004825 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004668 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.004735 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005252 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004507 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004989 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
```

[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006770 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.014830 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.013001 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004187 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004645 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in

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0.004438 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003845 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004625 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002819 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.005113 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002991 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003037 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004457 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003399 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003986 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004517 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002374 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004753 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003145 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004526 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004905 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

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0.004819 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002862 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004509 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003140 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004548 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004261 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004784 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003932 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003021 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003539 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.005415 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.002919 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.64 MB) transferred to GPU in
0.003132 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004482 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.004203 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.005231 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
```

0.005147 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.005532 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.65 MB) transferred to GPU in
0.003357 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007296 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.004316 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.004708 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003821 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004654 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003649 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004598 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004506 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003440 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004707 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004794 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004453 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002412 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004275 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003636 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004770 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005069 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003380 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005105 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002866 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004834 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002667 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004658 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004634 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003160 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004726 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005138 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003603 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004703 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005144 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004387 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004492 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005613 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.004091 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005229 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004623 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in
0.005165 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005022 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004893 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003956 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007199 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
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[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.004241 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in 0.004882 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.004713 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.004529 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.004977 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.003256 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.003574 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.004934 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.003847 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002787 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.003578 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.004231 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.004322 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004201 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004835 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004115 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.002982 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004989 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004544 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005284 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003990 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003600 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004775 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003276 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.003263 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.005068 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004017 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004909 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in
0.004003 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002518 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.004263 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.002528 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in 0.004655 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.005069 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.003843 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.77 MB) transferred to GPU in 0.004780 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.004171 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.004386 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.78 MB) transferred to GPU in 0.003104 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006930 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0

[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005996 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006751 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.

Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.004431 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006955 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA

Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.005462 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006939 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005315 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401

[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007243 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005072 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4

[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007054 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.019684 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.012478 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.004307 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004320 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004363 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004044 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004221 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004435 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002936 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004291 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003479 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004524 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002910 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004460 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.003178 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003312 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003101 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002182 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004239 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003790 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002850 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002182 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.003180 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004303 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002387 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004370 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003994 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006922 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
```

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[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.006009 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004401 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003382 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004344 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003513 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003123 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004230 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002876 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002419 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004838 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004340 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004456 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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0.002596 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002681 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002583 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004640 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002907 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003791 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004063 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002869 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003438 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003888 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002961 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004061 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004377 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004830 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004371 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.005189 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5

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[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007021 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.005976 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004150 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004058 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004370 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004298 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004297 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003464 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004292 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004229 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004055 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002837 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004078 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004227 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004261 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002594 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004727 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003744 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.005103 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003028 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004816 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004569 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004416 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004490 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003609 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004842 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004627 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003933 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006866 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
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Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.006381 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.004121 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002882 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004121 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004751 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.004367 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.004924 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004868 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004290 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.004332 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002837 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004434 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004628 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004226 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002787 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003711 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003433 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004207 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002470 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003381 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004761 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003800 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004900 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004513 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004925 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004423 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.005093 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004849 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006890 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005552 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003892 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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0.003390 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003938 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004572 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004206 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004174 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003733 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004432 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004501 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004018 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004153 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004547 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003628 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003982 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004459 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003816 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002694 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in

0.004320 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003354 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004510 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004481 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002948 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004367 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004379 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004445 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004362 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003188 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006737 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.

Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005721 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006762 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3

[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.004006 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006915 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation

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[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.005642 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006768 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.004686 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
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[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007531 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.005497 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319

[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007294 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.014436 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.009802 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004017 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004621 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.005489 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in

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0.004358 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004930 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004520 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004620 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004000 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004347 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004941 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004594 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003123 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002580 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003572 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004076 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003321 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004267 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002512 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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0.004090 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004429 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003529 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003546 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004640 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005020 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004897 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004689 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004262 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004563 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004882 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003960 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004791 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003102 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004400 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004870 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
```

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0.004555 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003119 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004446 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003312 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003424 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003978 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005100 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004051 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004552 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004249 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003429 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004987 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004629 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005212 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004080 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005232 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
```

```
0.006598 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003521 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004632 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005097 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003254 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005260 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005995 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004693 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005215 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005027 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005934 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005216 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005393 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.006585 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005712 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
```

```
0.005755 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.006508 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.006612 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008055 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007656 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007642 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008301 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.009496 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007476 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008192 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007856 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.009025 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007941 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007847 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007826 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.010179 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
```

0.007605 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007740 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.009410 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008373 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007526 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007160 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.009479 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22

[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005698 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004631 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004753 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004715 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004290 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005104 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003764 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003281 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004817 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005895 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004824 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005288 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003759 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002889 secs. 1 sparse feature groups

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005149 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003576 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004839 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004952 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004117 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004866 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005154 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004977 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005064 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004640 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003719 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005590 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003616 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005398 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004324 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005612 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003538 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004702 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005438 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004176 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004363 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005051 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005261 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003975 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005208 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005982 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003702 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005053 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005318 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004762 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004610 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004051 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004761 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004187 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004859 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003784 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004889 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004289 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003564 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005756 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005208 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003896 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004779 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002644 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005171 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005958 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005099 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003067 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007544 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007070 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005700 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006182 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006209 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006144 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005351 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006165 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006001 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006820 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007029 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007302 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007623 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007709 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008877 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007945 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008378 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008044 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008616 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008236 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008445 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008927 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008336 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009345 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008425 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009317 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008180 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009960 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007987 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007039 seconds.
```

You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005388 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003065 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004999 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004725 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004991 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.005093 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004497 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004729 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004486 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003128 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004140 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004739 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004559 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004229 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004040 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004116 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003995 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004407 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002958 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004380 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004316 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003859 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004532 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005060 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003865 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004761 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004670 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004919 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003721 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004374 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002756 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002767 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005031 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004840 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003328 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004576 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004700 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003108 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004399 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004573 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003257 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002540 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003323 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003643 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004839 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004538 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004845 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004583 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004459 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004464 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003701 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004636 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003501 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004541 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004693 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004741 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.006005 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005019 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005934 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005155 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005075 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005633 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005699 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.006004 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.006110 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005629 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005715 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004817 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008140 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008442 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008743 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007422 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007136 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007987 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.009142 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007779 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008216 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007563 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008279 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007480 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.009308 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007542 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007525 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.009546 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.010315 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007540 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.008238 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.007722 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.007876 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.007590 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.007879 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing row-wise multi-threading, the overhead of testing was 0.004308 seconds.
You can set `force_row_wise=true` to remove the overhead.
And if memory is not enough, you can set `force_col_wise=true`.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA

Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.007435 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004681 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004533 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004700 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005318 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004114 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005495 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004556 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005100 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005202 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005695 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005402 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004888 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003789 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004900 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003599 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005157 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004138 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003396 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003930 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005163 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004727 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009690 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005429 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003118 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003120 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004469 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003550 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004900 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004884 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005013 secs. 1 sparse feature groups
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0.004922 secs. 1 sparse feature groups
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0.004182 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.004206 secs. 1 sparse feature groups
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0.004486 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005315 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005100 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004028 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005267 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005143 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004089 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005006 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003357 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004912 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004817 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004627 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.003636 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005083 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002893 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004238 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005571 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007455 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006110 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005409 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005921 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006816 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005197 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006040 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006610 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006427 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005679 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006970 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007040 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006821 secs. 1 sparse feature groups
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0.009798 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008031 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007071 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008642 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008585 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008825 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007840 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007859 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009453 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007500 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.010600 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008069 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008776 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008826 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009022 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008961 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009050 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008848 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008194 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007085 seconds.
You can set `force_col_wise=true` to remove the overhead.

```
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.007261 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005574 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005236 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005481 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004915 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004673 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

```
0.003934 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004824 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003514 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005466 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004596 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005508 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004718 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004600 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005122 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004703 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003602 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003969 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003625 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004642 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003931 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004489 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

