

Shinkansen Travel Experience

PROBLEM STATEMENT

This is the problem of a Shinkansen (Bullet-Trains) of Japan. They aim to determine the relative importance of each parameter with regards to their contribution to the passenger travel experience. Provided is a random sample of individuals who travelled using their train. The on-time performance of the trains along with the passenger's information is published in the CSV file named 'Traveldata_train'. These passengers were later asked to provide their feedback on various parameters related to the travel along with their overall experience. These collected details are made available in the survey report CSV labelled 'Surveydata_train'.

In the survey, a passenger was explicitly asked whether they were delighted with their overall travel experience and that is captured in the data of the survey report under the variable labelled 'Overall_Experience'.

The objective of this exercise is to understand which parameters play an important role in swaying passenger feedback towards a positive scale. You are provided test data containing Travel data and Survey data of passengers. Both the test data and the train data are collected at the same time and belongs to the same company.

Objective:

- The goal of the problem is to predict whether a passenger was delighted considering his/her overall travel experience of traveling in Shinkansen (Bullet Train). For each passenger id in the test set, predict the "Overall_Experience" level.

Data set Details

The problem consists of 2 separate datasets: Travel data & Survey data. The Travel data has information related to passengers and the performance of the Train in which they traveled. The survey data is the aggregated data of surveys collected post-service experience. You are expected to treat both the datasets as raw data and perform any necessary cleaning/validation steps as required.

Import the necessary libraries

In [1]:

```
# Libraries for data manipulation
import numpy as np
import pandas as pd

# Libraries for data visualization
import matplotlib.pyplot as plt
import seaborn as sns

# Libraries for scaling the data
from scipy.stats import zscore
from sklearn.preprocessing import StandardScaler

# Library to check VIF
from statsmodels.stats.outliers_influence import variance_inflation_factor

# Libraries for Model Building
from sklearn.model_selection import train_test_split, GridSearchCV

from sklearn.tree import DecisionTreeClassifier

from sklearn.ensemble import BaggingClassifier

from sklearn.ensemble import RandomForestClassifier

from sklearn.neural_network import MLPClassifier
```

```

from sklearn.naive_bayes import GaussianNB

from sklearn.neighbors import KNeighborsClassifier

from sklearn.ensemble import AdaBoostClassifier

import catboost as catboost
from catboost import CatBoostClassifier

from sklearn.ensemble import GradientBoostingClassifier

import lightgbm as lightgbm
from lightgbm import LGBMClassifier

import xgboost as xgboost
from xgboost import XGBClassifier

from sklearn.linear_model import LogisticRegression

from sklearn.discriminant_analysis import LinearDiscriminantAnalysis

# Libraries for evaluation metrics
from sklearn import metrics
from sklearn.metrics import roc_auc_score, roc_curve, classification_report, confusion_matrix, plot_confusion_matrix

```

Read the data and EDA

In [2]:

```

import os
os.getcwd()

```

Out[2]:

```
'C:\\Users\\User\\Desktop\\GL\\Hackathon-Shinkansen'
```

In [3]:

```

survey_df = pd.read_csv("Surveydata_train.csv")
survey_df_test = pd.read_csv("Surveydata_test.csv")

```

In [4]:

```

travel_df = pd.read_csv("Traveldata_train.csv")
travel_df_test = pd.read_csv("Traveldata_test.csv")

```

In [5]:

```

# Has the Target Variable
survey_df.shape, travel_df.shape

```

Out[5]:

```
((94379, 17), (94379, 9))
```

In [6]:

```
survey_df_test.shape, travel_df_test.shape
```

Out[6]:

```
((35602, 16), (35602, 9))
```

In [7]:

```

display(survey_df.head())
display(survey_df_test.head())

```

	ID	Overall_Experience	Seat_comfort	Seat_Class	Arrival_time_convenient	Catering	Platform_location	Onboard
0	98800001	0	need improvement	Green Car	excellent	excellent	very convinient	
1	98800002	0	poor	Ordinary	excellent	poor	need improvement	
2	98800003	1	need improvement	Green Car	need improvement	need improvement	need improvement	need in
3	98800004	0	acceptable	Ordinary	need improvement	NaN	need improvement	
4	98800005	1	acceptable	Ordinary	acceptable	acceptable	manageable	need in

	ID	Seat_comfort	Seat_Class	Arrival_time_convenient	Catering	Platform_location	Onboardwifi_service	Onboard
0	99900001	acceptable	Green Car	acceptable	acceptable	manageable	need improvement	
1	99900002	extremely poor	Ordinary	good	poor	manageable	acceptable	
2	99900003	excellent	Ordinary	excellent	excellent	very convinient	excellent	
3	99900004	acceptable	Green Car	excellent	acceptable	very convinient	poor	
4	99900005	excellent	Ordinary	extremely poor	excellent	need improvement	excellent	

In [8]:

```
display(survey_df.info())
display(survey_df_test.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 94379 entries, 0 to 94378
Data columns (total 17 columns):
#   Column                                Non-Null Count  Dtype
---  -
0   ID                                     94379 non-null  int64
1   Overall_Experience                   94379 non-null  int64
2   Seat_comfort                         94318 non-null  object
3   Seat_Class                           94379 non-null  object
4   Arrival_time_convenient              85449 non-null  object
5   Catering                             85638 non-null  object
6   Platform_location                    94349 non-null  object
7   Onboardwifi_service                  94349 non-null  object
8   Onboard_entertainment                94361 non-null  object
9   Online_support                       94288 non-null  object
10  Onlinebooking_Ease                   94306 non-null  object
11  Onboard_service                       86778 non-null  object
12  Leg_room                             94289 non-null  object
13  Baggage_handling                     94237 non-null  object
14  Checkin_service                      94302 non-null  object
15  Cleanliness                          94373 non-null  object
16  Online_boarding                      94373 non-null  object
dtypes: int64(2), object(15)
memory usage: 12.2+ MB
```

None

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 35602 entries, 0 to 35601
Data columns (total 16 columns):
#   Column                                Non-Null Count  Dtype
---  -
0   ID                                     35602 non-null  int64
1   Seat_comfort                         35580 non-null  object
2   Seat_Class                           35602 non-null  object
3   Arrival_time_convenient              32277 non-null  object
4   Catering                             32245 non-null  object
5   Platform_location                    35590 non-null  object
```

```

5  Location_Location 35590 non-null object
6  Onboardwifi_service 35590 non-null object
7  Onboard_entertainment 35594 non-null object
8  Online_support 35576 non-null object
9  Onlinebooking_Ease 35584 non-null object
10 Onboard_service 32730 non-null object
11 Leg_room 35577 non-null object
12 Baggage_handling 35562 non-null object
13 Checkin_service 35580 non-null object
14 Cleanliness 35600 non-null object
15 Online_boarding 35600 non-null object

```

```

dtypes: int64(1), object(15)
memory usage: 4.3+ MB

```

None

In [9]:

```

display(travel_df.head())
display(travel_df_test.head())

```

	ID	Gender	CustomerType	Age	TypeTravel	Travel_Class	Travel_Distance	DepartureDelay_in_Mins	ArrivalDelay_in
0	98800001	Female	Loyal Customer	52.0	NaN	Business	272	0.0	
1	98800002	Male	Loyal Customer	48.0	Personal Travel	Eco	2200	9.0	
2	98800003	Female	Loyal Customer	43.0	Business travel	Business	1061	77.0	
3	98800004	Female	Loyal Customer	44.0	Business travel	Business	780	13.0	
4	98800005	Female	Loyal Customer	50.0	Business travel	Business	1981	0.0	

	ID	Gender	CustomerType	Age	TypeTravel	Travel_Class	Travel_Distance	DepartureDelay_in_Mins	ArrivalDelay_in
0	99900001	Female	NaN	36.0	Business travel	Business	532	0.0	
1	99900002	Female	disloyal Customer	21.0	Business travel	Business	1425	9.0	
2	99900003	Male	Loyal Customer	60.0	Business travel	Business	2832	0.0	
3	99900004	Female	Loyal Customer	29.0	Personal Travel	Eco	1352	0.0	
4	99900005	Male	disloyal Customer	18.0	Business travel	Business	1610	17.0	

In [10]:

```

display(travel_df.info())
display(travel_df_test.info())

```

```

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 94379 entries, 0 to 94378
Data columns (total 9 columns):
#   Column                Non-Null Count  Dtype
---  -
0   ID                     94379 non-null  int64
1   Gender                 94302 non-null  object
2   CustomerType           85428 non-null  object
3   Age                    94346 non-null  float64
4   TypeTravel             85153 non-null  object
5   Travel_Class           94379 non-null  object
6   Travel_Distance        94379 non-null  int64
7   DepartureDelay_in_Mins 94322 non-null  float64

```

8 ArrivalDelay_in_Mins 94022 non-null float64
dtypes: float64(3), int64(2), object(4)
memory usage: 6.5+ MB

None

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 35602 entries, 0 to 35601
Data columns (total 9 columns):

#	Column	Non-Null	Count	Dtype
0	ID	35602	non-null	int64
1	Gender	35572	non-null	object
2	CustomerType	32219	non-null	object
3	Age	35591	non-null	float64
4	TypeTravel	32154	non-null	object
5	Travel_Class	35602	non-null	object
6	Travel_Distance	35602	non-null	int64
7	DepartureDelay_in_Mins	35573	non-null	float64
8	ArrivalDelay_in_Mins	35479	non-null	float64

dtypes: float64(3), int64(2), object(4)
memory usage: 2.4+ MB

None

In [11]:

```
#merging the two datasets

df = pd.merge(survey_df, travel_df, on= 'ID')
df_test = pd.merge(survey_df_test, travel_df_test, on= 'ID')
```

In [12]:

```
display(df.head())
display(df_test.head())
```

	ID	Overall_Experience	Seat_comfort	Seat_Class	Arrival_time_convenient	Catering	Platform_location	Onboard
0	98800001	0	need improvement	Green Car	excellent	excellent	very convinient	
1	98800002	0	poor	Ordinary	excellent	poor	need improvement	
2	98800003	1	need improvement	Green Car	need improvement	need improvement	need improvement	need in
3	98800004	0	acceptable	Ordinary	need improvement	NaN	need improvement	
4	98800005	1	acceptable	Ordinary	acceptable	acceptable	manageable	need in

5 rows x 25 columns



	ID	Seat_comfort	Seat_Class	Arrival_time_convenient	Catering	Platform_location	Onboardwifi_service	Onboard
0	99900001	acceptable	Green Car	acceptable	acceptable	manageable	need improvement	
1	99900002	extremely poor	Ordinary	good	poor	manageable	acceptable	
2	99900003	excellent	Ordinary	excellent	excellent	very convinient	excellent	
3	99900004	acceptable	Green Car	excellent	acceptable	very convinient	poor	
4	99900005	excellent	Ordinary	extremely poor	excellent	need improvement	excellent	

5 rows x 24 columns

In [13]:

```
display("Train", df.shape)
display("Test", df_test.shape)
```

'Train'

(94379, 25)

'Test'

(35602, 24)

In [14]:

```
print(df.Overall_Experience.value_counts())
df.Overall_Experience.value_counts(normalize=True)
```

1 51593

0 42786

Name: Overall_Experience, dtype: int64

Out[14]:

1 0.546658

0 0.453342

Name: Overall_Experience, dtype: float64

In [18]:

```
df.info()
```

<class 'pandas.core.frame.DataFrame'>

Int64Index: 94379 entries, 0 to 94378

Data columns (total 25 columns):

#	Column	Non-Null Count	Dtype
0	ID	94379 non-null	int64
1	Overall_Experience	94379 non-null	int64
2	Seat_comfort	94318 non-null	object
3	Seat_Class	94379 non-null	object
4	Arrival_time_convenient	85449 non-null	object
5	Catering	85638 non-null	object
6	Platform_location	94349 non-null	object
7	Onboardwifi_service	94349 non-null	object
8	Onboard_entertainment	94361 non-null	object
9	Online_support	94288 non-null	object
10	Onlinebooking_Ease	94306 non-null	object
11	Onboard_service	86778 non-null	object
12	Leg_room	94289 non-null	object
13	Baggage_handling	94237 non-null	object
14	Checkin_service	94302 non-null	object
15	Cleanliness	94373 non-null	object
16	Online_boarding	94373 non-null	object
17	Gender	94302 non-null	object
18	CustomerType	85428 non-null	object
19	Age	94346 non-null	float64
20	TypeTravel	85153 non-null	object
21	Travel_Class	94379 non-null	object
22	Travel_Distance	94379 non-null	int64
23	DepartureDelay_in_Mins	94322 non-null	float64
24	ArrivalDelay_in_Mins	94022 non-null	float64

dtypes: float64(3), int64(3), object(19)

memory usage: 18.7+ MB

In [1250]:

```
display(df.describe(include = 'all'))
```

count	9.437900e+04	ID	Overall_Experience	Seat_comfort	Seat_Class	Arrival_time_convenient	Catering	Platform_location	C
unique	NaN	NaN	NaN	6	2	6	6	6	6
top	NaN	NaN	NaN	acceptable	Green Car	good	acceptable	manageable	
freq	NaN	NaN	NaN	21158	47435	19574	18468	24173	
mean	9.884719e+07		0.546658	NaN	NaN	NaN	NaN	NaN	NaN
std	2.724501e+04		0.497821	NaN	NaN	NaN	NaN	NaN	NaN
min	9.880000e+07		0.000000	NaN	NaN	NaN	NaN	NaN	NaN
25%	9.882360e+07		0.000000	NaN	NaN	NaN	NaN	NaN	NaN
50%	9.884719e+07		1.000000	NaN	NaN	NaN	NaN	NaN	NaN
75%	9.887078e+07		1.000000	NaN	NaN	NaN	NaN	NaN	NaN
max	9.889438e+07		1.000000	NaN	NaN	NaN	NaN	NaN	NaN

11 rows x 25 columns

In [1251]:

```
display("TRAIN DATASET",df.nunique())
display("TEST DATASET",df_test.nunique())
```

'TRAIN DATASET'

ID	94379
Overall_Experience	2
Seat_comfort	6
Seat_Class	2
Arrival_time_convenient	6
Catering	6
Platform_location	6
Onboardwifi_service	6
Onboard_entertainment	6
Online_support	6
Onlinebooking_Ease	6
Onboard_service	6
Leg_room	6
Baggage_handling	5
Checkin_service	6
Cleanliness	6
Online_boarding	6
Gender	2
CustomerType	2
Age	75
TypeTravel	2
Travel_Class	2
Travel_Distance	5210
DepartureDelay_in_Mins	437
ArrivalDelay_in_Mins	434
dtype:	int64

'TEST DATASET'

ID	35602
Seat_comfort	6
Seat_Class	2
Arrival_time_convenient	6
Catering	6
Platform_location	5
Onboardwifi_service	6
Onboard_entertainment	6
Online_support	5
Onlinebooking_Ease	6
Onboard_service	5
Leg_room	6
Baggage_handling	5
Checkin service	5

```
Cleanliness          5
Online_boarding      6
Gender               2
CustomerType         2
Age                 75
TypeTravel           2
Travel_Class         2
Travel_Distance     4644
DepartureDelay_in_Mins 350
ArrivalDelay_in_Mins 355
dtype: int64
```

In [1252]:

```
display("TRAIN DATASET",df.isnull().sum())
display("TEST DATASET",df_test.isnull().sum())
```

'TRAIN DATASET'

```
ID          0
Overall_Experience  0
Seat_comfort  61
Seat_Class   0
Arrival_time_convenient  8930
Catering     8741
Platform_location  30
Onboardwifi_service  30
Onboard_entertainment  18
Online_support  91
Onlinebooking_Ease  73
Onboard_service  7601
Leg_room      90
Baggage_handling  142
Checkin_service  77
Cleanliness    6
Online_boarding  6
Gender         77
CustomerType   8951
Age            33
TypeTravel     9226
Travel_Class   0
Travel_Distance  0
DepartureDelay_in_Mins  57
ArrivalDelay_in_Mins  357
dtype: int64
```

'TEST DATASET'

```
ID          0
Seat_comfort  22
Seat_Class   0
Arrival_time_convenient  3325
Catering     3357
Platform_location  12
Onboardwifi_service  12
Onboard_entertainment  8
Online_support  26
Onlinebooking_Ease  18
Onboard_service  2872
Leg_room      25
Baggage_handling  40
Checkin_service  22
Cleanliness    2
Online_boarding  2
Gender         30
CustomerType   3383
Age            11
TypeTravel     3448
Travel_Class   0
Travel_Distance  0
DepartureDelay_in_Mins  29
ArrivalDelay_in_Mins  123
dtype: int64
```



```
dtype: int64
```

```
In [1253]:
```

```
display("TRAIN DATASET",df.isnull().sum() / df.shape[0] * 100)
display("TEST DATASET",df_test.isnull().sum() / df_test.shape[0] * 100)
```

```
'TRAIN DATASET'
```

ID	0.000000
Overall_Experience	0.000000
Seat_comfort	0.064633
Seat_Class	0.000000
Arrival_time_convenient	9.461851
Catering	9.261594
Platform_location	0.031787
Onboardwifi_service	0.031787
Onboard_entertainment	0.019072
Online_support	0.096420
Onlinebooking_Ease	0.077348
Onboard_service	8.053698
Leg_room	0.095360
Baggage_handling	0.150457
Checkin_service	0.081586
Cleanliness	0.006357
Online_boarding	0.006357
Gender	0.081586
CustomerType	9.484101
Age	0.034965
TypeTravel	9.775480
Travel_Class	0.000000
Travel_Distance	0.000000
DepartureDelay_in_Mins	0.060395
ArrivalDelay_in_Mins	0.378262

```
dtype: float64
```

```
'TEST DATASET'
```

ID	0.000000
Seat_comfort	0.061794
Seat_Class	0.000000
Arrival_time_convenient	9.339363
Catering	9.429246
Platform_location	0.033706
Onboardwifi_service	0.033706
Onboard_entertainment	0.022471
Online_support	0.073030
Onlinebooking_Ease	0.050559
Onboard_service	8.066963
Leg_room	0.070221
Baggage_handling	0.112353
Checkin_service	0.061794
Cleanliness	0.005618
Online_boarding	0.005618
Gender	0.084265
CustomerType	9.502275
Age	0.030897
TypeTravel	9.684849
Travel_Class	0.000000
Travel_Distance	0.000000
DepartureDelay_in_Mins	0.081456
ArrivalDelay_in_Mins	0.345486

```
dtype: float64
```

```
In [1254]:
```

```
display("TRAIN",df.Seat_comfort.value_counts())
display(df.Seat_comfort.value_counts(normalize=True))
#display(df.groupby(['Seat_comfort', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Seat_comfort.value_counts())
display(df_test.Seat_comfort.value_counts(normalize=True))
```

```
'TRAIN'
```

```
acceptable      21158
need improvement 20946
good             20595
poor            15185
excellent       12971
extremely poor   3463
Name: Seat_comfort, dtype: int64
```

```
acceptable      0.224326
need improvement 0.222079
good            0.218357
poor            0.160998
excellent       0.137524
extremely poor  0.036716
Name: Seat_comfort, dtype: float64
```

'TEST'

```
acceptable      8003
need improvement 7831
good            7808
poor            5755
excellent       4854
extremely poor  1329
Name: Seat_comfort, dtype: int64
```

```
acceptable      0.224930
need improvement 0.220096
good            0.219449
poor            0.161748
excellent       0.136425
extremely poor  0.037352
Name: Seat_comfort, dtype: float64
```

In [1255]:

```
display("TRAIN",df.Seat_Class.value_counts())
display(df.Seat_Class.value_counts(normalize=True))
#display(df.groupby(['Seat_Class', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Seat_Class.value_counts())
display(df_test.Seat_Class.value_counts(normalize=True))
```

'TRAIN'

```
Green Car      47435
Ordinary       46944
Name: Seat_Class, dtype: int64
```

```
Green Car      0.502601
Ordinary       0.497399
Name: Seat_Class, dtype: float64
```

'TEST'

```
Ordinary       17860
Green Car      17742
Name: Seat_Class, dtype: int64
```

```
Ordinary       0.501657
Green Car      0.498343
Name: Seat_Class, dtype: float64
```

In [1256]:

```
display("TRAIN",df.Catering.value_counts())
display(df.Catering.value_counts(normalize=True))
#display(df.groupby(['Catering', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Catering.value_counts())
display(df_test.Catering.value_counts(normalize=True))
```

'TRAIN'

```
acceptable      18468
```

```
need improvement    17978
good                17969
poor               13858
excellent          13455
extremely poor     3910
Name: Catering, dtype: int64
```

```
acceptable         0.215652
need improvement    0.209930
good               0.209825
poor              0.161821
excellent          0.157115
extremely poor     0.045657
Name: Catering, dtype: float64
```

'TEST'

```
acceptable         7133
need improvement    6701
good               6701
poor              5178
excellent          5025
extremely poor     1507
Name: Catering, dtype: int64
```

```
acceptable         0.221213
need improvement    0.207815
good               0.207815
poor              0.160583
excellent          0.155838
extremely poor     0.046736
Name: Catering, dtype: float64
```

In [1257]:

```
display("TRAIN",df.Arrival_time_convenient.value_counts())
display(df.Arrival_time_convenient.value_counts(normalize=True))
#display(df.groupby(['Arrival_time_convenient', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Arrival_time_convenient.value_counts())
display(df_test.Arrival_time_convenient.value_counts(normalize=True))
```

'TRAIN'

```
good              19574
excellent         17684
acceptable        15177
need improvement  14990
poor             13692
extremely poor    4332
Name: Arrival_time_convenient, dtype: int64
```

```
good              0.229072
excellent         0.206954
acceptable        0.177615
need improvement  0.175426
poor             0.160236
extremely poor    0.050697
Name: Arrival_time_convenient, dtype: float64
```

'TEST'

```
good              7361
excellent         6589
acceptable        5844
need improvement  5684
poor             5131
extremely poor    1668
Name: Arrival_time_convenient, dtype: int64
```

```
good              0.228057
excellent         0.204139
acceptable        0.181058
need improvement  0.176101
poor             0.158968
```

```
extremely poor      0.051678
Name: Arrival_time_convenient, dtype: float64
```

In [1258]:

```
display("TRAIN",df.Platform_location.value_counts())
display(df.Platform_location.value_counts(normalize=True))
#display(df.groupby(['Platform_location', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Platform_location.value_counts())
display(df_test.Platform_location.value_counts(normalize=True))
```

'TRAIN'

```
manageable      24173
Convinient      21912
need improvement 17832
Inconvinient    16449
very convinient 13981
very inconvinient 2
Name: Platform_location, dtype: int64
```

```
manageable      0.256208
Convinient      0.232244
need improvement 0.189000
Inconvinient    0.174342
very convinient 0.148184
very inconvinient 0.000021
Name: Platform_location, dtype: float64
```

'TEST'

```
manageable      9364
Convinient      8178
need improvement 6703
Inconvinient    6134
very convinient 5211
Name: Platform_location, dtype: int64
```

```
manageable      0.263108
Convinient      0.229784
need improvement 0.188339
Inconvinient    0.172352
very convinient 0.146418
Name: Platform_location, dtype: float64
```

In [1259]:

```
display("TRAIN",df.Onboardwifi_service.value_counts())
display(df.Onboardwifi_service.value_counts(normalize=True))
#display(df.groupby(['Onboardwifi_service', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Onboardwifi_service.value_counts())
display(df_test.Onboardwifi_service.value_counts(normalize=True))
```

'TRAIN'

```
good      22835
excellent 20968
acceptable 20118
need improvement 19596
poor      10741
extremely poor 91
Name: Onboardwifi_service, dtype: int64
```

```
good      0.242027
excellent 0.222239
acceptable 0.213230
need improvement 0.207697
poor      0.113843
extremely poor 0.000965
Name: Onboardwifi_service, dtype: float64
```

'TEST'

```
good      8743
```

```

excellent      7875
acceptable     7495
need improvement 7456
poor           3980
extremely poor    41
Name: Onboardwifi_service, dtype: int64

```

```

good           0.245659
excellent      0.221270
acceptable     0.210593
need improvement 0.209497
poor           0.111829
extremely poor 0.001152
Name: Onboardwifi_service, dtype: float64

```

In [1260]:

```

display("TRAIN",df.Onboard_entertainment.value_counts())
display(df.Onboard_entertainment.value_counts(normalize=True))
#display(df.groupby(['Onboard_entertainment', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Onboard_entertainment.value_counts())
display(df_test.Onboard_entertainment.value_counts(normalize=True))

```

'TRAIN'

```

good           30446
excellent      21644
acceptable     17560
need improvement 13926
poor           8641
extremely poor 2144
Name: Onboard_entertainment, dtype: int64

```

```

good           0.322654
excellent      0.229374
acceptable     0.186094
need improvement 0.147582
poor           0.091574
extremely poor 0.022721
Name: Onboard_entertainment, dtype: float64

```

'TEST'

```

good           11436
excellent      8204
acceptable     6675
need improvement 5279
poor           3167
extremely poor 833
Name: Onboard_entertainment, dtype: int64

```

```

good           0.321290
excellent      0.230488
acceptable     0.187532
need improvement 0.148312
poor           0.088976
extremely poor 0.023403
Name: Onboard_entertainment, dtype: float64

```

In [1261]:

```

display("TRAIN",df.Online_support.value_counts())
display(df.Online_support.value_counts(normalize=True))
#display(df.groupby(['Online_support', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Online_support.value_counts())
display(df_test.Online_support.value_counts(normalize=True))

```

'TRAIN'

```

good           30016
excellent      25894
acceptable     15702
need improvement 12508

```

```
poor                10167
extremely poor      1
Name: Online_support, dtype: int64

good                0.318344
excellent           0.274627
acceptable          0.166532
need improvement    0.132657
poor                0.107829
extremely poor      0.000011
Name: Online_support, dtype: float64
```

'TEST'

```
good                11487
excellent           9665
acceptable          5902
need improvement    4755
poor                3767
Name: Online_support, dtype: int64

good                0.322886
excellent           0.271672
acceptable          0.165898
need improvement    0.133658
poor                0.105886
Name: Online_support, dtype: float64
```

In [1262]:

```
display("TRAIN",df.Onlinebooking_Ease.value_counts())
display(df.Onlinebooking_Ease.value_counts(normalize=True))
#display(df.groupby(['Onlinebooking_Ease', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Onlinebooking_Ease.value_counts())
display(df_test.Onlinebooking_Ease.value_counts(normalize=True))
```

'TRAIN'

```
good                28909
excellent           24744
acceptable          16390
need improvement    14479
poor                9768
extremely poor      16
Name: Onlinebooking_Ease, dtype: int64

good                0.306545
excellent           0.262380
acceptable          0.173796
need improvement    0.153532
poor                0.103578
extremely poor      0.000170
Name: Onlinebooking_Ease, dtype: float64
```

'TEST'

```
good                11025
excellent           9380
acceptable          6029
need improvement    5474
poor                3674
extremely poor      2
Name: Onlinebooking_Ease, dtype: int64

good                0.309830
excellent           0.263602
acceptable          0.169430
need improvement    0.153833
poor                0.103249
extremely poor      0.000056
Name: Onlinebooking_Ease, dtype: float64
```

In [1263]:

```
display("TRAIN",df.Onboard_service.value_counts())
display(df.Onboard_service.value_counts(normalize=True))
#display(df.groupby(['Onboard_service', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Onboard_service.value_counts())
display(df_test.Onboard_service.value_counts(normalize=True))
```

'TRAIN'

```
good          27265
excellent     21272
acceptable    18071
need improvement 11390
poor          8776
extremely poor    4
Name: Onboard_service, dtype: int64
```

```
good          0.314193
excellent     0.245131
acceptable    0.208244
need improvement 0.131254
poor          0.101132
extremely poor 0.000046
Name: Onboard_service, dtype: float64
```

'TEST'

```
good          10222
excellent     7941
acceptable    6770
need improvement 4385
poor          3412
Name: Onboard_service, dtype: int64
```

```
good          0.312313
excellent     0.242621
acceptable    0.206844
need improvement 0.133975
poor          0.104247
Name: Onboard_service, dtype: float64
```

In [1264]:

```
display("TRAIN",df.Leg_room.value_counts())
display(df.Leg_room.value_counts(normalize=True))
#display(df.groupby(['Leg_room', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Leg_room.value_counts())
display(df_test.Leg_room.value_counts(normalize=True))
```

'TRAIN'

```
good          28870
excellent     24832
acceptable    16384
need improvement 15753
poor          8110
extremely poor   340
Name: Leg_room, dtype: int64
```