0.003624 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003577 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005058 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005173 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003388 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002432 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004834 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004103 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005333 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004603 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004311 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004972 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004767 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004682 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004140 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003703 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in

```
0.003698 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005000 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003709 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003690 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003959 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004997 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004721 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004755 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004171 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004695 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003357 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005302 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004640 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004846 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005433 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005558 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

```
0.004550 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004954 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004533 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003992 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003990 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005073 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005263 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006101 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006686 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006223 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005441 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005992 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006881 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004577 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006198 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005576 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
```

```
0.005209 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007688 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007081 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006594 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005350 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008234 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007940 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008043 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007383 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008186 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008042 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008108 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.010526 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007714 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008958 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008645 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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0.008235 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.008822 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.009576 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.008926 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.008739 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.005767 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…

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[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.004772 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002457 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004514 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004284 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004565 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004835 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005230 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003814 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004039 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005045 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004265 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005131 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.006180 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008453 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008857 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008483 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.009121 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008690 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008489 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.009144 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008492 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008301 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008962 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.010050 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008209 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008439 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006290 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
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[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.004854 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004213 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004185 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004203 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002765 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.003987 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005204 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005070 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004942 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004680 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004943 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005698 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004611 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008725 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007905 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008743 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008988 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009169 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009173 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.010469 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009489 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009662 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008909 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.008252 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.009027 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007210 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.004497 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in

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0.004890 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004114 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004119 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004686 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004585 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003013 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003987 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004870 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004514 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003844 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.006116 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005087 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008670 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008580 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008994 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008936 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
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0.008360 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.009074 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.007533 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008805 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008623 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.009046 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.009113 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.008519 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.009406 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006922 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0

[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005716 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003678 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003404 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004793 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003535 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003746 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005765 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004888 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005096 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005130 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005464 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007616 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006734 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006752 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.010634 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008569 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008003 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.010177 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009300 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008813 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.010008 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009960 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.010656 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009154 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009692 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.010549 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
```

Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007684 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005804 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003291 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004155 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004754 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003538 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003898 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003952 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003336 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004649 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004539 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003645 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005671 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006650 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007012 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.010339 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.007836 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009711 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009282 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008977 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009485 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009265 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.011309 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.009356 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008845 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.008546 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.010398 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007012 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
```

features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005846 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004318 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.004376 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.003748 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.004119 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!

```
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005465 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002342 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003973 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004540 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.005969 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
```

[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005734 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.003445 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.002974 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004184 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006982 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5

[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.006003 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.004485 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004404 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004420 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007189 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9

[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.004574 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002514 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.005236 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004601 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.005543 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3

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[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.005671 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002041 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002531 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002756 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004352 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003914 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004145 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004131 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004098 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004128 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002616 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002562 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003648 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003840 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004091 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004794 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002922 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003214 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005503 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003837 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004098 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004683 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004144 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004307 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002886 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002546 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004454 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004074 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003616 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004731 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004629 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004691 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004443 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004559 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003517 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002541 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003432 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004346 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003880 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002501 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004386 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004205 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004356 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004132 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003464 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004011 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003953 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004051 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004262 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004375 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004055 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004208 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002838 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003175 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002896 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004843 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003021 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003837 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004037 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004062 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004191 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005597 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003722 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003576 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005771 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004439 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004608 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004497 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004772 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005179 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005736 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006365 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005744 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006152 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006160 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004710 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005906 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006021 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006536 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007296 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006801 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007947 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005502 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007306 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005608 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005633 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005169 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005889 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005643 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.006299 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.009179 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.006337 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.005944 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.005696 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.006320 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.007028 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.005764 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored. Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006329 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored. Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored. Current value: bagging_fraction=0.4

[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.006069 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.004354 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.004375 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.002353 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.004263 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.004165 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.003146 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.004352 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.003763 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.004288 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.002830 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in

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0.002755 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002441 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002350 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004073 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002594 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004489 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003333 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003971 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004794 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004222 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004102 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003632 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004292 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002714 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003618 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003724 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
```

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0.004414 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003830 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003120 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003769 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004416 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004277 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004271 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004697 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004709 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004466 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004117 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003567 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003480 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002563 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003019 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
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0.002702 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004563 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004255 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003208 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003229 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004325 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004085 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003590 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003446 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004325 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003490 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004359 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004901 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004202 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004823 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005613 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in

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0.004450 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004578 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005376 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005313 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003970 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003976 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004345 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005768 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003567 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006991 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006536 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006523 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005509 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006700 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006279 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007429 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
```

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0.006465 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006749 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005748 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007476 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005191 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.008114 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006433 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006134 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006242 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005982 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006784 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005989 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007482 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006905 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006121 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
```

0.006520 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006246 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006245 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005828 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006574 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.008283 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006787 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006990 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!

[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005898 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.004018 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.004207 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.004296 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.004119 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.003359 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.004130 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.004213 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.004009 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.004213 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.003986 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.003404 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in 0.002953 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003546 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004173 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004283 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004400 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003559 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004253 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004220 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004270 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004211 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003433 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004795 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004301 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004681 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002616 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004429 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003827 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003880 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002864 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003001 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002707 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004463 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003110 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002821 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003122 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003402 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003020 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003604 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004356 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004491 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004071 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003056 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004335 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003999 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004630 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004201 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004468 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003800 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004102 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004231 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002124 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003000 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003992 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.002959 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003419 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003887 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003309 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004328 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004829 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004760 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003436 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005124 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003699 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003686 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004443 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005805 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004868 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.003786 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004386 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005826 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004788 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007480 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004677 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006114 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007132 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005735 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005870 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005130 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006680 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.008059 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005231 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.008269 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.004928 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.008702 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006104 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007132 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006381 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007360 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007095 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006197 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007925 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.007884 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006607 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.006957 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.37 MB) transferred to GPU in
0.005263 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006846 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
```

Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.006828 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002137 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005762 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003916 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003941 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004276 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003510 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004048 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004382 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004235 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004354 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004244 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004241 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004265 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002666 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004324 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004331 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004296 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002621 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002733 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002653 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004363 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002556 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004412 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004620 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004383 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004912 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003750 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004708 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003646 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004257 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003481 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004467 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004459 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004246 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004684 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004471 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002463 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003922 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003585 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002276 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004509 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005149 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003964 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004323 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004266 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004401 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004158 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002956 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004293 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003828 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003511 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004920 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005320 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005268 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005409 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004057 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005536 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003904 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006919 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006425 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.008158 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005953 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007323 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005910 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006197 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005604 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005774 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006715 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004828 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006049 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007385 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005162 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006860 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007436 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007490 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006069 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006640 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006903 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006975 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007018 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007808 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005498 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.008248 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006865 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006292 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006594 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.008296 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006861 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007702 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005670 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007238 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007213 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.006097 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.006732 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in 0.005633 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in 0.006834 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored. Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007823 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored. Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored. Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005601 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004247 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003005 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002708 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004317 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004096 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003387 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003957 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004534 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003992 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004101 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004548 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004047 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003295 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002517 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
```

0.002961 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003035 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002455 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004231 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002325 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003310 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004520 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002829 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004282 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004090 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004242 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003561 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004386 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004069 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004824 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004229 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in

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0.003453 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004124 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004292 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003984 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004778 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004364 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004345 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004381 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003746 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003284 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003675 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004662 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004509 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002889 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004398 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004177 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
```

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0.004314 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004888 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004972 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004524 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003665 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004266 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.002980 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004201 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.002870 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004501 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004442 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004647 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.003256 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004340 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004917 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003617 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
```

```
0.004880 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005985 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005516 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005168 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.003579 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004136 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005085 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.004985 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004318 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.004109 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005978 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006371 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007294 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006162 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.008136 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007486 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
```