```
good          0.306186
excellent     0.263361
acceptable    0.173764
need improvement 0.167071
poor          0.086012
extremely poor 0.003606
Name: Leg_room, dtype: float64
```

'TEST'

```
good          10842
excellent     9536
acceptable    6079
need improvement 5992
poor          3025
extremely poor  103
```

```
Name: Leg_room, dtype: int64

good                0.304747
excellent           0.268038
acceptable          0.170869
need improvement    0.168423
poor                0.085027
extremely poor     0.002895
Name: Leg_room, dtype: float64
```

In [1265]:

```
display("TRAIN",df.Baggage_handling.value_counts())
display(df.Baggage_handling.value_counts(normalize=True))
#display(df.groupby(['Baggage_handling', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Baggage_handling.value_counts())
display(df_test.Baggage_handling.value_counts(normalize=True))
```

'TRAIN'

```
good                34944
excellent           26003
acceptable          17767
need improvement    9759
poor                5764
Name: Baggage_handling, dtype: int64
```

```
good                0.370810
excellent           0.275932
acceptable          0.188535
need improvement    0.103558
poor                0.061165
Name: Baggage_handling, dtype: float64
```

'TEST'

```
good                13291
excellent           9729
acceptable          6683
need improvement    3659
poor                2200
Name: Baggage_handling, dtype: int64
```

```
good                0.373742
excellent           0.273579
acceptable          0.187925
need improvement    0.102891
poor                0.061864
Name: Baggage_handling, dtype: float64
```

In [1266]:

```
display("TRAIN",df.Checkin_service.value_counts())
display(df.Checkin_service.value_counts(normalize=True))
#display(df.groupby(['Checkin_service', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Checkin_service.value_counts())
display(df_test.Checkin_service.value_counts(normalize=True))
```

'TRAIN'

```
good                26502
acceptable          25803
excellent           19641
need improvement    11218
poor                11137
extremely poor      1
Name: Checkin_service, dtype: int64
```

```
good                0.281033
acceptable          0.273621
excellent           0.208278
need improvement    0.118958
poor                0.118099
extremely poor      0.000011
```



```
extremely poor      0.000011
Name: Checkin_service, dtype: float64
```

'TEST'

```
good          9982
acceptable    9740
excellent     7375
need improvement 4262
poor          4221
Name: Checkin_service, dtype: int64
```

```
good          0.280551
acceptable    0.273749
excellent     0.207279
need improvement 0.119786
poor          0.118634
Name: Checkin_service, dtype: float64
```

In [1267]:

```
display("TRAIN",df.Cleanliness.value_counts())
display(df.Cleanliness.value_counts(normalize=True))
#display(df.groupby(['Cleanliness', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Cleanliness.value_counts())
display(df_test.Cleanliness.value_counts(normalize=True))
```

'TRAIN'

```
good          35427
excellent     26053
acceptable    17449
need improvement 9806
poor          5633
extremely poor      5
Name: Cleanliness, dtype: int64
```

```
good          0.375393
excellent     0.276064
acceptable    0.184894
need improvement 0.103907
poor          0.059689
extremely poor 0.000053
Name: Cleanliness, dtype: float64
```

'TEST'

```
good          13421
excellent     9900
acceptable    6534
need improvement 3607
poor          2138
Name: Cleanliness, dtype: int64
```

```
good          0.376994
excellent     0.278090
acceptable    0.183539
need improvement 0.101320
poor          0.060056
Name: Cleanliness, dtype: float64
```

In [1268]:

```
display("TRAIN",df.Online_boarding.value_counts())
display(df.Online_boarding.value_counts(normalize=True))
#display(df.groupby(['Online_boarding', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Online_boarding.value_counts())
display(df_test.Online_boarding.value_counts(normalize=True))
```

'TRAIN'

```
good          25533
acceptable    22475
excellent     21742
need improvement 12451
```

```

need improvement      13451
poor                  11160
extremely poor        12
Name: Online_boarding, dtype: int64

good                  0.270554
acceptable            0.238151
excellent             0.230384
need improvement      0.142530
poor                  0.118254
extremely poor        0.000127
Name: Online_boarding, dtype: float64

```

'TEST'

```

good                  9680
acceptable            8323
excellent             8250
need improvement      5134
poor                  4211
extremely poor        2
Name: Online_boarding, dtype: int64

good                  0.271910
acceptable            0.233792
excellent             0.231742
need improvement      0.144213
poor                  0.118287
extremely poor        0.000056
Name: Online_boarding, dtype: float64

```

In [1269]:

```

display("TRAIN",df.Gender.value_counts())
display(df.Gender.value_counts(normalize=True))
#display(df.groupby(['Gender', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Gender.value_counts())
display(df_test.Gender.value_counts(normalize=True))

```

'TRAIN'

```

Female      47815
Male        46487
Name: Gender, dtype: int64

```

```

Female      0.507041
Male        0.492959
Name: Gender, dtype: float64

```

'TEST'

```

Female      18069
Male        17503
Name: Gender, dtype: int64

```

```

Female      0.507956
Male        0.492044
Name: Gender, dtype: float64

```

In [1270]:

```

display("TRAIN",df.CustomerType.value_counts())
display(df.CustomerType.value_counts(normalize=True))
#display(df.groupby(['CustomerType', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.CustomerType.value_counts())
display(df_test.CustomerType.value_counts(normalize=True))

```

'TRAIN'

```

Loyal Customer      69823
disloyal Customer   15605
Name: CustomerType, dtype: int64

```

```

Loyal Customer      0.817332
disloyal Customer   0.182668

```

```
disloyal Customer      0.182191
Name: CustomerType, dtype: float64
```

'TEST'

```
Loyal Customer      26349
disloyal Customer    5870
Name: CustomerType, dtype: int64
```

```
Loyal Customer      0.817809
disloyal Customer    0.182191
Name: CustomerType, dtype: float64
```

In [1271]:

```
display("TRAIN",df.TypeTravel.value_counts())
display(df.TypeTravel.value_counts(normalize=True))
#display(df.groupby(['TypeTravel', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.TypeTravel.value_counts())
display(df_test.TypeTravel.value_counts(normalize=True))
```

'TRAIN'

```
Business travel      58617
Personal Travel      26536
Name: TypeTravel, dtype: int64
```

```
Business travel      0.688373
Personal Travel      0.311627
Name: TypeTravel, dtype: float64
```

'TEST'

```
Business travel      22313
Personal Travel      9841
Name: TypeTravel, dtype: int64
```

```
Business travel      0.693942
Personal Travel      0.306058
Name: TypeTravel, dtype: float64
```

In [1272]:

```
display("TRAIN",df.Travel_Class.value_counts())
display(df.Travel_Class.value_counts(normalize=True))
#display(df.groupby(['Travel_Class', 'Overall_Experience']).count()['ID'])
display("TEST",df_test.Travel_Class.value_counts())
display(df_test.Travel_Class.value_counts(normalize=True))
```

'TRAIN'

```
Eco      49342
Business  45037
Name: Travel_Class, dtype: int64
```

```
Eco      0.522807
Business  0.477193
Name: Travel_Class, dtype: float64
```

'TEST'

```
Eco      18473
Business  17129
Name: Travel_Class, dtype: int64
```

```
Eco      0.518875
Business  0.481125
Name: Travel_Class, dtype: float64
```

Label Encoding

In [19]:

```
df['Overall_experience'] = df['Overall_experience'].replace('Excellent', 5)
df['Overall_experience'] = df['Overall_experience'].replace('Good', 4)
df['Overall_experience'] = df['Overall_experience'].replace('Average', 3)
df['Overall_experience'] = df['Overall_experience'].replace('Not good', 2)
df['Overall_experience'] = df['Overall_experience'].replace('Poor', 1)
```

```

df['Seat_comfort'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df['Seat_Class'].replace(['Green Car', 'Ordinary'], [1, 0], inplace = True)
df['Arrival_time_convenient'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df['Catering'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df['Platform_location'].replace(['very convinient', 'Convinient', 'manageable', 'need improvement', 'Inconvinient', 'very inconvinient'], [5, 4, 3, 2, 1, 0], inplace = True)
df['Onboardwifi_service'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df['Onboard_entertainment'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df['Online_support'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df['Onlinebooking_Ease'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df['Onboard_service'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df['Leg_room'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df['Baggage_handling'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df['Checkin_service'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df['Cleanliness'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df['Online_boarding'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df['Gender'].replace(['Female', 'Male'], [1, 0], inplace = True)
df['CustomerType'].replace(['Loyal Customer', 'disloyal Customer'], [1, 0], inplace = True)
df['TypeTravel'].replace(['Business travel', 'Personal Travel'], [1, 0], inplace = True)
df['Travel_Class'].replace(['Business', 'Eco'], [1, 0], inplace = True)

```

In [20]:

```

df_test['Seat_comfort'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df_test['Seat_Class'].replace(['Green Car', 'Ordinary'], [1, 0], inplace = True)
df_test['Arrival_time_convenient'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df_test['Catering'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df_test['Platform_location'].replace(['very convinient', 'Convinient', 'manageable', 'need improvement', 'Inconvinient', 'very inconvinient'], [5, 4, 3, 2, 1, 0], inplace = True)
df_test['Onboardwifi_service'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df_test['Onboard_entertainment'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df_test['Online_support'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df_test['Onlinebooking_Ease'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df_test['Onboard_service'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df_test['Leg_room'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df_test['Baggage_handling'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df_test['Checkin_service'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df_test['Cleanliness'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df_test['Online_boarding'].replace(['excellent', 'good', 'acceptable', 'need improvement', 'poor', 'extremely poor'], [5, 4, 3, 2, 1, 0], inplace = True)
df_test['Gender'].replace(['Female', 'Male'], [1, 0], inplace = True)
df_test['CustomerType'].replace(['Loyal Customer', 'disloyal Customer'], [1, 0], inplace = True)
df_test['TypeTravel'].replace(['Business travel', 'Personal Travel'], [1, 0], inplace = True)

```

```
df_test['Travel_Class'].replace(['Business', 'Eco'], [1, 0], inplace = True)
```

Null Imputation - for xgb and lgb algorithms

```
df['Seat_comfort'] = df['Seat_comfort'].fillna(-999)
```

```
df['col'] = df['col'].astype(pd.Int32Dtype())
```

In [927]:

```
#df['col'] = df['col'].astype(pd.Int32Dtype())
df['Seat_comfort'] = df['Seat_comfort'].fillna(-1)
#df['Seat_Class'].replace(['Green Car', 'Ordinary'], [1, 0], inplace = True)
df['Arrival_time_convenient'] = df['Arrival_time_convenient'].fillna(-1)
df['Catering'] = df['Catering'].fillna(-1)
df['Platform_location'] = df['Platform_location'].fillna(-1)
df['Onboardwifi_service'] = df['Onboardwifi_service'].fillna(-1)
df['Onboard_entertainment'] = df['Onboard_entertainment'].fillna(-1)
df['Online_support'] = df['Online_support'].fillna(-1)
df['Onlinebooking_Ease'] = df['Onlinebooking_Ease'].fillna(-1)
df['Onboard_service'] = df['Onboard_service'].fillna(-1)
df['Leg_room'] = df['Leg_room'].fillna(-1)
df['Baggage_handling'] = df['Baggage_handling'].fillna(-1)
df['Checkin_service'] = df['Checkin_service'].fillna(-1)
df['Cleanliness'] = df['Cleanliness'].fillna(-1)
df['Online_boarding'] = df['Online_boarding'].fillna(-1)
df['Gender'] = df['Gender'].fillna(-1)
df['CustomerType'] = df['CustomerType'].fillna(-1)
df['TypeTravel'] = df['TypeTravel'].fillna(-1)
#df['Travel_Class'].replace(['Business', 'Eco'], [1, 0], inplace = True)
df['Age'] = df['Age'].fillna(-1)
df['DepartureDelay_in_Mins'] = df['DepartureDelay_in_Mins'].fillna(-1)
df['ArrivalDelay_in_Mins'] = df['ArrivalDelay_in_Mins'].fillna(-1)
```

In [928]:

```
df_test['Seat_comfort'] = df_test['Seat_comfort'].fillna(-1)
#df_test['Seat_Class'].replace(['Green Car', 'Ordinary'], [1, 0], inplace = True)
df_test['Arrival_time_convenient'] = df_test['Arrival_time_convenient'].fillna(-1)
df_test['Catering'] = df_test['Catering'].fillna(-1)
df_test['Platform_location'] = df_test['Platform_location'].fillna(-1)
df_test['Onboardwifi_service'] = df_test['Onboardwifi_service'].fillna(-1)
df_test['Onboard_entertainment'] = df_test['Onboard_entertainment'].fillna(-1)
df_test['Online_support'] = df_test['Online_support'].fillna(-1)
df_test['Onlinebooking_Ease'] = df_test['Onlinebooking_Ease'].fillna(-1)
df_test['Onboard_service'] = df_test['Onboard_service'].fillna(-1)
df_test['Leg_room'] = df_test['Leg_room'].fillna(-1)
df_test['Baggage_handling'] = df_test['Baggage_handling'].fillna(-1)
df_test['Checkin_service'] = df_test['Checkin_service'].fillna(-1)
df_test['Cleanliness'] = df_test['Cleanliness'].fillna(-1)
df_test['Online_boarding'] = df_test['Online_boarding'].fillna(-1)
df_test['Gender'] = df_test['Gender'].fillna(-1)
df_test['CustomerType'] = df_test['CustomerType'].fillna(-1)
df_test['TypeTravel'] = df_test['TypeTravel'].fillna(-1)
#df_test['Travel_Class'].replace(['Business', 'Eco'], [1, 0], inplace = True)
df_test['Age'] = df_test['Age'].fillna(-1)
df_test['DepartureDelay_in_Mins'] = df_test['DepartureDelay_in_Mins'].fillna(-1)
df_test['ArrivalDelay_in_Mins'] = df_test['ArrivalDelay_in_Mins'].fillna(-1)
```

Data Type Conversion

In [929]:

```
df['Seat_comfort'] = df['Seat_comfort'].astype('int64')
df['Seat_Class'] = df['Seat_Class'].astype('int64')
df['Arrival_time_convenient'] = df['Arrival_time_convenient'].astype('int64')
```