```
0.005544 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006696 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.005730 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006711 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007051 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006790 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005412 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006073 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006563 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006316 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.007315 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.005984 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006533 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.007270 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.006188 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.008364 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
```

0.006533 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.45 MB) transferred to GPU in
0.006708 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.44 MB) transferred to GPU in
0.008103 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.6, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.6
[LightGBM] [Warning] bagging_fraction is set=0.4, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.4
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007258 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.005540 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003392 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005119 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003808 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004551 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004845 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004811 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004825 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003829 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005405 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004770 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005241 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005208 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005029 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004862 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004989 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004967 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004528 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005691 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.003899 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005083 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004959 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003897 secs. 1 sparse feature groups
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0.003132 secs. 1 sparse feature groups
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0.004895 secs. 1 sparse feature groups
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0.004257 secs. 1 sparse feature groups
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0.005226 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005518 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005418 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.004557 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005116 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004804 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004830 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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0.006375 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004653 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004227 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004888 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005241 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005293 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005405 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005771 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004432 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.003645 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.003714 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004365 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004692 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004432 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005528 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004606 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005280 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005181 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005106 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005051 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005458 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004108 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.006248 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005838 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005081 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004482 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005363 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003572 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004366 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.003611 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004612 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005999 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004811 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005758 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004707 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.006398 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005193 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005715 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
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0.005278 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003947 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005345 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005466 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005116 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004918 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005181 secs. 1 sparse feature groups
```

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003481 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005710 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005391 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004282 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005399 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005225 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005809 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006662 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
```

[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.003928 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.004745 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.003155 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005588 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005162 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.006061 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.004011 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.01 MB) transferred to GPU in 0.004381 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005409 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.004092 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005514 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005342 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005484 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.007344 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.002767 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003421 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.006306 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005573 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004800 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005062 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003747 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004122 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004019 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005068 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004457 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004574 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004623 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003918 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004646 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005681 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005116 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005300 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004992 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003921 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005046 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005227 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004884 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005142 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004938 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004243 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.007044 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005755 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005155 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005409 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004826 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004478 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004853 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005106 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005484 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005261 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004054 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003573 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003330 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005321 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004977 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005189 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005413 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005753 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004796 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004596 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.006011 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004076 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004087 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004210 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005408 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.006217 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.006556 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.007473 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005493 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004756 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005332 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005794 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.006330 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004800 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005218 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.004279 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.004368 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005544 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.004686 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.004587 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005453 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.004967 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005154 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005111 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005794 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007051 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27

[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.004329 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in 0.005088 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in 0.004623 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in 0.005307 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in 0.004929 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in 0.004900 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in 0.004871 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in

```
0.004797 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004906 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005302 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005067 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004122 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005485 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.003408 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004879 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004854 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004840 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003750 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005623 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005400 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005446 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005163 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004462 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
```

0.004311 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004858 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004766 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005151 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005211 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004950 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.006195 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005093 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004473 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003506 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003956 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004754 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003302 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005272 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004492 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003031 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in

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0.003937 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005361 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004388 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004947 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004918 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005007 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003496 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004452 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004676 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005544 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005281 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005579 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004608 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005386 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.003560 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004779 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
```

```
0.005283 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004777 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005022 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004357 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005606 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.006649 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005276 secs. 1 sparse feature groups
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[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004881 secs. 1 sparse feature groups
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0.005225 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005052 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
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[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.003485 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005847 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005893 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004751 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005492 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
```

0.003189 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.004382 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004605 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005766 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005752 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.006064 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.004457 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005449 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.003622 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.006017 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005514 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005691 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005473 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in
0.005471 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.84 MB) transferred to GPU in
0.005135 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.83 MB) transferred to GPU in

0.005347 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006220 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.005831 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005398 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.004353 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005580 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005026 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.006430 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005246 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.01 MB) transferred to GPU in
0.005090 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004982 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005451 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005868 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005259 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005514 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005610 secs. 1 sparse feature groups
```

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```

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```

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[LightGBM] [Info] Size of histogram bin entry: 8
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```

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0.006051 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003685 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006069 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA

Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
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0.005335 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
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[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
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[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
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0.004678 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005958 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005495 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005369 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005021 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.003599 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005544 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005852 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005922 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.006326 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.006429 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004359 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004842 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005213 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.006564 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004320 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004377 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.005171 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in
0.004692 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.003543 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005073 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005170 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.004829 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005910 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005615 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.005464 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.004811 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.004300 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.00 MB) transferred to GPU in 0.006064 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.9, subsample=1.0 will be ignored. Current value: bagging_fraction=0.9
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.005616 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5

[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.004828 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004888 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.003155 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004340 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004418 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002897 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004475 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.003661 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004159 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in

0.004572 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003572 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004725 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002818 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007135 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in

0.015714 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.013674 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003525 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004365 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003628 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002347 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004448 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002954 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004482 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003485 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002266 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004741 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004756 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006994 seconds.

You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.004996 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.003464 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.004846 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002863 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004433 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004284 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002715 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.004370 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.002535 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.003972 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004728 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.002733 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004290 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007077 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319

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[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.014889 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.015055 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004328 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004273 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004547 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004372 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004835 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004851 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002846 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004828 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002782 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
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0.003176 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006916 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.006543 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.004385 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004968 secs. 0 sparse feature groups

[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004527 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004033 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004235 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003077 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004475 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004648 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003178 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004230 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004727 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004250 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006983 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.

Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.006038 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.005758 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6

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[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.006599 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007528 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
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[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.013040 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006243 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.004552 secs. 1 sparse feature groups

[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007305 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.004762 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.

Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006939 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005453 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006762 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.

Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.006060 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
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[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006986 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
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Current value: bagging_freq=0
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Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.004912 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401

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[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007078 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464

[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
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[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.006502 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007318 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
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[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005005 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007053 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
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[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.004567 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004441 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003914 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004273 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003586 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004938 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007455 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be

ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005993 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005149 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004869 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006016 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002900 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004794 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006984 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401

[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.004729 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003585 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004579 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.005156 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004646 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003880 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2

[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007339 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.011086 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.021910 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005245 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002913 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005086 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.003743 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007193 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored. Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.004646 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004430 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in

0.005172 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004738 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005282 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005023 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=2, subsample_freq=0 will be ignored.
Current value: bagging_freq=2
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006866 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in

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0.005433 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004278 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004197 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002912 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004672 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004585 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004035 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.003321 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003780 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004397 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004263 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.003114 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004403 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004193 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004923 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004244 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004209 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004322 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004468 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007586 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
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Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.004820 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002776 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003057 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004451 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002485 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004484 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004339 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002609 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003419 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.005319 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004987 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004221 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004551 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004381 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.005069 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003425 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004814 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002707 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007634 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
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[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.005411 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003639 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.003459 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004414 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003237 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003409 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004086 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004197 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003702 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003151 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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0.003163 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004155 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002561 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004270 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004946 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004326 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002310 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003971 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004745 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007695 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4

[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.003858 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004363 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004322 secs. 1 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004407 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003026 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004731 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004851 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002912 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003205 secs. 1 sparse feature groups

[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.003565 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.003559 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004768 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004441 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004763 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.004928 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.003083 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004382 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.003767 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.002999 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.008709 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.

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Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.006131 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004359 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003637 secs. 0 sparse feature groups
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004203 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004364 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003835 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003737 secs. 0 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002587 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002902 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004337 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004246 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.005190 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004396 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004283 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004172 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004527 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003822 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004469 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004209 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.4, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.4
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007193 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
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features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005666 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006842 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0

[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.016030 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006918 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.

Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.004054 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006819 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored. Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA

Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.017514 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006961 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.006008 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546

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[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=6, subsample_freq=0 will be ignored.
Current value: bagging_freq=6
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006827 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.017011 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.015348 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004236 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004533 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002999 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004816 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004373 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004250 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004044 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005051 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004372 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004569 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004635 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005008 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003592 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003832 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005382 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003759 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004758 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.005090 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.005178 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007213 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.006127 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005088 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004929 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004725 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003948 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004177 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002932 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004877 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004514 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004941 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005110 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005456 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003700 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004687 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005209 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005165 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003150 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004466 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004175 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005485 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005965 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007456 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8

[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.004986 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003530 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.005072 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003621 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004263 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003319 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004951 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003886 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004264 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003891 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004758 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003460 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003568 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004475 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002811 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in

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0.003493 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004829 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004718 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004536 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004592 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005175 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing row-wise multi-threading, the overhead of
testing was 0.004228 seconds.
You can set `force_row_wise=true` to remove the overhead.
And if memory is not enough, you can set `force_col_wise=true`.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
```

features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.003886 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004986 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004330 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004901 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004165 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004624 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004298 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003361 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004250 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003944 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005064 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005657 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004234 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in

0.004563 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005056 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004809 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005223 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003585 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005235 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004113 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004424 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006126 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.

Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.003712 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002885 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004496 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004394 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004011 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.003190 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.003929 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.003560 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004527 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.003540 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005039 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.003765 secs. 0 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005856 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004497 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006044 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004874 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004713 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005343 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003178 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004742 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005121 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007197 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
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[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005901 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004793 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.002598 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004534 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004419 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004170 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.002861 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004513 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004609 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004421 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004816 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004818 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004469 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007108 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.017774 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401

[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.013383 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003476 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004453 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004662 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003280 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004755 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003836 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005181 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003843 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004540 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003697 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004638 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007015 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463

[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.004508 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.002966 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.003195 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.003352 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004803 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004680 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004337 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004149 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003337 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004280 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004116 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.005085 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004662 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007190 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
```

[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.006062 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.005388 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004971 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.002911 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.003725 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.005077 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.003893 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004886 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.003150 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in 0.003235 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004740 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004043 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004070 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be

ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006827 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005663 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004210 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004380 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in

0.004601 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004670 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003051 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003521 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002866 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004724 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004716 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004518 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003643 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003484 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.005371 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.

Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005474 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007445 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3

[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.004820 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006995 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation

[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.005513 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007163 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored.
Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005303 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401

[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006816 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.004031 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=1.0, subsample=1.0 will be ignored. Current value: bagging_fraction=1.0
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored. Current value: bagging_freq=3
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319

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[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006909 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.005438 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007507 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
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[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.004971 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006737 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1

[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005562 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007758 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored. Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored. Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319

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[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.004899 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007761 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
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[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005812 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.7, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.7
[LightGBM] [Warning] bagging_freq is set=1, subsample_freq=0 will be ignored.
Current value: bagging_freq=1
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007124 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.005785 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004309 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.003155 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003904 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003307 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004473 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004323 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004608 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003222 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004418 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002844 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003325 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004483 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007147 seconds.
You can set `force_col_wise=true` to remove the overhead.
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[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005630 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004403 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004434 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004057 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004396 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004364 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
```

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0.004623 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004487 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004543 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004507 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004535 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003689 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004252 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004566 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006890 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
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Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005904 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004346 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.002770 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004372 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.003755 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.003025 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004436 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.004423 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004297 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.003916 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in 0.004460 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in 0.004666 secs. 1 sparse feature groups

[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004524 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003036 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006837 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005750 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004419 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004474 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004408 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002845 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004579 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004800 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004743 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004517 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003474 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.005210 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003397 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004001 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004602 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007000 seconds.
You can set `force_col_wise=true` to remove the overhead.
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```
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.020084 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.016136 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004557 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003092 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004504 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004290 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
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0.004448 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004625 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004808 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004511 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004730 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004467 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003935 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004174 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.9, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.9
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006140 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.

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Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.013409 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.015098 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004404 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003773 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003291 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004359 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003087 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.002594 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004872 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002295 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004393 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004129 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003031 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.005301 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007077 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004324 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006921 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006818 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006736 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.007850 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006035 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007366 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006811 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.008259 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006731 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.005871 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006753 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007146 secs. 1 sparse feature groups
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007267 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.006872 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006612 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006145 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007661 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.005446 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006874 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007267 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.007523 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006201 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007502 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006394 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006519 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006582 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007815 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.006050 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.006441 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.007709 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.007064 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007405 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007526 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006351 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.007114 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.006745 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006349 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006577 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006742 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.008344 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006313 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007334 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006141 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006066 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006931 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.005815 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.005859 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006137 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006891 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007173 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007305 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.007637 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007329 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006937 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006875 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006212 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006224 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006984 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006687 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006594 secs. 1 sparse feature groups
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[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007068 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.005714 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.004399 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.003652 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004210 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004184 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004402 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003894 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003444 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.005182 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004641 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004583 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004378 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003502 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004948 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004268 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007004 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007814 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007403 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007396 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007487 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006860 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.006113 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007399 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007938 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007088 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.006963 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006778 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.006197 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007389 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007772 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007815 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006509 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007584 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.008050 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.008519 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.006806 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007819 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007891 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007004 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006819 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007386 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007299 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007939 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006557 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007173 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006563 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007178 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007699 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006393 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007441 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006548 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007004 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007249 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007788 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.005597 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.005930 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007855 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.008109 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006012 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006958 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006881 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007792 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007125 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006542 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007562 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007593 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007039 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.007894 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.007315 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.007232 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.007958 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.007286 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.007864 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.007888 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.006298 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.007802 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007277 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be

ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.005374 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003897 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004942 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003368 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002381 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004070 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004326 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004455 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004313 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004762 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in

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0.004616 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.004033 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.003852 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.004342 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.002337 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.005321 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006439 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006093 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006600 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.005929 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006549 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006868 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.005531 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.006550 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006885 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006415 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
```

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0.006216 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007549 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007626 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.006307 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007587 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006462 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006480 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007829 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006181 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006692 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.006756 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006887 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006090 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006061 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007737 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006704 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
```

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0.007857 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.007041 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.007595 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.006974 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.006165 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007019 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007495 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006501 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.006429 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.006497 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.005768 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006709 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006174 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.005687 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006864 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006500 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
```