```

df['Catering']= df['Catering'].astype('int64')
df['Platform_location']= df['Platform_location'].astype('int64')
df['Onboardwifi_service']= df['Onboardwifi_service'].astype('int64')
df['Onboard_entertainment']= df['Onboard_entertainment'].astype('int64')
df['Online_support']= df['Online_support'].astype('int64')
df['Onlinebooking_Ease']= df['Onlinebooking_Ease'].astype('int64')
df['Onboard_service']= df['Onboard_service'].astype('int64')
df['Leg_room']= df['Leg_room'].astype('int64')
df['Baggage_handling']= df['Baggage_handling'].astype('int64')
df['Checkin_service']= df['Checkin_service'].astype('int64')
df['Cleanliness']= df['Cleanliness'].astype('int64')
df['Online_boarding']= df['Online_boarding'].astype('int64')
df['Gender']= df['Gender'].astype('int64')
df['CustomerType']= df['CustomerType'].astype('int64')
df['TypeTravel']= df['TypeTravel'].astype('int64')
df['Travel_Class']= df['Travel_Class'].astype('int64')
df['Age']= df['Age'].astype('int64')
df['DepartureDelay_in_Mins']=df['DepartureDelay_in_Mins'].astype('int64')
df['ArrivalDelay_in_Mins']=df['ArrivalDelay_in_Mins'].astype('int64')

```

In [930]:

```

df_test['Seat_comfort'] = df_test['Seat_comfort'].astype('int64')
df_test['Seat_Class']= df_test['Seat_Class'].astype('int64')
df_test['Arrival_time_convenient']= df_test['Arrival_time_convenient'].astype('int64')
df_test['Catering']= df_test['Catering'].astype('int64')
df_test['Platform_location']= df_test['Platform_location'].astype('int64')
df_test['Onboardwifi_service']= df_test['Onboardwifi_service'].astype('int64')
df_test['Onboard_entertainment']= df_test['Onboard_entertainment'].astype('int64')
df_test['Online_support']= df_test['Online_support'].astype('int64')
df_test['Onlinebooking_Ease']= df_test['Onlinebooking_Ease'].astype('int64')
df_test['Onboard_service']= df_test['Onboard_service'].astype('int64')
df_test['Leg_room']= df_test['Leg_room'].astype('int64')
df_test['Baggage_handling']= df_test['Baggage_handling'].astype('int64')
df_test['Checkin_service']= df_test['Checkin_service'].astype('int64')
df_test['Cleanliness']= df_test['Cleanliness'].astype('int64')
df_test['Online_boarding']= df_test['Online_boarding'].astype('int64')
df_test['Gender']= df_test['Gender'].astype('int64')
df_test['CustomerType']= df_test['CustomerType'].astype('int64')
df_test['TypeTravel']= df_test['TypeTravel'].astype('int64')
df_test['Travel_Class']= df_test['Travel_Class'].astype('int64')
df['Age']= df['Age'].astype('int64')
df['DepartureDelay_in_Mins']=df['DepartureDelay_in_Mins'].astype('int64')
df['ArrivalDelay_in_Mins']=df['ArrivalDelay_in_Mins'].astype('int64')

```

In [931]:

```
df.info()
```

```

<class 'pandas.core.frame.DataFrame'>
Int64Index: 94379 entries, 0 to 94378
Data columns (total 25 columns):
#   Column                               Non-Null Count  Dtype
---  -
0   ID                                   94379 non-null  int64
1   Overall_Experience                  94379 non-null  int64
2   Seat_comfort                       94379 non-null  int64
3   Seat_Class                         94379 non-null  int64
4   Arrival_time_convenient            94379 non-null  int64
5   Catering                           94379 non-null  int64
6   Platform_location                  94379 non-null  int64
7   Onboardwifi_service                94379 non-null  int64
8   Onboard_entertainment               94379 non-null  int64
9   Online_support                     94379 non-null  int64
10  Onlinebooking_Ease                 94379 non-null  int64
11  Onboard_service                    94379 non-null  int64
12  Leg_room                           94379 non-null  int64
13  Baggage_handling                   94379 non-null  int64
14  Checkin_service                    94379 non-null  int64
15  Cleanliness                        94379 non-null  int64
16  Online_boarding                    94379 non-null  int64
17  Gender                             94379 non-null  int64

```

```

18 CustomerType          94379 non-null int64
19 Age                  94379 non-null int64
20 TypeTravel           94379 non-null int64
21 Travel_Class         94379 non-null int64
22 Travel_Distance      94379 non-null int64
23 DepartureDelay_in_Mins 94379 non-null int64
24 ArrivalDelay_in_Mins  94379 non-null int64
dtypes: int64(25)
memory usage: 20.7 MB

```

In [932]:

```

df_test.info()

<class 'pandas.core.frame.DataFrame'>
Int64Index: 35602 entries, 0 to 35601
Data columns (total 24 columns):
 #   Column                                Non-Null Count  Dtype
---  -
 0   ID                                    35602 non-null  int64
 1   Seat_comfort                         35602 non-null  int64
 2   Seat_Class                           35602 non-null  int64
 3   Arrival_time_convenient              35602 non-null  int64
 4   Catering                             35602 non-null  int64
 5   Platform_location                   35602 non-null  int64
 6   Onboardwifi_service                 35602 non-null  int64
 7   Onboard_entertainment                35602 non-null  int64
 8   Online_support                       35602 non-null  int64
 9   Onlinebooking_Ease                  35602 non-null  int64
10   Onboard_service                      35602 non-null  int64
11   Leg_room                             35602 non-null  int64
12   Baggage_handling                    35602 non-null  int64
13   Checkin_service                     35602 non-null  int64
14   Cleanliness                          35602 non-null  int64
15   Online_boarding                      35602 non-null  int64
16   Gender                               35602 non-null  int64
17   CustomerType                         35602 non-null  int64
18   Age                                  35602 non-null  float64
19   TypeTravel                           35602 non-null  int64
20   Travel_Class                         35602 non-null  int64
21   Travel_Distance                      35602 non-null  int64
22   DepartureDelay_in_Mins               35602 non-null  float64
23   ArrivalDelay_in_Mins                 35602 non-null  float64
dtypes: float64(3), int64(21)
memory usage: 6.8 MB

```

In []:

Null Imputation - by Median/Mode method

In [163]:

```

df.loc[df['Seat_comfort'].isnull() == True, 'Seat_comfort'] = df['Seat_comfort'].mode()[0]
df_test.loc[df_test['Seat_comfort'].isnull() == True, 'Seat_comfort'] = df_test['Seat_comfort'].mode()[0]
display("Mode Seat_Comfort-Train", df['Seat_comfort'].mode()[0])
display("Mode Seat_Comfort-Test", df_test['Seat_comfort'].mode()[0])

```

'Mode Seat_Comfort-Train'

3.0

'Mode Seat_Comfort-Test'

3.0

In [164]:


```
#df.loc[df['Seat_comfort'].isnull() == True, 'Seat_comfort'] = df['Seat_comfort'].median()
#df_test.loc[df_test['Seat_comfort'].isnull() == True, 'Seat_comfort'] = df_test['Seat_comfort'].median()
#display("Median Seat_Comfort-Train",df['Seat_comfort'].median())
#display("Median Seat_Comfort-Test",df_test['Seat_comfort'].median())
```

In [165]:

```
df.loc[df['Arrival_time_convenient'].isnull() == True, 'Arrival_time_convenient'] = df['Arrival_time_convenient'].mode()[0]
df_test.loc[df_test['Arrival_time_convenient'].isnull() == True, 'Arrival_time_convenient'] = df_test['Arrival_time_convenient'].mode()[0]
display("Mode Arrival_time_convenient-Train",df['Arrival_time_convenient'].mode()[0])
display("Mode Arrival_time_convenient-Test",df_test['Arrival_time_convenient'].mode()[0])
```

'Mode Arrival_time_convenient-Train'

4.0

'Mode Arrival_time_convenient-Test'

4.0

In [166]:

```
#df.loc[df['Arrival_time_convenient'].isnull() == True, 'Arrival_time_convenient'] = df['Arrival_time_convenient'].median()
#df_test.loc[df_test['Arrival_time_convenient'].isnull() == True, 'Arrival_time_convenient'] = df_test['Arrival_time_convenient'].median()
#display("Median Arrival_time_convenient-Train",df['Arrival_time_convenient'].median())
#display("Median Arrival_time_convenient-Test",df_test['Arrival_time_convenient'].median())
```

In [167]:

```
df.loc[df['Catering'].isnull() == True, 'Catering'] = df['Catering'].mode()[0]
df_test.loc[df_test['Catering'].isnull() == True, 'Catering'] = df_test['Catering'].mode()[0]
display("Mode Catering-Train",df['Catering'].mode()[0])
display("Mode Catering-Test",df_test['Catering'].mode()[0])
```

'Mode Catering-Train'

3.0

'Mode Catering-Test'

3.0

In [168]:

```
#df.loc[df['Catering'].isnull() == True, 'Catering'] = df['Catering'].median()
#df_test.loc[df_test['Catering'].isnull() == True, 'Catering'] = df_test['Catering'].median()
#display("Median Catering-Train",df['Catering'].median())
#display("Median Catering-Test",df_test['Catering'].median())
```

In [169]:

```
df.loc[df['Platform_location'].isnull() == True, 'Platform_location'] = df['Platform_location'].mode()[0]
df_test.loc[df_test['Platform_location'].isnull() == True, 'Platform_location'] = df_test['Platform_location'].mode()[0]
display("Mode Platform_location-Train",df['Platform_location'].mode()[0])
display("Mode Platform_location-Test",df_test['Platform_location'].mode()[0])
```

'Mode Platform_location-Train'

3.0

'Mode Platform_location-Test'

3.0

In [170]:

```
#df.loc[df['Platform_location'].isnull() == True, 'Platform_location'] = df['Platform_location'].median()
#df_test.loc[df_test['Platform_location'].isnull() == True, 'Platform_location'] = df_test['Platform_location'].median()
#display("Median Platform_location-Train", df['Platform_location'].median())
#display("Median Platform_location-Test", df_test['Platform_location'].median())
```

In [171]:

```
df.loc[df['Onboardwifi_service'].isnull() == True, 'Onboardwifi_service'] = df['Onboardwifi_service'].mode()[0]
df_test.loc[df_test['Onboardwifi_service'].isnull() == True, 'Onboardwifi_service'] = df_test['Onboardwifi_service'].mode()[0]
display("Mode Onboardwifi_service-Train", df['Onboardwifi_service'].mode()[0])
display("Mode Onboardwifi_service-Test", df_test['Onboardwifi_service'].mode()[0])
```

'Mode Onboardwifi_service-Train'

4.0

'Mode Onboardwifi_service-Test'

4.0

In [172]:

```
#df.loc[df['Onboardwifi_service'].isnull() == True, 'Onboardwifi_service'] = df['Onboardwifi_service'].median()
#df_test.loc[df_test['Onboardwifi_service'].isnull() == True, 'Onboardwifi_service'] = df_test['Onboardwifi_service'].median()
#display("Median Onboardwifi_service-Train", df['Onboardwifi_service'].median())
#display("Median Onboardwifi_service-Test", df_test['Onboardwifi_service'].median())
```

In [173]:

```
df.loc[df['Onboard_entertainment'].isnull() == True, 'Onboard_entertainment'] = df['Onboard_entertainment'].mode()[0]
df_test.loc[df_test['Onboard_entertainment'].isnull() == True, 'Onboard_entertainment'] = df_test['Onboard_entertainment'].mode()[0]
display("Mode Onboard_entertainment-Train", df['Onboard_entertainment'].mode()[0])
display("Mode Onboard_entertainment-Test", df_test['Onboard_entertainment'].mode()[0])
```

'Mode Onboard_entertainment-Train'

4.0

'Mode Onboard_entertainment-Test'

4.0

In [174]:

```
#df.loc[df['Onboard_entertainment'].isnull() == True, 'Onboard_entertainment'] = df['Onboard_entertainment'].median()
#df_test.loc[df_test['Onboard_entertainment'].isnull() == True, 'Onboard_entertainment'] = df_test['Onboard_entertainment'].median()
#display("Median Onboard_entertainment-Train", df['Onboard_entertainment'].median())
#display("Median Onboard_entertainment-Test", df_test['Onboard_entertainment'].median())
```

In [175]:

```
df.loc[df['Online_support'].isnull() == True, 'Online_support'] = df['Online_support'].mode()[0]
df_test.loc[df_test['Online_support'].isnull() == True, 'Online_support'] = df_test['Online_support'].mode()[0]
display("Mode Online_support-Train", df['Online_support'].mode()[0])
display("Mode Online_support-Test", df_test['Online_support'].mode()[0])
```

'Mode Online_support-Train'

```
'Mode Online_support-Train'
```

```
4.0
```

```
'Mode Online_support-Test'
```

```
4.0
```

```
In [176]:
```

```
#df.loc[df['Online_support'].isnull() == True, 'Online_support'] = df['Online_support'].median()
#df_test.loc[df_test['Online_support'].isnull() == True, 'Online_support'] = df_test['Online_support'].median()
#display("Median Online_support-Train", df['Online_support'].median())
#display("Median Online_support-Test", df_test['Online_support'].median())
```

```
In [177]:
```

```
df.loc[df['Onlinebooking_Ease'].isnull() == True, 'Onlinebooking_Ease'] = df['Onlinebooking_Ease'].mode()[0]
df_test.loc[df_test['Onlinebooking_Ease'].isnull() == True, 'Onlinebooking_Ease'] = df_test['Onlinebooking_Ease'].mode()[0]
display("Mode Onlinebooking_Ease-Train", df['Onlinebooking_Ease'].mode()[0])
display("Mode Onlinebooking_Ease-Test", df_test['Onlinebooking_Ease'].mode()[0])
```

```
'Mode Onlinebooking_Ease-Train'
```

```
4.0
```

```
'Mode Onlinebooking_Ease-Test'
```

```
4.0
```

```
In [178]:
```

```
#df.loc[df['Onlinebooking_Ease'].isnull() == True, 'Onlinebooking_Ease'] = df['Onlinebooking_Ease'].median()
#df_test.loc[df_test['Onlinebooking_Ease'].isnull() == True, 'Onlinebooking_Ease'] = df_test['Onlinebooking_Ease'].median()
#display("Median Onlinebooking_Ease-Train", df['Onlinebooking_Ease'].median())
#display("Median Onlinebooking_Ease-Test", df_test['Onlinebooking_Ease'].median())
```