```
0.006261 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006631 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007733 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006614 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.007642 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007121 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007197 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.005741 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007096 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.47 MB) transferred to GPU in
0.006689 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007012 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007394 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007697 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.006845 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007560 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007636 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
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0.006854 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.46 MB) transferred to GPU in
0.007512 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.008745 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.006792 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004613 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003461 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003131 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004609 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.002679 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.003446 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004464 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004427 secs. 1 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004073 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004626 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002865 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003618 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004579 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.005242 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.005413 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007798 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007100 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007783 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006226 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.008034 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007785 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007587 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007104 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006753 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007653 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006757 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.005816 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007816 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.008069 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006357 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006787 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.006490 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007274 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007535 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007333 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007366 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.008017 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.008098 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007277 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006775 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007117 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006847 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007380 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007436 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007083 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007880 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007958 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007952 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007367 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007338 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007337 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006624 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.008034 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007386 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006097 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007822 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.008001 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006726 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006899 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007124 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007217 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007778 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007758 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007871 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.006891 secs. 1 sparse feature groups
```

[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.006359 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.007766 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.007383 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.007478 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.007932 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.008024 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.006972 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.007468 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.007619 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.007361 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006942 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.

Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.006332 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.004338 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004657 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004377 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.003482 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.002525 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.004114 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.004498 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.003018 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004491 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.003187 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004374 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.005093 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.002981 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.004877 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.005945 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.004718 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007100 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007955 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007750 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007632 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007681 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007596 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007487 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006831 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.008201 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006974 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.006152 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.008365 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007739 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006319 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007166 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007044 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006811 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007274 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.006397 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.009491 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007272 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.006198 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.009079 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007165 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007936 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007844 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006949 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007012 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007464 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007409 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.008013 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007149 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007273 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006007 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006966 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006795 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007738 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.008011 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007404 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007309 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007281 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007809 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007397 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007072 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007074 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006975 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007026 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.006823 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.006764 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.006009 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007281 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.007017 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in
0.007963 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.008297 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006898 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in
0.006323 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (0.55 MB) transferred to GPU in 0.005724 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.007346 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.56 MB) transferred to GPU in 0.006647 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006938 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005965 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521

[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.003475 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.002320 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004103 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004739 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.013598 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…

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[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.006856 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004536 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003094 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003516 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004660 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.008380 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
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[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.006366 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004359 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004171 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004503 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.003006 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007067 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6

[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.007018 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004772 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004863 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004424 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004132 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.
Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007125 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored.

Current value: bagging_freq=5
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.006280 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.003552 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004557 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.002941 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004664 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=5, subsample_freq=0 will be ignored. Current value: bagging_freq=5
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007481 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521

[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.006690 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet

the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
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[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007357 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
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ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.

Current value: bagging_freq=0

[LightGBM] [Info] Number of positive: 8318, number of negative: 40319

[LightGBM] [Info] This is the GPU trainer!!

[LightGBM] [Info] Total Bins 3447

[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22

[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation

[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…

[LightGBM] [Info] GPU programs have been built

[LightGBM] [Info] Size of histogram bin entry: 8

[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.016760 secs. 1 sparse feature groups

[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401

[LightGBM] [Info] Start training from score -1.578401

[LightGBM] [Warning] No further splits with positive gain, best gain: -inf

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[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.005623 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
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[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
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[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8

[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005654 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
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[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006864 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored. Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored. Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.005719 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007371 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0

[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.018222 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
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[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] No further splits with positive gain, best gain: -inf
[LightGBM] [Warning] Stopped training because there are no more leaves that meet
the split requirements
[LightGBM] [Warning] feature_fraction is set=0.5, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.5
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=0, subsample_freq=0 will be ignored.
Current value: bagging_freq=0
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006872 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
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Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005856 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004295 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004561 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004453 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.003360 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004264 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.003224 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004156 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.003897 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

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[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004385 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004126 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004708 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.005775 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.005103 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003334 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003059 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004687 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004522 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.005285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004391 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004192 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004328 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004376 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004534 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003813 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.003074 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.003581 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004604 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004889 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004809 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.003123 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004855 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004454 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.011128 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.006865 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.005665 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006182 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be

ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005293 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004100 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004777 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003487 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004171 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004260 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004364 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004632 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in

0.004027 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004528 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004042 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004258 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003063 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004830 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004580 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004706 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004844 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004346 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004609 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004509 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005142 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002597 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003248 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004478 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in

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0.003171 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003340 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005375 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004940 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005777 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004713 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004945 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005880 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.005094 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.007206 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004906 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.007908 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.007027 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
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[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.005169 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.003079 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004209 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004744 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.004503 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.004423 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in 0.002775 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in 0.003022 secs. 1 sparse feature groups

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004377 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003783 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004279 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.002985 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004106 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004566 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003137 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.002552 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004596 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004440 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004543 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004529 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004181 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003926 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.003105 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003523 secs. 1 sparse feature groups
```

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003926 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004452 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004077 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.004705 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.003472 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004417 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.004306 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.002776 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.006552 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.56 MB) transferred to GPU in
0.006066 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.005834 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.55 MB) transferred to GPU in
0.005747 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006894 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
```

features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.017213 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.015406 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.005093 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.002885 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004837 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004512 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004803 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004638 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004722 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004662 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004460 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002509 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004707 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004120 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003773 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003401 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005367 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003848 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004522 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003917 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003396 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005548 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004557 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004875 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004508 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in 0.005658 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.003980 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in 0.002978 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.004405 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.005657 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.005864 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.002679 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in 0.003245 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in 0.003928 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in 0.005898 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in 0.005095 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored. Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored. Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006749 seconds.
You can set `force_col_wise=true` to remove the overhead.

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[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005968 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004681 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003270 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004247 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004676 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003701 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
```

0.003093 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004964 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004924 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.005285 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004753 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002733 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004590 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005224 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003153 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005054 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.002879 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.005794 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004677 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004598 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004463 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004202 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in

0.004423 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004112 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004194 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004063 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003008 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.004741 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003991 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.003679 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004040 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.005425 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.005489 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.67 MB) transferred to GPU in
0.004929 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.005401 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.66 MB) transferred to GPU in
0.003837 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.8, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.8
[LightGBM] [Warning] bagging_fraction is set=0.6, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.6
[LightGBM] [Warning] bagging_freq is set=4, subsample_freq=0 will be ignored.
Current value: bagging_freq=4
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of

testing was 0.006819 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3465
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3449
[LightGBM] [Info] Number of data points in the train set: 48636, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in 0.015051 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171005 -> initscore=-1.578521
[LightGBM] [Info] Start training from score -1.578521
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.013175 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004840 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002643 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004910 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004858 secs. 1 sparse feature groups

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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004065 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003428 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003167 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004789 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005013 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004946 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.006427 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005099 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004704 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004067 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002735 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005462 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005107 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004700 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004870 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004741 secs. 1 sparse feature groups
```

[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004786 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004865 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004750 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.002585 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004336 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003184 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.003791 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.004725 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in 0.005105 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.007034 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7

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[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in
0.005933 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003382 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004336 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003586 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004471 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004906 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005430 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005012 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005015 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005229 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005358 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004240 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003351 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004874 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005210 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005511 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.002981 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005254 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005293 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005380 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003728 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004728 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.006009 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004806 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005123 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005429 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
```

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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005903 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003367 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003203 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003386 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003550 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of
testing was 0.006959 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3463
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3447
[LightGBM] [Info] Number of data points in the train set: 48637, number of used
features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA
Corporation
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[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.93 MB) transferred to GPU in
0.012983 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.011886 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005258 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002639 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003491 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004984 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003854 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003272 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003247 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004609 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003824 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004860 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003311 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005010 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in

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0.003334 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004972 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.005097 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.002659 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004109 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004575 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003712 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004772 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004736 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.003538 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004502 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004069 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004832 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004737 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004675 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
0.004772 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 20 dense feature groups (0.74 MB) transferred to GPU in
```

0.003289 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006883 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8318, number of negative: 40319
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.006237 secs. 1 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171022 -> initscore=-1.578401
[LightGBM] [Info] Start training from score -1.578401
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005305 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005143 secs. 1 sparse feature groups

```
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003302 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003157 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004369 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005285 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004929 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005034 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005410 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003997 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005363 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005122 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003928 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005319 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003169 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.003216 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005510 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.004104 secs. 1 sparse feature groups
```

[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005051 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004434 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.003009 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004056 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004985 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005105 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005518 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.002717 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004931 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005116 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.004920 secs. 1 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005386 secs. 1 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] Auto-choosing col-wise multi-threading, the overhead of testing was 0.006912 seconds.
You can set `force_col_wise=true` to remove the overhead.
[LightGBM] [Info] Total Bins 3464
[LightGBM] [Info] Number of data points in the train set: 48637, number of used

features: 27
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored. Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored. Current value: bagging_freq=7
[LightGBM] [Info] Number of positive: 8317, number of negative: 40320
[LightGBM] [Info] This is the GPU trainer!!
[LightGBM] [Info] Total Bins 3448
[LightGBM] [Info] Number of data points in the train set: 48637, number of used features: 22
[LightGBM] [Info] Using GPU Device: NVIDIA GeForce RTX 2050, Vendor: NVIDIA Corporation
[LightGBM] [Info] Compiling OpenCL Kernel with 256 bins…
[LightGBM] [Info] GPU programs have been built
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (1.11 MB) transferred to GPU in 0.014359 secs. 0 sparse feature groups
[LightGBM] [Info] [binary:BoostFromScore]: pavg=0.171002 -> initscore=-1.578546
[LightGBM] [Info] Start training from score -1.578546
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.003389 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in 0.005343 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8

```
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
```

```
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005032 secs. 0 sparse feature groups
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[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005502 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005889 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
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0.003152 secs. 0 sparse feature groups
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0.003525 secs. 0 sparse feature groups
[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
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[LightGBM] [Info] Size of histogram bin entry: 8
[LightGBM] [Info] 21 dense feature groups (0.89 MB) transferred to GPU in
0.005359 secs. 0 sparse feature groups
[LightGBM] [Warning] feature_fraction is set=0.7, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=0.7
[LightGBM] [Warning] bagging_fraction is set=0.8, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.8
[LightGBM] [Warning] bagging_freq is set=7, subsample_freq=0 will be ignored.
Current value: bagging_freq=7

interactive(children=(ToggleButtons(description='Plot Type:', icons=('',),␣
 ↪options=(('Pipeline Plot', 'pipelin…

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 ↪options=(('Pipeline Plot', 'pipelin…

Transformation Pipeline and Model Successfully Saved
```

```
[25]: (Pipeline(memory=Memory(location=None),
          steps=[('numerical_imputer',
                  TransformerWrapper(exclude=None,
                                     include=['StrengthFactor', 'PriceReg',
                                              'ReleaseYear', 'ItemCount',
                                              'LowUserPrice', 'LowNetPrice',
                                              'ReleaseNumber', 'km_dist_own',
                                              'km_dist_ratio',
   'km_cluster_size',
                                              'km_dist_own_log',
                                              'km_cluster_size_log',
```

```
                                                  'gmm_prob_max', 'gmm_prob_margin',
                                                  'gmm_entropy', 'gmm_entr…
                                    boosting_type='gbdt', class_weight=None,
                                    colsample_bytree=1.0, device='gpu',
                                    feature_fraction=1.0, importance_type='split',
                                    learning_rate=0.5, max_depth=-1,
                                    min_child_samples=66, min_child_weight=0.001,
                                    min_split_gain=0.2, n_estimators=290,
     n_jobs=-1,

                                    num_leaves=70, objective=None,
                                    random_state=2025, reg_alpha=0.4, reg_lambda=4,
                                    subsample=1.0, subsample_for_bin=200000,
                                    subsample_freq=0))],
              verbose=False),
      'D:\\OneDrive\\Documentos\\GitHub\\portifolio\\gestao_estoques\\models\\LGBMCla
     ssifier_tuned.pkl')
```

```python
[26]:  # tunar logist regression
       tuned_lr = tune_model(
           lr_model,
           optimize='F1',
           n_iter=50,
           choose_better=True
       )

       # avaliar modelo
       evaluate_model(lr_model)
       evaluate_model(tuned_lr)

       # Salvar o modelo tunado
       save_model(tuned_lr, str(SAVE_DIR / "LogisticRegression_tuned"))
```

```
<IPython.core.display.HTML object>

<pandas.io.formats.style.Styler at 0x20007285600>

<IPython.core.display.HTML object>

Fitting 5 folds for each of 50 candidates, totalling 250 fits

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 ↪options=(('Pipeline Plot', 'pipelin…

interactive(children=(ToggleButtons(description='Plot Type:', icons=('',),␣
 ↪options=(('Pipeline Plot', 'pipelin…

Transformation Pipeline and Model Successfully Saved
```

```
[26]:  (Pipeline(memory=Memory(location=None),
                steps=[('numerical_imputer',
```

```
                    TransformerWrapper(exclude=None,
                                       include=['StrengthFactor', 'PriceReg',
                                                'ReleaseYear', 'ItemCount',
                                                'LowUserPrice', 'LowNetPrice',
                                                'ReleaseNumber', 'km_dist_own',
                                                'km_dist_ratio',
 'km_cluster_size',
                                                'km_dist_own_log',
                                                'km_cluster_size_log',
                                                'gmm_prob_max', 'gmm_prob_margin',
                                                'gmm_entropy', 'gmm_entr…
 importance_getter='auto',
 max_features=22,
                                                             norm_order=1,
                                                             prefit=False,
 threshold=-inf))),
                    ('trained_model',
                     LogisticRegression(C=0.027, class_weight='balanced',
                                        dual=False, fit_intercept=True,
                                        intercept_scaling=1, l1_ratio=None,
                                        max_iter=1000, multi_class='auto',
                                        n_jobs=None, penalty='l2',
                                        random_state=2025, solver='lbfgs',
                                        tol=0.0001, verbose=0, warm_start=False))],
          verbose=False),
  'D:\\OneDrive\\Documentos\\GitHub\\portifolio\\gestao_estoques\\models\\Logisti
cRegression_tuned.pkl')
```

```python
[27]:   # tunar AdaBoost
        tuned_ada = tune_model(
            Ada_model ,
            optimize='F1',
            n_iter=50,
            choose_better=True
        )

        # avaliar modelo
        evaluate_model(Ada_model)
        evaluate_model(tuned_ada)

        # Salvar o modelo tunado
        save_model(tuned_ada, str(SAVE_DIR / "AdaBoostClassifier_tuned"))
```

```
<IPython.core.display.HTML object>

<pandas.io.formats.style.Styler at 0x20007b13a00>

<IPython.core.display.HTML object>
```

```
Fitting 5 folds for each of 50 candidates, totalling 250 fits
Original model was better than the tuned model, hence it will be returned. NOTE:
The display metrics are for the tuned model (not the original one).

interactive(children=(ToggleButtons(description='Plot Type:', icons=('',),␣
 ↪options=(('Pipeline Plot', 'pipelin…

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 ↪options=(('Pipeline Plot', 'pipelin…

Transformation Pipeline and Model Successfully Saved
```

[27]:
```
(Pipeline(memory=Memory(location=None),
         steps=[('numerical_imputer',
                 TransformerWrapper(exclude=None,
                                    include=['StrengthFactor', 'PriceReg',
                                             'ReleaseYear', 'ItemCount',
                                             'LowUserPrice', 'LowNetPrice',
                                             'ReleaseNumber', 'km_dist_own',
                                             'km_dist_ratio',
 'km_cluster_size',

                                             'km_dist_own_log',
                                             'km_cluster_size_log',
                                             'gmm_prob_max', 'gmm_prob_margin',
                                             'gmm_entropy', 'gmm_entr…
         num_leaves=31,
         objective=None,
         random_state=None,
         reg_alpha=0.0,
         reg_lambda=0.0,
         subsample=1.0,
         subsample_for_bin=200000,
         subsample_freq=0),
 importance_getter='auto',
 max_features=22,
                                                          norm_order=1,
                                                          prefit=False,
 threshold=-inf))),
                 ('trained_model',
                  AdaBoostClassifier(algorithm='SAMME.R', estimator=None,
                                     learning_rate=1.0, n_estimators=50,
                                     random_state=2025))],
         verbose=False),
  'D:\\OneDrive\\Documentos\\GitHub\\portifolio\\gestao_estoques\\models\\AdaBoos
tClassifier_tuned.pkl')
```

[28]:
```
# tunar Quadratic Discriminant Analysis
tuned_qda = tune_model(
    Ada_model ,
```

```
    optimize='F1',
    n_iter=50,
    choose_better=True
)