```
In [179]:
```

```
df.loc[df['Onboard_service'].isnull() == True, 'Onboard_service'] = df['Onboard_service'].mode()[0]
df_test.loc[df_test['Onboard_service'].isnull() == True, 'Onboard_service'] = df_test['Onboard_service'].mode()[0]
display("Mode Onboard_service-Train", df['Onboard_service'].mode()[0])
display("Mode Onboard_service-Test", df_test['Onboard_service'].mode()[0])
```

```
'Mode Onboard_service-Train'
```

```
4.0
```

```
'Mode Onboard_service-Test'
```

```
4.0
```

```
In [180]:
```

```
#df.loc[df['Onboard_service'].isnull() == True, 'Onboard_service'] = df['Onboard_service'].median()
#df_test.loc[df_test['Onboard_service'].isnull() == True, 'Onboard_service'] = df_test['Onboard_service'].median()
#display("Median Onboard_service-Train", df['Onboard_service'].median())
#display("Median Onboard_service-Test", df_test['Onboard_service'].median())
```

```
In [181]:
```

```
df.loc[df['Leg_room'].isnull() == True, 'Leg_room'] = df['Leg_room'].mode()[0]
df_test.loc[df_test['Leg_room'].isnull() == True, 'Leg_room'] = df_test['Leg_room'].mode()
```

```
) [0]
display("Mode Leg_room-Train",df['Leg_room'].mode()[0])
display("Mode Leg_room-Test",df_test['Leg_room'].mode()[0])
```

'Mode Leg_room-Train'

4.0

'Mode Leg_room-Test'

4.0

In [182]:

```
#df.loc[df['Leg_room'].isnull() == True,'Leg_room'] = df['Leg_room'].median()
#df_test.loc[df_test['Leg_room'].isnull() == True,'Leg_room'] = df_test['Leg_room'].median()
#display("Median Leg_room-Train",df['Leg_room'].median())
#display("Median Leg_room-Test",df_test['Leg_room'].median())
```

In [183]:

```
df.loc[df['Baggage_handling'].isnull() == True,'Baggage_handling'] = df['Baggage_handling'].mode()[0]
df_test.loc[df_test['Baggage_handling'].isnull() == True,'Baggage_handling'] = df_test['Baggage_handling'].mode()[0]
display("Mode Baggage_handling-Train",df['Baggage_handling'].mode()[0])
display("Mode Baggage_handling-Test",df_test['Baggage_handling'].mode()[0])
```

'Mode Baggage_handling-Train'

4.0

'Mode Baggage_handling-Test'

4.0

In [184]:

```
#df.loc[df['Baggage_handling'].isnull() == True,'Baggage_handling'] = df['Baggage_handling'].median()
#df_test.loc[df_test['Baggage_handling'].isnull() == True,'Baggage_handling'] = df_test['Baggage_handling'].median()
#display("Median Baggage_handling-Train",df['Baggage_handling'].median())
#display("Median Baggage_handling-Test",df_test['Baggage_handling'].median())#
```

In [185]:

```
df.loc[df['Checkin_service'].isnull() == True,'Checkin_service'] = df['Checkin_service'].mode()[0]
df_test.loc[df_test['Checkin_service'].isnull() == True,'Checkin_service'] = df_test['Checkin_service'].mode()[0]
display("Mode Checkin_service-Train",df['Checkin_service'].mode()[0])
display("Mode Checkin_service-Test",df_test['Checkin_service'].mode()[0])
```

'Mode Checkin_service-Train'

4.0

'Mode Checkin_service-Test'

4.0

In [186]:

```
#df.loc[df['Checkin_service'].isnull() == True,'Checkin_service'] = df['Checkin_service'].median()
#df_test.loc[df_test['Checkin_service'].isnull() == True,'Checkin_service'] = df_test['Checkin_service'].median()
#display("Median Checkin_service-Train",df['Checkin_service'].median())
#display("Median Checkin_service-Test",df_test['Checkin_service'].median())
```

In [187]:

```
df.loc[df['Cleanliness'].isnull() == True, 'Cleanliness'] = df['Cleanliness'].mode()[0]
df_test.loc[df_test['Cleanliness'].isnull() == True, 'Cleanliness'] = df_test['Cleanliness'].mode()[0]
display("Mode Cleanliness-Train", df['Cleanliness'].mode()[0])
display("Mode Cleanliness-Test", df_test['Cleanliness'].mode()[0])
```

'Mode Cleanliness-Train'

4.0

'Mode Cleanliness-Test'

4.0

In [188]:

```
#df.loc[df['Cleanliness'].isnull() == True, 'Cleanliness'] = df['Cleanliness'].median()
#df_test.loc[df_test['Cleanliness'].isnull() == True, 'Cleanliness'] = df_test['Cleanliness'].median()
#display("Median Cleanliness-Train", df['Cleanliness'].median())
#display("Median Cleanliness-Test", df_test['Cleanliness'].median())
```

In [189]:

```
df.loc[df['Online_boarding'].isnull() == True, 'Online_boarding'] = df['Online_boarding'].mode()[0]
df_test.loc[df_test['Online_boarding'].isnull() == True, 'Online_boarding'] = df_test['Online_boarding'].mode()[0]
display("Mode Online_boarding-Train", df['Online_boarding'].mode()[0])
display("Mode Online_boarding-Test", df_test['Online_boarding'].mode()[0])
```

'Mode Online_boarding-Train'

4.0

'Mode Online_boarding-Test'

4.0

In [190]:

```
#df.loc[df['Online_boarding'].isnull() == True, 'Online_boarding'] = df['Online_boarding'].median()
#df_test.loc[df_test['Online_boarding'].isnull() == True, 'Online_boarding'] = df_test['Online_boarding'].median()
#display("Median Online_boarding-Train", df['Online_boarding'].median())
#display("Median Online_boarding-Test", df_test['Online_boarding'].median())
```

In [191]:

```
df.loc[df['Gender'].isnull() == True, 'Gender'] = df['Gender'].mode()[0]
df_test.loc[df_test['Gender'].isnull() == True, 'Gender'] = df_test['Gender'].mode()[0]
display("Mode Gender-Train", df['Gender'].mode()[0])
display("Mode Gender-Test", df_test['Gender'].mode()[0])
```

'Mode Gender-Train'

1.0

'Mode Gender-Test'

1.0

In [192]:

```
#df.loc[df['Gender'].isnull() == True, 'Gender'] = df['Gender'].median()
#df_test.loc[df_test['Gender'].isnull() == True, 'Gender'] = df_test['Gender'].median()
#display("Median Gender-Train", df['Gender'].median())
#display("Median Gender-Test", df_test['Gender'].median())
```

In [193]:

```
df.loc[df['Customer-Name'].isnull() == True, 'Customer-Name'] = df['Customer-Name'].mode()[0]
```

```
df.loc[df['CustomerType'].isnull() == True, 'CustomerType'] = df['CustomerType'].mode()[0]
df_test.loc[df_test['CustomerType'].isnull() == True, 'CustomerType'] = df_test['CustomerType'].mode()[0]
display("Mode CustomerType-Train", df['CustomerType'].mode()[0])
display("Mode CustomerType-Test", df_test['CustomerType'].mode()[0])
```

'Mode CustomerType-Train'

1.0

'Mode CustomerType-Test'

1.0

In [194]:

```
#df.loc[df['CustomerType'].isnull() == True, 'CustomerType'] = df['CustomerType'].median()
#df_test.loc[df_test['CustomerType'].isnull() == True, 'CustomerType'] = df_test['CustomerType'].median()
#display("Median CustomerType-Train", df['CustomerType'].median())
#display("Median CustomerType-Test", df_test['CustomerType'].median())
```

In [195]:

```
df.loc[df['TypeTravel'].isnull() == True, 'TypeTravel'] = df['TypeTravel'].mode()[0]
df_test.loc[df_test['TypeTravel'].isnull() == True, 'TypeTravel'] = df_test['TypeTravel'].mode()[0]
display("Mode TypeTravel-Train", df['TypeTravel'].mode()[0])
display("Mode TypeTravel-Test", df_test['TypeTravel'].mode()[0])
```

'Mode TypeTravel-Train'

1.0

'Mode TypeTravel-Test'

1.0

In [196]:

```
#df.loc[df['TypeTravel'].isnull() == True, 'TypeTravel'] = df['TypeTravel'].median()
#df_test.loc[df_test['TypeTravel'].isnull() == True, 'TypeTravel'] = df_test['TypeTravel'].median()
#display("Median TypeTravel-Train", df['TypeTravel'].median())
#display("Median TypeTravel-Test", df_test['TypeTravel'].median())
```

In [197]:

```
df.loc[df['Travel_Class'].isnull() == True, 'Travel_Class'] = df['Travel_Class'].mode()[0]
df_test.loc[df_test['Travel_Class'].isnull() == True, 'Travel_Class'] = df_test['Travel_Class'].mode()[0]
display("Mode Travel_Class-Train", df['Travel_Class'].mode()[0])
display("Mode Travel_Class-Test", df_test['Travel_Class'].mode()[0])
```

'Mode Travel_Class-Train'

0

'Mode Travel_Class-Test'

0

In [198]:

```
#df.loc[df['Travel_Class'].isnull() == True, 'Travel_Class'] = df['Travel_Class'].median()
#df_test.loc[df_test['Travel_Class'].isnull() == True, 'Travel_Class'] = df_test['Travel_Class'].median()
#display("Median Travel_Class-Train", df['Travel_Class'].median())
#display("Median Travel_Class-Test", df_test['Travel_Class'].median())
```

Out[198]:

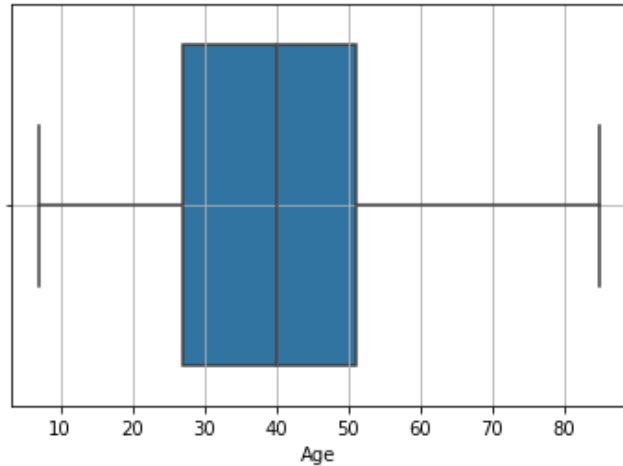
Outliers Check

In [1275]:

```
cols = ['Age', 'Travel_Distance', 'DepartureDelay_in_Mins', 'ArrivalDelay_in_Mins']
for i in cols:
    sns.boxplot(df[i], whis=1.5)
    plt.grid()
    plt.show();
```

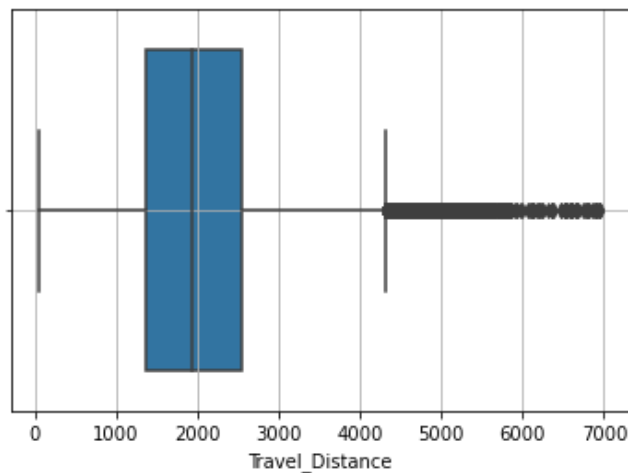
C:\Users\User\anaconda3\lib\site-packages\seaborn_decorators.py:36: FutureWarning: Pass the following variable as a keyword arg: x. From version 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit keyword will result in an error or misinterpretation.

warnings.warn(



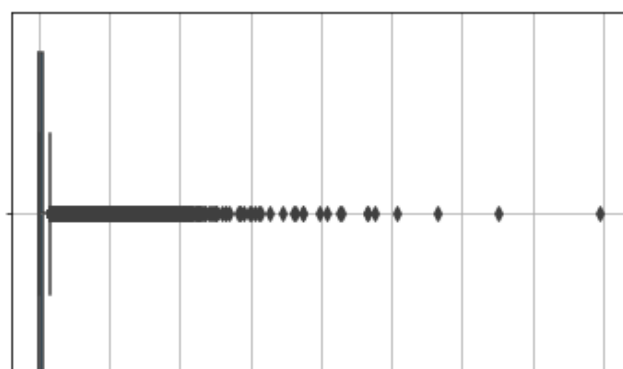
C:\Users\User\anaconda3\lib\site-packages\seaborn_decorators.py:36: FutureWarning: Pass the following variable as a keyword arg: x. From version 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit keyword will result in an error or misinterpretation.

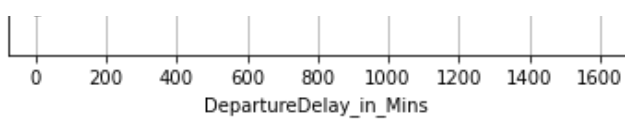
warnings.warn(



C:\Users\User\anaconda3\lib\site-packages\seaborn_decorators.py:36: FutureWarning: Pass the following variable as a keyword arg: x. From version 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit keyword will result in an error or misinterpretation.

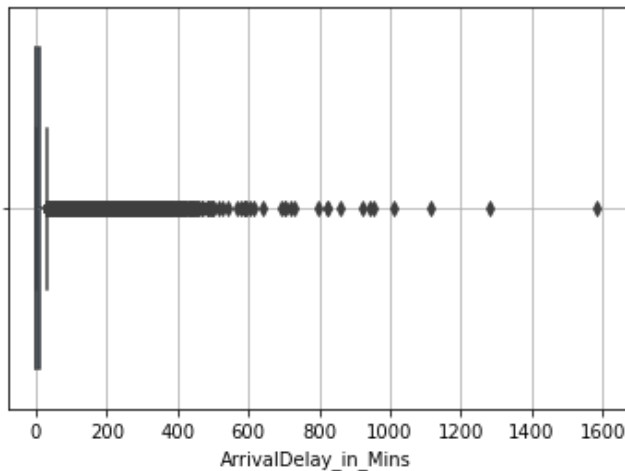
warnings.warn(





C:\Users\User\anaconda3\lib\site-packages\seaborn_decorators.py:36: FutureWarning: Pass the following variable as a keyword arg: x. From version 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit keyword will result in an error or misinterpretation.