# avaliar modelo
evaluate_model(Ada_model)
evaluate_model(tuned_qda)

# Salvar o modelo tunado
save_model(tuned_qda, str(SAVE_DIR / "QuadraticDiscriminantAnalysis_tuned"))
```

<IPython.core.display.HTML object>

<pandas.io.formats.style.Styler at 0x2000da2be50>

<IPython.core.display.HTML object>

Fitting 5 folds for each of 50 candidates, totalling 250 fits
Original model was better than the tuned model, hence it will be returned. NOTE:
The display metrics are for the tuned model (not the original one).

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 ↪options=(('Pipeline Plot', 'pipelin…

interactive(children=(ToggleButtons(description='Plot Type:', icons=('',),␣
 ↪options=(('Pipeline Plot', 'pipelin…

Transformation Pipeline and Model Successfully Saved

[28]: (Pipeline(memory=Memory(location=None),
           steps=[('numerical_imputer',
                    TransformerWrapper(exclude=None,
                                       include=['StrengthFactor', 'PriceReg',
                                                'ReleaseYear', 'ItemCount',
                                                'LowUserPrice', 'LowNetPrice',
                                                'ReleaseNumber', 'km_dist_own',
                                                'km_dist_ratio',
  'km_cluster_size',

                                                'km_dist_own_log',
                                                'km_cluster_size_log',
                                                'gmm_prob_max', 'gmm_prob_margin',
                                                'gmm_entropy', 'gmm_entr…
              num_leaves=31,
              objective=None,
              random_state=None,
              reg_alpha=0.0,
              reg_lambda=0.0,
              subsample=1.0,
              subsample_for_bin=200000,
```

```
            subsample_freq=0),
 importance_getter='auto',
 max_features=22,
                                                    norm_order=1,
                                                    prefit=False,
 threshold=-inf))),
                  ('trained_model',
                   AdaBoostClassifier(algorithm='SAMME.R', estimator=None,
                                      learning_rate=1.0, n_estimators=50,
                                      random_state=2025))],
          verbose=False),
  'D:\\OneDrive\\Documentos\\GitHub\\portifolio\\gestao_estoques\\models\\Quadrat
icDiscriminantAnalysis_tuned.pkl')
```

1.25.7 Rodar blend de modelos

```python
[29]: # --- PASSO 3: Criar uma lista com os modelos tunados para uso futuro ---
      tuned_models = [tuned_lgbm, tuned_lr, tuned_qda, tuned_ada]

      # 1) Criar o modelo blended a partir da lista de modelos tunados
      # Este modelo usa validação cruzada para encontrar o melhor blend
      blended_final = blend_models(estimator_list=tuned_models,
                                   optimize='F1'
                                   )

      # 2) Avaliar o modelo blended ANTES de finalizá-lo.
      # A avaliação aqui é justa e representa o desempenho real em novos dados.
      evaluate_model(blended_final)

      # 3) Se a avaliação acima for satisfatória, finalize o modelo.
      # A função finalize_model retreina o modelo com todo o dataset.
      final_blender_model = finalize_model(blended_final)

      # 4) Salve o modelo finalizado (este é o que irá para produção).
      save_model(final_blender_model, 'D:/OneDrive/Documentos/GitHub/portifolio/
        ↪gestao_estoques/models/final_blender_model')
```

```
<IPython.core.display.HTML object>

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<IPython.core.display.HTML object>

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Transformation Pipeline and Model Successfully Saved
```

```
[29]: (Pipeline(memory=Memory(location=None),
               steps=[('numerical_imputer',
                       TransformerWrapper(exclude=None,
                                          include=['StrengthFactor', 'PriceReg',
                                                   'ReleaseYear', 'ItemCount',
                                                   'LowUserPrice', 'LowNetPrice',
                                                   'ReleaseNumber', 'km_dist_own',
                                                   'km_dist_ratio',
        'km_cluster_size',
                                                   'km_dist_own_log',
                                                   'km_cluster_size_log',
                                                   'gmm_prob_max', 'gmm_prob_margin',
                                                   'gmm_entropy', 'gmm_entr…
                                       ('Ada Boost Classifier',
        AdaBoostClassifier(algorithm='SAMME.R',
        estimator=None,
        learning_rate=1.0,
        n_estimators=50,
        random_state=2025)),
                                       ('Ada Boost Classifier_1',
        AdaBoostClassifier(algorithm='SAMME.R',
        estimator=None,
        learning_rate=1.0,
        n_estimators=50,
        random_state=2025))],
                                       flatten_transform=True, n_jobs=1,
                                       verbose=False, voting='soft',
                                       weights=None))],
               verbose=False),
  'D:/OneDrive/Documentos/GitHub/portifolio/gestao_estoques/models/final_blender_
    model.pkl')
```

Nota

Devemos utilizar o evaluate_model antes da finalização do modelo, caso contrário as métricas resultarão em valores enganosamente altos, que não refletem a performance real do modelo em dados totalmente novos e não vistos.

1.25.8   Rodar modelo staking

```
[ ]: # Criar o modelo stacked.
     # --- PASSO 3: Criar uma lista com os modelos tunados para uso futuro ---
     tuned_models = [tuned_lgbm, tuned_lr, tuned_qda, tuned_ada]

     stacker_final = stack_models(tuned_models,
                                   optimize='F1'
                                   )
```

```python
# Avaliar modelo ()
evaluate_model(stacker_final)

# A função finalize_model retreina o modelo com todo o dataset
final_stacker_model = finalize_model(stacker_final)

# salvar o modelo final
save_model(final_stacker_model, 'D:/OneDrive/Documentos/GitHub/portifolio/
  ↪gestao_estoques/models/stacker_final_model')
```

<IPython.core.display.HTML object>

<pandas.io.formats.style.Styler at 0x2000da2a950>

<IPython.core.display.HTML object>

interactive(children=(ToggleButtons(description='Plot Type:', icons=('',),␣
  ↪options=(('Pipeline Plot', 'pipelin…

Transformation Pipeline and Model Successfully Saved

```
[ ]: (Pipeline(memory=Memory(location=None),
              steps=[('numerical_imputer',
                      TransformerWrapper(exclude=None,
                                         include=['StrengthFactor', 'PriceReg',
                                                  'ReleaseYear', 'ItemCount',
                                                  'LowUserPrice', 'LowNetPrice',
                                                  'ReleaseNumber', 'km_dist_own',
                                                  'km_dist_ratio',
      'km_cluster_size',
                                                  'km_dist_own_log',
                                                  'km_cluster_size_log',
                                                  'gmm_prob_max', 'gmm_prob_margin',
                                                  'gmm_entropy', 'gmm_entr…
      n_estimators=50,
      random_state=2025))],
                                          final_estimator=LogisticRegression(C=1.0,
      class_weight=None,
      dual=False,
      fit_intercept=True,
      intercept_scaling=1,
      l1_ratio=None,
      max_iter=1000,
      multi_class='auto',
      n_jobs=None,
      penalty='l2',
      random_state=2025,
      solver='lbfgs',
      tol=0.0001,
```

```
          verbose=0,
          warm_start=False),
                                            n_jobs=1, passthrough=False,
                                            stack_method='auto', verbose=0))],
               verbose=False),
   'D:/OneDrive/Documentos/GitHub/portifolio/gestao_estoques/models/stacker_final_
model.pkl')
```