```
warnings.warn(
```



In [1276]:

```
def remove_outlier(col):
    Q1,Q3=col.quantile([0.25,0.75])
    IQR=Q3-Q1
    lower_range= Q1-(1.5 * IQR)
    upper_range= Q3+(1.5 * IQR)
    return lower_range, upper_range
```

In [1277]:

```
for column in df[cols].columns:
    lr,ur=remove_outlier(df[column])
    df[column]=np.where(df[column]>ur,ur,df[column])
    df[column]=np.where(df[column]<lr,lr,df[column])
```

In [82]:

```
#cols = ['Age', 'Travel_Distance', 'DepartureDelay_in_Mins', 'ArrivalDelay_in_Mins']
#for i in cols:
#    sns.boxplot(df[i],whis=1.5)
#    plt.grid()
#    plt.show();
```

In [1221]:

```
median1=df['Age'].median()
df['Age']=df['Age'].fillna(median1)
df_test.loc[df_test['Age'].isnull() == True,'Age'] = df_test['Age'].median()
display("Train",median1)
display("Test",df_test['Age'].median())
```

'Train'

40.0

'Test'

40.0

In [1222]:

```
median2=df['DepartureDelay_in_Mins'].median()
df['DepartureDelay_in_Mins']=df['DepartureDelay_in_Mins'].fillna(median2)
df_test.loc[df_test['DepartureDelay_in_Mins'].isnull() == True,'DepartureDelay_in_Mins']
```

```
= df_test['DepartureDelay_in_Mins'].median()
display("Train",median2)
display("Test",df_test['DepartureDelay_in_Mins'].median())
```

'Train'

0.0

'Test'

0.0

In [1223]:

```
median3=df['ArrivalDelay_in_Mins'].median()
df['ArrivalDelay_in_Mins']=df['ArrivalDelay_in_Mins'].fillna(median3)
df_test.loc[df_test['ArrivalDelay_in_Mins'].isnull() == True,'ArrivalDelay_in_Mins'] = d
f_test['ArrivalDelay_in_Mins'].median()
display("Train",median3)
display("Test",df_test['ArrivalDelay_in_Mins'].median())
```

'Train'

0.0

'Test'

0.0

In [1224]:

```
display("TRAIN DATASET",df.isnull().sum())
display("TEST DATASET",df_test.isnull().sum())
```

'TRAIN DATASET'

Overall_Experience	0
Seat_comfort	61
Seat_Class	0
Arrival_time_convenient	8930
Catering	8741
Platform_location	30
Onboardwifi_service	30
Onboard_entertainment	18
Online_support	91
Onlinebooking_Ease	73
Onboard_service	7601
Leg_room	90
Baggage_handling	142
Checkin_service	77
Cleanliness	6
Online_boarding	6
Gender	77
CustomerType	8951
Age	0
TypeTravel	9226
Travel_Class	0
Travel_Distance	0
DepartureDelay_in_Mins	0
ArrivalDelay_in_Mins	0
dtype:	int64

'TEST DATASET'

Seat_comfort	22
Seat_Class	0
Arrival_time_convenient	3325
Catering	3357
Platform_location	12
Onboardwifi_service	12
Onboard_entertainment	8
Online_support	26
Onlinebooking_Ease	18
Onboard_service	2872


```

Leg_room                25
Baggage_handling        40
Checkin_service         22
Cleanliness             2
Online_boarding         2
Gender                 30
CustomerType            3383
Age                    0
TypeTravel             3448
Travel_Class            0
Travel_Distance         0
DepartureDelay_in_Mins  0
ArrivalDelay_in_Mins   0
dtype: int64

```

Check for any object data types

In [937]:

```

cat=[]
num=[]
for i in df.columns:
    if df[i].dtype=="object":
        cat.append(i)
    else:
        num.append(i)
print(cat)
print("\n")
print(num)

```

```

[]

```

```

['ID', 'Overall_Experience', 'Seat_comfort', 'Seat_Class', 'Arrival_time_convenient', 'Ca
tering', 'Platform_location', 'Onboardwifi_service', 'Onboard_entertainment', 'Online_sup
port', 'Onlinebooking_Ease', 'Onboard_service', 'Leg_room', 'Baggage_handling', 'Checkin_
service', 'Cleanliness', 'Online_boarding', 'Gender', 'CustomerType', 'Age', 'TypeTravel'
, 'Travel_Class', 'Travel_Distance', 'DepartureDelay_in_Mins', 'ArrivalDelay_in_Mins']

```

In [938]:

```

for column in df.columns:
    if df[column].dtype == 'object':
        print(column.upper(),': ',df[column].nunique())
        print(df[column].value_counts(normalize=True).sort_values())
        print('\n')

```

Quick Pivot for some analysis

In [207]:

```

#pd.pivot_table(df, index=['Product', 'Gender'],
#               columns=['MaritalStatus'], aggfunc=len)
#pd.pivot_table(df, index=['Overall_Experience'],
#               columns=['Overall_Experience'])

```

In []:

```

#display(df['Catering'].value_counts(normalize=True).sort_values)
#display(pd.crosstab(df['Overall_Experience'],df['Catering'] ))
#sns.countplot(x="Overall_Experience",hue="Catering",data=df)
#df.hist(by='Overall_Experience',column = 'Catering')

```

In []:

```

#plt.figure(figsize=(5,5))
#sns.countplot(x="Overall_Experience",hue="Catering",data=df)

```

```
In [13]:
```

```
#df.info()
```

```
In [939]:
```

```
#df['Age']= df['Age'].astype('int64')
#df['DepartureDelay_in_Mins']= df['DepartureDelay_in_Mins'].astype('int64')
#df['ArrivalDelay_in_Mins']= df['ArrivalDelay_in_Mins'].astype('int64')
```

```
In [14]:
```

```
#df_test['Age']= df_test['Age'].astype('int64')
#df_test['DepartureDelay_in_Mins']= df_test['DepartureDelay_in_Mins'].astype('int64')
#df_test['ArrivalDelay_in_Mins']= df_test['ArrivalDelay_in_Mins'].astype('int64')
```

Necessary step for Test file prediction and submission

```
In [22]:
```

```
df=df.drop(['ID'],axis=1)
```

```
In [23]:
```

```
test_file_ids = df_test['ID'] ## necessary step
```

```
In [24]:
```

```
df_test=df_test.drop(['ID'],axis=1)
```

```
In [25]:
```

```
df.shape,df_test.shape
```

```
Out[25]:
```

```
((94379, 24), (35602, 23))
```

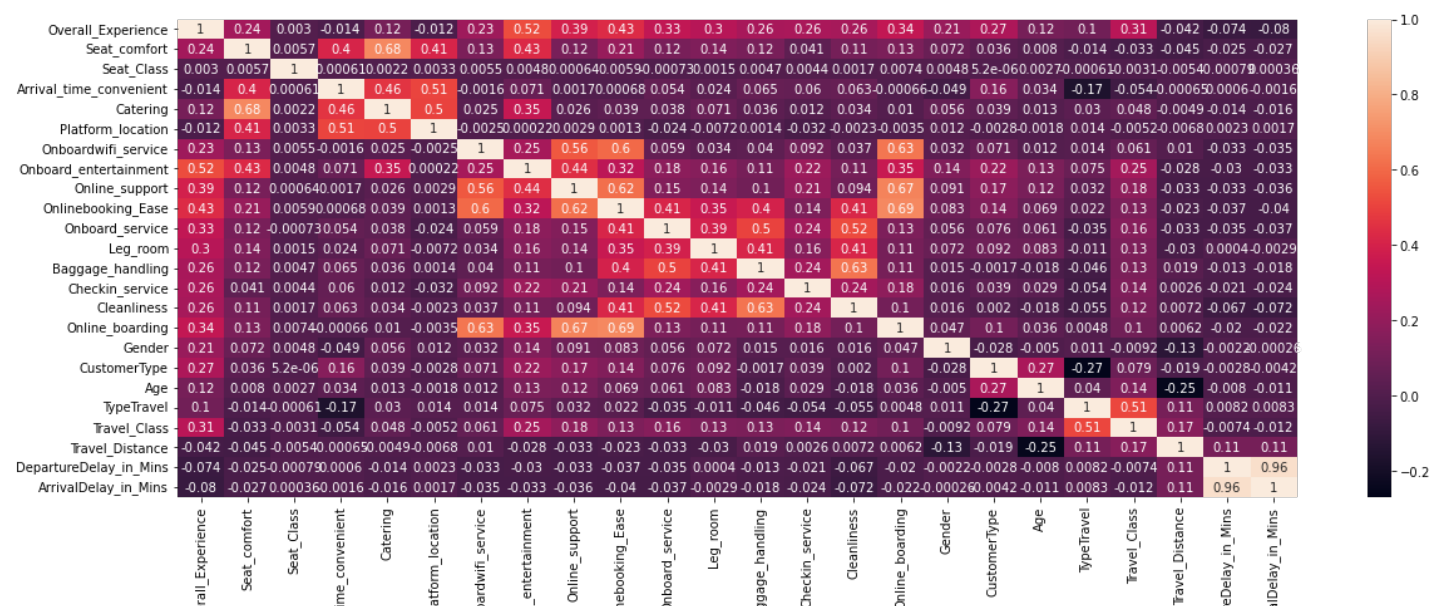
Correlation

```
In [99]:
```

```
corr=df.corr()
plt.figure(figsize=(20,7))
sns.heatmap(corr,annot=True)
```

```
Out[99]:
```

```
<AxesSubplot:>
```



In []:

```
#sns.pairplot(df)
```

In [100]:

```
#from scipy.stats import zscore
df_num_scaled=df.apply(zscore)
df_num_scaled.head()
```

Out[100]:

	Overall_Experience	Seat_comfort	Seat_Class	Arrival_time_convenient	Catering	Platform_location	Onboardwifi_service	Onboardentertainment	Online_support	Onlinebooking_Ease	Onboard_service	Leg_room	Baggage_handling	Checkin_service	Cleanliness	Online_boarding	Gender	CustomerType	Age	TypeTravel	Travel_Class	Travel_Distance	DepartureDelay_in_Mins	ArrivalDelay_in_Mins
0	-1.098107	-0.602903	0.994811	1.288950	1.549973	1.536013	0.569615	1.356788	-0.757533	-0.946258	-0.757533	-0.757533	-0.188322	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533
1	-1.098107	-1.321256	-1.005216	1.288950	1.356788	-0.757533	0.569615	-0.757533	-0.946258	-0.757533	-0.757533	-0.757533	-0.188322	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533
2	0.910658	-0.602903	0.994811	-0.735667	0.630097	-0.757533	-0.946258	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.188322	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533
3	-1.098107	0.115449	-1.005216	-0.735667	0.096593	-0.757533	-0.188322	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.188322	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533
4	0.910658	0.115449	-1.005216	-0.060795	0.096593	0.006983	-0.946258	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.188322	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533	-0.757533

5 rows x 24 columns

Variance Inflation Factor

In [101]:

```
df.columns
```

Out[101]:

```
Index(['Overall_Experience', 'Seat_comfort', 'Seat_Class',
      'Arrival_time_convenient', 'Catering', 'Platform_location',
      'Onboardwifi_service', 'Onboard_entertainment', 'Online_support',
      'Onlinebooking_Ease', 'Onboard_service', 'Leg_room', 'Baggage_handling',
      'Checkin_service', 'Cleanliness', 'Online_boarding', 'Gender',
      'CustomerType', 'Age', 'TypeTravel', 'Travel_Class', 'Travel_Distance',
      'DepartureDelay_in_Mins', 'ArrivalDelay_in_Mins'],
      dtype='object')
```

In [106]:

```
from statsmodels.stats.outliers_influence import variance_inflation_factor
B = df_num_scaled.drop(['Overall_Experience', 'DepartureDelay_in_Mins'],axis=1)
vif = pd.DataFrame()
vif["features"]=B.columns
vif["VIF"] = [variance_inflation_factor(B.values, i)
              for i in range(len(B.columns))]
print(vif.sort_values(by='VIF'))
```

	features	VIF
1	Seat_Class	1.000252
21	ArrivalDelay_in_Mins	1.023309
15	Gender	1.057783
20	Travel_Distance	1.163112
17	Age	1.209245
12	Checkin_service	1.216195
16	CustomerType	1.365831
10	Leg_room	1.392572
2	Arrival_time_convenient	1.625704
4	Platform_location	1.647192
9	Onboard_service	1.665763
18	TypeTravel	1.689714

19	Travel_Class	1.709056
6	Onboard_entertainment	1.893667
11	Baggage_handling	1.930431
13	Cleanliness	2.040062
5	Onboardwifi_service	2.043840
0	Seat_comfort	2.320029
3	Catering	2.346398
7	Online_support	2.353442
14	Online_boarding	2.717137
8	Onlinebooking_Ease	3.797826

In []:

```
corr=B.corr()
plt.figure(figsize=(20,7))
sns.heatmap(corr,annot=True)
```

Model Building

In [945]:

```
df.columns
```

Out[945]:

```
Index(['Overall_Experience', 'Seat_comfort', 'Seat_Class',
      'Arrival_time_convenient', 'Catering', 'Platform_location',
      'Onboardwifi_service', 'Onboard_entertainment', 'Online_support',
      'Onlinebooking_Ease', 'Onboard_service', 'Leg_room', 'Baggage_handling',
      'Checkin_service', 'Cleanliness', 'Online_boarding', 'Gender',
      'CustomerType', 'Age', 'TypeTravel', 'Travel_Class', 'Travel_Distance',
      'DepartureDelay_in_Mins', 'ArrivalDelay_in_Mins'],
      dtype='object')
```

In [26]:

```
# Copy all the predictor variables into X dataframe
X = df.drop(['Overall_Experience'],axis=1)
# Copy target into the y dataframe.
y = df[['Overall_Experience']]
```

In [27]:

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.30 , random_state=
1,stratify=df['Overall_Experience'])
```

In [1284]:

```
#from sklearn.preprocessing import StandardScaler
#sc = StandardScaler()
#X_train = sc.fit_transform(X_train)
#X_test = sc.transform (X_test)
```

In [1285]:

```
#from sklearn.preprocessing import StandardScaler
#sc = StandardScaler()
#X = sc.fit_transform(X)
#df_test = sc.transform (df_test)
```

In [1286]:

```
#X
```

In [28]:

```
X_train.shape, y_train.shape, X_test.shape, y_test.shape
```

Out[28]:

```
((66065, 23), (66065, 1), (28314, 23), (28314, 1))
```

In [1046]:

```
#X_train
```

In [847]:

```
#corr=X.corr()  
#plt.figure(figsize=(20,7))  
#sns.heatmap(corr,annot=True)
```

In []:

```
cb = CatBoostClassifier(iterations=140, depth=14, learning_rate=0.04) - .95002  
cb = CatBoostClassifier(iterations=600, depth=14, learning_rate=0.04) - .9528  
cb = CatBoostClassifier( learning_rate=0.04) - .9544
```

In []:

```
#999: learn: 0.0773031 total: 2m 46s remaining: 0us
```

In [29]:

```
#random_state=1  
#n_estimators=500  
#class_weight={0:0.45, 1:0.55}  
#rf= RandomForestClassifier()  
#xgb = XGBClassifier()  
cb = CatBoostClassifier(iterations=1200, depth = 10, learning_rate=0.06)  
#dt = DecisionTreeClassifier(random_state=1)  
#dt_bg = BaggingClassifier(base_estimator=dt, n_estimators=100, random_state=1)  
#lgb = LGBMClassifier()  
#gb = GradientBoostingClassifier(random_state=1)  
#mlp = MLPClassifier()  
#nb = GaussianNB()  
#knn = KNeighborsClassifier()  
#ab = AdaBoostClassifier(n_estimators=100, random_state=1)  
#log = LogisticRegression()  
#lda = LinearDiscriminantAnalysis()  
models=[cb]  
#models=[xgb, cb, lgb]  
#models=[rf, xgb, cb, dt_bg, lgb, mlp]  
#models=[rf, xgb, cb, dt, dt_bg, lgb, mlp, nb, knn, ab, gb, log, lda]  
scores_train=[]  
scores_test=[]
```

In [30]:

```
for i in models:  
    i.fit(X_train, y_train)  
    scores_train.append(i.score(X_train, y_train))  
    scores_test.append(i.score(X_test, y_test))
```

```
0: learn: 0.6048982 total: 457ms remaining: 9m 8s  
1: learn: 0.5310511 total: 569ms remaining: 5m 40s  
2: learn: 0.4735620 total: 710ms remaining: 4m 43s  
3: learn: 0.4279339 total: 866ms remaining: 4m 18s  
4: learn: 0.3935418 total: 991ms remaining: 3m 56s  
5: learn: 0.3666765 total: 1.13s remaining: 3m 44s  
6: learn: 0.3394307 total: 1.28s remaining: 3m 38s  
7: learn: 0.3176176 total: 1.43s remaining: 3m 32s  
8: learn: 0.2955641 total: 1.58s remaining: 3m 29s  
9: learn: 0.2820172 total: 1.7s remaining: 3m 21s  
10: learn: 0.2703977 total: 1.81s remaining: 3m 15s  
11: learn: 0.2577109 total: 1.95s remaining: 3m 12s  
12: learn: 0.2454461 total: 2.11s remaining: 3m 13s  
13: learn: 0.2363359 total: 2.26s remaining: 3m 11s  
14: learn: 0.2264181 total: 2.44s remaining: 3m 13s  
15: learn: 0.2192018 total: 2.58s remaining: 3m 11s  
16: learn: 0.2115647 total: 2.71s remaining: 3m 8s
```

17: learn: 0.2069292 total: 2.83s remaining: 3m 5s
18: learn: 0.2016109 total: 2.99s remaining: 3m 5s
19: learn: 0.1980293 total: 3.17s remaining: 3m 7s
20: learn: 0.1943444 total: 3.34s remaining: 3m 7s
21: learn: 0.1902859 total: 3.46s remaining: 3m 5s
22: learn: 0.1867722 total: 3.58s remaining: 3m 2s
23: learn: 0.1834742 total: 3.71s remaining: 3m 1s
24: learn: 0.1807155 total: 3.84s remaining: 3m
25: learn: 0.1778776 total: 3.97s remaining: 2m 59s
26: learn: 0.1753977 total: 4.11s remaining: 2m 58s
27: learn: 0.1733495 total: 4.3s remaining: 2m 59s
28: learn: 0.1713455 total: 4.47s remaining: 3m
29: learn: 0.1683220 total: 4.61s remaining: 2m 59s
30: learn: 0.1662801 total: 4.72s remaining: 2m 58s
31: learn: 0.1643941 total: 4.85s remaining: 2m 56s
32: learn: 0.1614621 total: 5.03s remaining: 2m 57s
33: learn: 0.1599290 total: 5.21s remaining: 2m 58s
34: learn: 0.1576874 total: 5.38s remaining: 2m 59s
35: learn: 0.1558220 total: 5.49s remaining: 2m 57s
36: learn: 0.1545279 total: 5.6s remaining: 2m 56s
37: learn: 0.1526382 total: 5.73s remaining: 2m 55s
38: learn: 0.1503803 total: 5.92s remaining: 2m 56s
39: learn: 0.1486668 total: 6.08s remaining: 2m 56s
40: learn: 0.1469999 total: 6.24s remaining: 2m 56s
41: learn: 0.1457779 total: 6.36s remaining: 2m 55s
42: learn: 0.1445348 total: 6.47s remaining: 2m 54s
43: learn: 0.1428059 total: 6.64s remaining: 2m 54s
44: learn: 0.1419822 total: 6.81s remaining: 2m 54s
45: learn: 0.1407350 total: 6.93s remaining: 2m 53s
46: learn: 0.1390474 total: 7.12s remaining: 2m 54s
47: learn: 0.1380305 total: 7.33s remaining: 2m 55s
48: learn: 0.1368968 total: 7.5s remaining: 2m 56s
49: learn: 0.1361232 total: 7.68s remaining: 2m 56s
50: learn: 0.1352387 total: 7.82s remaining: 2m 56s
51: learn: 0.1335481 total: 7.95s remaining: 2m 55s
52: learn: 0.1326894 total: 8.15s remaining: 2m 56s
53: learn: 0.1318411 total: 8.36s remaining: 2m 57s
54: learn: 0.1310693 total: 8.55s remaining: 2m 57s
55: learn: 0.1302753 total: 8.78s remaining: 2m 59s
56: learn: 0.1292849 total: 9.01s remaining: 3m
57: learn: 0.1277906 total: 9.23s remaining: 3m 1s
58: learn: 0.1266974 total: 9.46s remaining: 3m 2s
59: learn: 0.1259671 total: 9.66s remaining: 3m 3s
60: learn: 0.1252229 total: 9.91s remaining: 3m 5s
61: learn: 0.1244028 total: 10.1s remaining: 3m 6s
62: learn: 0.1235679 total: 10.4s remaining: 3m 7s
63: learn: 0.1227017 total: 10.6s remaining: 3m 8s
64: learn: 0.1222648 total: 10.8s remaining: 3m 9s
65: learn: 0.1215067 total: 11s remaining: 3m 9s
66: learn: 0.1208271 total: 11.2s remaining: 3m 10s
67: learn: 0.1201431 total: 11.5s remaining: 3m 10s
68: learn: 0.1193806 total: 11.6s remaining: 3m 10s
69: learn: 0.1186905 total: 11.8s remaining: 3m 10s
70: learn: 0.1182765 total: 12s remaining: 3m 10s
71: learn: 0.1178376 total: 12.2s remaining: 3m 10s
72: learn: 0.1174747 total: 12.3s remaining: 3m 10s
73: learn: 0.1171407 total: 12.4s remaining: 3m 9s
74: learn: 0.1164164 total: 12.6s remaining: 3m 8s
75: learn: 0.1159771 total: 12.7s remaining: 3m 7s
76: learn: 0.1151366 total: 12.8s remaining: 3m 6s
77: learn: 0.1144391 total: 12.9s remaining: 3m 5s
78: learn: 0.1137292 total: 13s remaining: 3m 4s
79: learn: 0.1130282 total: 13.1s remaining: 3m 3s
80: learn: 0.1124249 total: 13.3s remaining: 3m 3s
81: learn: 0.1116695 total: 13.4s remaining: 3m 2s
82: learn: 0.1111097 total: 13.6s remaining: 3m 2s
83: learn: 0.1104038 total: 13.7s remaining: 3m 2s
84: learn: 0.1099749 total: 13.8s remaining: 3m 1s
85: learn: 0.1094772 total: 13.9s remaining: 3m
86: learn: 0.1090301 total: 14.1s remaining: 2m 59s
87: learn: 0.1084494 total: 14.2s remaining: 2m 59s
88: learn: 0.1078982 total: 14.3s remaining: 2m 58s

89: learn: 0.1074653 total: 14.4s remaining: 2m 57s
90: learn: 0.1070632 total: 14.5s remaining: 2m 57s
91: learn: 0.1066844 total: 14.7s remaining: 2m 56s
92: learn: 0.1061018 total: 14.9s remaining: 2m 57s
93: learn: 0.1057420 total: 15.1s remaining: 2m 57s
94: learn: 0.1051615 total: 15.2s remaining: 2m 56s
95: learn: 0.1047758 total: 15.3s remaining: 2m 55s
96: learn: 0.1043842 total: 15.4s remaining: 2m 55s
97: learn: 0.1040222 total: 15.5s remaining: 2m 54s
98: learn: 0.1038261 total: 15.7s remaining: 2m 54s
99: learn: 0.1034215 total: 15.8s remaining: 2m 53s
100: learn: 0.1032421 total: 15.9s remaining: 2m 53s
101: learn: 0.1029767 total: 16s remaining: 2m 52s
102: learn: 0.1026473 total: 16.1s remaining: 2m 52s
103: learn: 0.1019531 total: 16.3s remaining: 2m 51s
104: learn: 0.1013986 total: 16.4s remaining: 2m 51s
105: learn: 0.1008835 total: 16.5s remaining: 2m 50s
106: learn: 0.1003830 total: 16.7s remaining: 2m 50s
107: learn: 0.1001091 total: 16.8s remaining: 2m 49s
108: learn: 0.0998312 total: 16.9s remaining: 2m 49s
109: learn: 0.0994700 total: 17.1s remaining: 2m 49s
110: learn: 0.0990908 total: 17.3s remaining: 2m 49s
111: learn: 0.0986355 total: 17.4s remaining: 2m 48s
112: learn: 0.0983874 total: 17.5s remaining: 2m 48s
113: learn: 0.0980614 total: 17.6s remaining: 2m 47s
114: learn: 0.0977907 total: 17.8s remaining: 2m 47s
115: learn: 0.0974345 total: 17.9s remaining: 2m 47s
116: learn: 0.0969728 total: 18.1s remaining: 2m 47s
117: learn: 0.0965732 total: 18.2s remaining: 2m 46s
118: learn: 0.0962258 total: 18.3s remaining: 2m 46s
119: learn: 0.0957265 total: 18.4s remaining: 2m 45s
120: learn: 0.0952638 total: 18.5s remaining: 2m 45s
121: learn: 0.0948767 total: 18.7s remaining: 2m 45s
122: learn: 0.0945431 total: 18.9s remaining: 2m 45s
123: learn: 0.0942333 total: 19s remaining: 2m 44s
124: learn: 0.0939373 total: 19.1s remaining: 2m 44s
125: learn: 0.0935681 total: 19.2s remaining: 2m 43s
126: learn: 0.0932533 total: 19.3s remaining: 2m 43s
127: learn: 0.0928729 total: 19.4s remaining: 2m 42s
128: learn: 0.0927453 total: 19.6s remaining: 2m 42s
129: learn: 0.0925050 total: 19.7s remaining: 2m 41s
130: learn: 0.0922714 total: 19.8s remaining: 2m 41s
131: learn: 0.0920536 total: 19.9s remaining: 2m 41s
132: learn: 0.0918411 total: 20s remaining: 2m 40s
133: learn: 0.0916255 total: 20.2s remaining: 2m 40s
134: learn: 0.0914197 total: 20.3s remaining: 2m 39s
135: learn: 0.0912486 total: 20.4s remaining: 2m 39s
136: learn: 0.0909408 total: 20.5s remaining: 2m 39s
137: learn: 0.0908031 total: 20.7s remaining: 2m 39s
138: learn: 0.0906316 total: 21s remaining: 2m 39s
139: learn: 0.0903920 total: 21.1s remaining: 2m 39s
140: learn: 0.0898610 total: 21.3s remaining: 2m 39s
141: learn: 0.0896345 total: 21.4s remaining: 2m 39s
142: learn: 0.0893367 total: 21.6s remaining: 2m 39s
143: learn: 0.0890773 total: 21.7s remaining: 2m 39s
144: learn: 0.0886420 total: 21.9s remaining: 2m 39s
145: learn: 0.0883666 total: 22.1s remaining: 2m 39s
146: learn: 0.0882453 total: 22.2s remaining: 2m 39s
147: learn: 0.0880818 total: 22.4s remaining: 2m 38s
148: learn: 0.0878765 total: 22.5s remaining: 2m 38s
149: learn: 0.0876870 total: 22.6s remaining: 2m 38s
150: learn: 0.0874463 total: 22.8s remaining: 2m 38s
151: learn: 0.0871368 total: 23s remaining: 2m 38s
152: learn: 0.0869732 total: 23.2s remaining: 2m 38s
153: learn: 0.0866172 total: 23.4s remaining: 2m 38s
154: learn: 0.0863056 total: 23.5s remaining: 2m 38s
155: learn: 0.0860438 total: 23.7s remaining: 2m 38s
156: learn: 0.0859204 total: 23.9s remaining: 2m 38s
157: learn: 0.0857802 total: 24s remaining: 2m 38s
158: learn: 0.0856363 total: 24.2s remaining: 2m 38s
159: learn: 0.0854854 total: 24.3s remaining: 2m 38s
160: learn: 0.0852214 total: 24.5s remaining: 2m 38s