1.25.9 PREDIÇÕES DO BLEND

```python
[31]: # Configurações iniciais
      SAVE_DIR = Path(r"D:/OneDrive/Documentos/GitHub/portifolio/gestao_estoques/
       ↪models")
      TARGET = 'SoldFlag'

      # 1) prever (ok como você já fez)
      blend = load_model(str(SAVE_DIR / "final_blender_model"))
      X_act = sales_data_act.drop(columns=[TARGET], errors='ignore')
      pred_blend = predict_model(blend, data=X_act, raw_score=True)

      # 2) detectar colunas extras criadas pelo predict_model
      extras = [c for c in pred_blend.columns if c not in X_act.columns]

      # heurística para achar score/label
      score_col = None
      label_col = None

      # candidatos óbvios
      for c in extras:
          cl = c.lower()
          if cl.endswith('score') or cl in {'score', 'prediction_score'}:
              score_col = c
          if 'label' in cl:
              label_col = c

      # fallback: se não achou score, pega uma coluna float em [0,1] entre as extras
      if score_col is None:
          for c in extras:
              s = pred_blend[c]
              if pd.api.types.is_float_dtype(s) and s.min() >= 0 and s.max() <= 1:
                  score_col = c
                  break

      if score_col is None:
          raise ValueError(f"Não encontrei coluna de score em {extras}. Mostre-me
       ↪pred_blend.columns para ajustar.")
```

```python
# 3) montar out_blend com apenas as colunas desejadas
out_blend = pd.DataFrame(index=sales_data_act.index)

# alvo se existir
if TARGET in sales_data_act.columns:
    out_blend['SoldFlag'] = sales_data_act[TARGET].values

# score
out_blend['blend_score'] = pred_blend[score_col].values

# label: usa a coluna do PyCaret se existir
if label_col is not None:
    out_blend['blend_label'] = pred_blend[label_col].values
    try:
        out_blend['blend_label'] = out_blend['blend_label'].astype(int)
    except Exception:
        pass

# 4) recorte final na ordem pedida
# A lista de colunas desejadas foi ajustada
cols = ['SoldFlag', 'blend_label', 'blend_score']
df_blend = out_blend.loc[:, [c for c in cols if c in out_blend.columns]].copy()

display(df_blend.head())
```

Transformation Pipeline and Model Successfully Loaded

<IPython.core.display.HTML object>

```
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
```

	SoldFlag	blend_label	blend_score
75996	NaN	0	0.6408
75997	NaN	0	0.7350
75998	NaN	0	0.7506
75999	NaN	1	0.3723
76000	NaN	0	0.7486

1.25.10 predições do STACK

```python
# Configurações iniciais
SAVE_DIR = Path(r"D:/OneDrive/Documentos/GitHub/portifolio/gestao_estoques/
 ↪models")
TARGET = 'SoldFlag'

# 1) carregar e prever
stack = load_model(str(SAVE_DIR / "stacker_final_model"))
X_act = sales_data_act.drop(columns=[TARGET], errors='ignore')
pred_stack = predict_model(stack, data=X_act, raw_score=True)

# 2) detectar colunas extras (criadas pelo predict_model)
extras = [c for c in pred_stack.columns if c not in X_act.columns]

score_col = None
label_col = None
for c in extras:
    cl = c.lower()
    if cl.endswith('score') or cl in {'score', 'prediction_score'}:
        score_col = c
    if 'label' in cl:
        label_col = c

# fallback de score: pega uma coluna float nas extras que esteja entre 0 e 1
if score_col is None:
    for c in extras:
        s = pred_stack[c]
        if pd.api.types.is_float_dtype(s) and s.min() >= 0 and s.max() <= 1:
            score_col = c
            break
if score_col is None:
    raise ValueError(f"Não encontrei coluna de score em {extras}. Rode␣
 ↪print(pred_stack.columns.tolist()).")

# 3) montar out_stack só com o que precisamos
out_stack = pd.DataFrame(index=sales_data_act.index)

# alvo, se existir
if TARGET in sales_data_act.columns:
    out_stack['SoldFlag'] = sales_data_act[TARGET].values

# score
out_stack['stack_score'] = pred_stack[score_col].values

# label (usa o do PyCaret se houver)
if label_col is not None:
```

```python
    out_stack['stack_label'] = pred_stack[label_col].values
    # tenta converter para int se fizer sentido
    try:
        out_stack['stack_label'] = out_stack['stack_label'].astype(int)
    except Exception:
        pass

# 4) salvar completo
out_stack.to_csv(SAVE_DIR / "predicoes_stack_sales_data_act.csv", index=False)
print("OK: predicoes_stack_sales_data_act.csv")

# 5) recorte final, na ordem pedida
# Removemos 'stack_label_thr' da lista de colunas desejadas
cols_wanted = ['SoldFlag', 'stack_label', 'stack_score']
df_stack = out_stack.loc[:, [c for c in cols_wanted if c in out_stack.columns]].
  ↪copy()
display(df_stack.head())
```

Transformation Pipeline and Model Successfully Loaded

<IPython.core.display.HTML object>

```
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
[LightGBM] [Warning] feature_fraction is set=1.0, colsample_bytree=1.0 will be
ignored. Current value: feature_fraction=1.0
[LightGBM] [Warning] bagging_fraction is set=0.5, subsample=1.0 will be ignored.
Current value: bagging_fraction=0.5
[LightGBM] [Warning] bagging_freq is set=3, subsample_freq=0 will be ignored.
Current value: bagging_freq=3
OK: predicoes_stack_sales_data_act.csv
```

	SoldFlag	stack_label	stack_score
75996	NaN	0	0.8237
75997	NaN	0	0.9659
75998	NaN	0	0.9733
75999	NaN	0	0.6724
76000	NaN	0	0.9736

```python
[33]:   # séries (ajuste os nomes se precisar)
        s_blend = out_blend['blend_score'].dropna()
        s_stack = out_stack['stack_score'].dropna()

        # long-form para o Plotly
        df_plot = pd.concat([
```

```python
        pd.DataFrame({'score': s_blend, 'modelo': 'Blend'}),
        pd.DataFrame({'score': s_stack, 'modelo': 'Stack'})
], ignore_index=True)

fig = px.histogram(
    df_plot, x='score', color='modelo',
    nbins=200, barmode='overlay', opacity=0.55,
    title='Distribuição de Scores – Blend vs Stack'
)
fig.update_xaxes(title='Score classe positiva', range=[0, 1])
fig.update_yaxes(title='Frequência')
fig.show()
```

[34]:
```python
# JOIN pelo índice
join = (
    df_blend[['SoldFlag','blend_score','blend_label']]
    .join(df_stack[['stack_score','stack_label']], how='inner')
)

# Contagem de positivos e negativos
total_registros = len(join)

# Inicializa o DataFrame para armazenar as contagens
df_counts = pd.DataFrame()

# Loop para processar os modelos
for modelo_col, modelo_nome in [('blend_label', 'Blend'), ('stack_label',
 ↪'Stack')]:
    positivos = int(join[modelo_col].fillna(0).astype(int).sum())
    negativos = total_registros – positivos

    # Adiciona as contagens ao DataFrame
    df_counts = pd.concat([
        df_counts,
        pd.DataFrame([
            {"Modelo": modelo_nome, "Categoria": "Positivos", "Quantidade":
 ↪positivos},
            {"Modelo": modelo_nome, "Categoria": "Negativos", "Quantidade":
 ↪negativos},
        ])
    ])

# (Opcional) acrescenta barra com rótulos reais, se existir
if join['SoldFlag'].notna().any():
    positivos_real = int(join['SoldFlag'].fillna(0).astype(int).sum())
    negativos_real = total_registros – positivos_real
    df_counts = pd.concat([
```

```
        df_counts,
        pd.DataFrame([
            {"Modelo": "Ground truth", "Categoria": "Positivos", "Quantidade":␣
↪positivos_real},
            {"Modelo": "Ground truth", "Categoria": "Negativos", "Quantidade":␣
↪negativos_real},
        ])
    ])

# Plotly: barras agrupadas
fig = px.bar(
    df_counts, x="Modelo", y="Quantidade", color="Categoria",
    barmode="group", text="Quantidade",
    title="Contagem de Classes - Blend vs Stack"
)
fig.update_traces(textposition="outside")
fig.update_layout(yaxis_title="Quantidade de registros", xaxis_title="")
fig.show()

# Se quiser ver o resultado do join:
display(join.head())
```

	SoldFlag	blend_score	blend_label	stack_score	stack_label
75996	NaN	0.6408	0	0.8237	0
75997	NaN	0.7350	0	0.9659	0
75998	NaN	0.7506	0	0.9733	0
75999	NaN	0.3723	1	0.6724	0
76000	NaN	0.7486	0	0.9736	0

1.26 CONCLUSÃO