161: learn: 0.0848821 total: 24.7s remaining: 2m 38s
162: learn: 0.0846858 total: 24.9s remaining: 2m 38s
163: learn: 0.0845108 total: 25s remaining: 2m 38s
164: learn: 0.0841774 total: 25.4s remaining: 2m 39s
165: learn: 0.0839314 total: 25.5s remaining: 2m 38s
166: learn: 0.0836752 total: 25.7s remaining: 2m 39s
167: learn: 0.0834990 total: 26s remaining: 2m 39s
168: learn: 0.0832809 total: 26.2s remaining: 2m 39s
169: learn: 0.0830516 total: 26.3s remaining: 2m 39s
170: learn: 0.0828714 total: 26.5s remaining: 2m 39s
171: learn: 0.0826294 total: 26.6s remaining: 2m 39s
172: learn: 0.0824769 total: 26.8s remaining: 2m 38s
173: learn: 0.0822883 total: 27s remaining: 2m 39s
174: learn: 0.0821385 total: 27.2s remaining: 2m 39s
175: learn: 0.0818220 total: 27.3s remaining: 2m 38s
176: learn: 0.0814306 total: 27.4s remaining: 2m 38s
177: learn: 0.0811088 total: 27.6s remaining: 2m 38s
178: learn: 0.0809435 total: 27.8s remaining: 2m 38s
179: learn: 0.0808548 total: 27.9s remaining: 2m 38s
180: learn: 0.0806492 total: 28.1s remaining: 2m 38s
181: learn: 0.0804872 total: 28.3s remaining: 2m 38s
182: learn: 0.0802741 total: 28.4s remaining: 2m 37s
183: learn: 0.0800402 total: 28.6s remaining: 2m 37s
184: learn: 0.0797955 total: 28.8s remaining: 2m 37s
185: learn: 0.0795878 total: 29s remaining: 2m 37s
186: learn: 0.0793672 total: 29.2s remaining: 2m 37s
187: learn: 0.0791342 total: 29.3s remaining: 2m 37s
188: learn: 0.0789147 total: 29.5s remaining: 2m 37s
189: learn: 0.0786657 total: 29.7s remaining: 2m 37s
190: learn: 0.0784853 total: 29.8s remaining: 2m 37s
191: learn: 0.0782807 total: 30s remaining: 2m 37s
192: learn: 0.0779999 total: 30.2s remaining: 2m 37s
193: learn: 0.0777457 total: 30.3s remaining: 2m 37s
194: learn: 0.0774805 total: 30.4s remaining: 2m 36s
195: learn: 0.0772700 total: 30.5s remaining: 2m 36s
196: learn: 0.0771208 total: 30.8s remaining: 2m 36s
197: learn: 0.0769999 total: 30.9s remaining: 2m 36s
198: learn: 0.0767923 total: 31s remaining: 2m 36s
199: learn: 0.0765856 total: 31.2s remaining: 2m 35s
200: learn: 0.0762544 total: 31.3s remaining: 2m 35s
201: learn: 0.0761176 total: 31.5s remaining: 2m 35s
202: learn: 0.0759155 total: 31.7s remaining: 2m 35s
203: learn: 0.0756741 total: 31.9s remaining: 2m 35s
204: learn: 0.0754649 total: 32.1s remaining: 2m 35s
205: learn: 0.0752247 total: 32.2s remaining: 2m 35s
206: learn: 0.0751509 total: 32.4s remaining: 2m 35s
207: learn: 0.0749935 total: 32.5s remaining: 2m 35s
208: learn: 0.0747342 total: 32.7s remaining: 2m 35s
209: learn: 0.0744658 total: 32.9s remaining: 2m 35s
210: learn: 0.0743660 total: 33.1s remaining: 2m 34s
211: learn: 0.0742454 total: 33.2s remaining: 2m 34s
212: learn: 0.0740790 total: 33.3s remaining: 2m 34s
213: learn: 0.0739284 total: 33.4s remaining: 2m 34s
214: learn: 0.0738266 total: 33.6s remaining: 2m 33s
215: learn: 0.0736017 total: 33.7s remaining: 2m 33s
216: learn: 0.0734075 total: 33.8s remaining: 2m 33s
217: learn: 0.0731858 total: 34s remaining: 2m 32s
218: learn: 0.0729982 total: 34.1s remaining: 2m 32s
219: learn: 0.0727326 total: 34.2s remaining: 2m 32s
220: learn: 0.0725332 total: 34.3s remaining: 2m 32s
221: learn: 0.0724006 total: 34.5s remaining: 2m 32s
222: learn: 0.0722704 total: 34.7s remaining: 2m 32s
223: learn: 0.0722015 total: 34.9s remaining: 2m 32s
224: learn: 0.0720576 total: 35.1s remaining: 2m 31s
225: learn: 0.0717714 total: 35.3s remaining: 2m 32s
226: learn: 0.0715196 total: 35.5s remaining: 2m 32s
227: learn: 0.0712441 total: 35.7s remaining: 2m 32s
228: learn: 0.0709638 total: 35.8s remaining: 2m 32s
229: learn: 0.0708447 total: 36s remaining: 2m 31s
230: learn: 0.0704481 total: 36.2s remaining: 2m 31s
231: learn: 0.0702731 total: 36.4s remaining: 2m 31s
232: learn: 0.0700480 total: 36.6s remaining: 2m 31s

232: learn: 0.0698782 total: 36.7s remaining: 2m 31s
233: learn: 0.0698782 total: 36.7s remaining: 2m 31s
234: learn: 0.0697110 total: 36.9s remaining: 2m 31s
235: learn: 0.0695155 total: 37.1s remaining: 2m 31s
236: learn: 0.0694304 total: 37.2s remaining: 2m 31s
237: learn: 0.0692539 total: 37.3s remaining: 2m 30s
238: learn: 0.0690677 total: 37.5s remaining: 2m 30s
239: learn: 0.0690159 total: 37.6s remaining: 2m 30s
240: learn: 0.0688244 total: 37.7s remaining: 2m 30s
241: learn: 0.0687051 total: 37.8s remaining: 2m 29s
242: learn: 0.0686214 total: 38s remaining: 2m 29s
243: learn: 0.0684859 total: 38.1s remaining: 2m 29s
244: learn: 0.0683457 total: 38.3s remaining: 2m 29s
245: learn: 0.0680279 total: 38.4s remaining: 2m 28s
246: learn: 0.0679578 total: 38.5s remaining: 2m 28s
247: learn: 0.0678777 total: 38.6s remaining: 2m 28s
248: learn: 0.0677560 total: 38.8s remaining: 2m 28s
249: learn: 0.0676641 total: 38.9s remaining: 2m 27s
250: learn: 0.0675931 total: 39s remaining: 2m 27s
251: learn: 0.0674072 total: 39.1s remaining: 2m 27s
252: learn: 0.0673596 total: 39.3s remaining: 2m 27s
253: learn: 0.0672261 total: 39.5s remaining: 2m 27s
254: learn: 0.0670312 total: 39.7s remaining: 2m 27s
255: learn: 0.0668929 total: 39.9s remaining: 2m 27s
256: learn: 0.0668404 total: 40.1s remaining: 2m 27s
257: learn: 0.0666892 total: 40.2s remaining: 2m 26s
258: learn: 0.0665549 total: 40.4s remaining: 2m 26s
259: learn: 0.0664949 total: 40.5s remaining: 2m 26s
260: learn: 0.0664077 total: 40.6s remaining: 2m 26s
261: learn: 0.0663584 total: 40.8s remaining: 2m 25s
262: learn: 0.0660889 total: 40.9s remaining: 2m 25s
263: learn: 0.0659793 total: 41.1s remaining: 2m 25s
264: learn: 0.0659026 total: 41.2s remaining: 2m 25s
265: learn: 0.0658230 total: 41.4s remaining: 2m 25s
266: learn: 0.0656161 total: 41.5s remaining: 2m 25s
267: learn: 0.0654800 total: 41.7s remaining: 2m 24s
268: learn: 0.0653477 total: 41.8s remaining: 2m 24s
269: learn: 0.0652590 total: 41.9s remaining: 2m 24s
270: learn: 0.0650710 total: 42.1s remaining: 2m 24s
271: learn: 0.0648144 total: 42.2s remaining: 2m 24s
272: learn: 0.0647328 total: 42.4s remaining: 2m 23s
273: learn: 0.0645872 total: 42.6s remaining: 2m 23s
274: learn: 0.0644893 total: 42.8s remaining: 2m 23s
275: learn: 0.0643878 total: 43s remaining: 2m 23s
276: learn: 0.0642509 total: 43.1s remaining: 2m 23s
277: learn: 0.0640921 total: 43.3s remaining: 2m 23s
278: learn: 0.0639802 total: 43.5s remaining: 2m 23s
279: learn: 0.0637493 total: 43.7s remaining: 2m 23s
280: learn: 0.0635084 total: 43.9s remaining: 2m 23s
281: learn: 0.0634280 total: 44.1s remaining: 2m 23s
282: learn: 0.0632066 total: 44.3s remaining: 2m 23s
283: learn: 0.0630896 total: 44.5s remaining: 2m 23s
284: learn: 0.0629652 total: 44.6s remaining: 2m 23s
285: learn: 0.0628996 total: 44.8s remaining: 2m 23s
286: learn: 0.0628075 total: 44.9s remaining: 2m 22s
287: learn: 0.0626695 total: 45s remaining: 2m 22s
288: learn: 0.0625603 total: 45.2s remaining: 2m 22s
289: learn: 0.0623163 total: 45.3s remaining: 2m 22s
290: learn: 0.0622191 total: 45.4s remaining: 2m 21s
291: learn: 0.0620950 total: 45.6s remaining: 2m 21s
292: learn: 0.0619637 total: 45.8s remaining: 2m 21s
293: learn: 0.0618440 total: 45.9s remaining: 2m 21s
294: learn: 0.0616200 total: 46s remaining: 2m 21s
295: learn: 0.0614989 total: 46.1s remaining: 2m 20s
296: learn: 0.0612319 total: 46.4s remaining: 2m 20s
297: learn: 0.0611724 total: 46.6s remaining: 2m 20s
298: learn: 0.0611166 total: 46.7s remaining: 2m 20s
299: learn: 0.0609196 total: 47s remaining: 2m 20s
300: learn: 0.0607881 total: 47.1s remaining: 2m 20s
301: learn: 0.0606371 total: 47.2s remaining: 2m 20s
302: learn: 0.0604840 total: 47.3s remaining: 2m 20s
303: learn: 0.0604019 total: 47.4s remaining: 2m 19s
304: learn: 0.0600429 total: 47.6s remaining: 2m 19s

305: learn: 0.0599007 total: 47.7s remaining: 2m 19s
306: learn: 0.0597270 total: 47.8s remaining: 2m 19s
307: learn: 0.0595967 total: 47.9s remaining: 2m 18s
308: learn: 0.0594983 total: 48s remaining: 2m 18s
309: learn: 0.0594027 total: 48.2s remaining: 2m 18s
310: learn: 0.0592688 total: 48.4s remaining: 2m 18s
311: learn: 0.0592307 total: 48.6s remaining: 2m 18s
312: learn: 0.0591481 total: 48.7s remaining: 2m 18s
313: learn: 0.0589647 total: 48.9s remaining: 2m 18s
314: learn: 0.0588100 total: 49.1s remaining: 2m 17s
315: learn: 0.0587341 total: 49.2s remaining: 2m 17s
316: learn: 0.0586472 total: 49.4s remaining: 2m 17s
317: learn: 0.0583826 total: 49.6s remaining: 2m 17s
318: learn: 0.0582884 total: 49.8s remaining: 2m 17s
319: learn: 0.0581815 total: 49.9s remaining: 2m 17s
320: learn: 0.0580022 total: 50.1s remaining: 2m 17s
321: learn: 0.0578674 total: 50.3s remaining: 2m 17s
322: learn: 0.0578151 total: 50.5s remaining: 2m 17s
323: learn: 0.0576785 total: 50.6s remaining: 2m 16s
324: learn: 0.0574938 total: 50.8s remaining: 2m 16s
325: learn: 0.0574473 total: 50.9s remaining: 2m 16s
326: learn: 0.0573005 total: 51s remaining: 2m 16s
327: learn: 0.0572155 total: 51.1s remaining: 2m 15s
328: learn: 0.0570628 total: 51.3s remaining: 2m 15s
329: learn: 0.0569949 total: 51.4s remaining: 2m 15s
330: learn: 0.0568480 total: 51.5s remaining: 2m 15s
331: learn: 0.0566243 total: 51.7s remaining: 2m 15s
332: learn: 0.0565810 total: 51.8s remaining: 2m 14s
333: learn: 0.0564800 total: 51.9s remaining: 2m 14s
334: learn: 0.0563915 total: 52.1s remaining: 2m 14s
335: learn: 0.0563242 total: 52.3s remaining: 2m 14s
336: learn: 0.0561827 total: 52.4s remaining: 2m 14s
337: learn: 0.0560264 total: 52.6s remaining: 2m 14s
338: learn: 0.0558914 total: 52.7s remaining: 2m 13s
339: learn: 0.0557838 total: 52.9s remaining: 2m 13s
340: learn: 0.0556988 total: 53s remaining: 2m 13s
341: learn: 0.0555933 total: 53.2s remaining: 2m 13s
342: learn: 0.0554238 total: 53.4s remaining: 2m 13s
343: learn: 0.0551353 total: 53.5s remaining: 2m 13s
344: learn: 0.0550820 total: 53.6s remaining: 2m 12s
345: learn: 0.0550407 total: 53.8s remaining: 2m 12s
346: learn: 0.0549504 total: 53.9s remaining: 2m 12s
347: learn: 0.0548045 total: 54.1s remaining: 2m 12s
348: learn: 0.0547470 total: 54.2s remaining: 2m 12s
349: learn: 0.0546974 total: 54.4s remaining: 2m 11s
350: learn: 0.0545659 total: 54.5s remaining: 2m 11s
351: learn: 0.0545212 total: 54.6s remaining: 2m 11s
352: learn: 0.0544212 total: 54.8s remaining: 2m 11s
353: learn: 0.0541859 total: 54.9s remaining: 2m 11s
354: learn: 0.0541114 total: 55s remaining: 2m 10s
355: learn: 0.0539393 total: 55.2s remaining: 2m 10s
356: learn: 0.0538295 total: 55.3s remaining: 2m 10s
357: learn: 0.0536504 total: 55.5s remaining: 2m 10s
358: learn: 0.0535244 total: 55.7s remaining: 2m 10s
359: learn: 0.0534240 total: 55.9s remaining: 2m 10s
360: learn: 0.0532984 total: 56s remaining: 2m 10s
361: learn: 0.0532214 total: 56.2s remaining: 2m 10s
362: learn: 0.0530632 total: 56.4s remaining: 2m 10s
363: learn: 0.0529719 total: 56.6s remaining: 2m 9s
364: learn: 0.0528582 total: 56.7s remaining: 2m 9s
365: learn: 0.0527653 total: 56.9s remaining: 2m 9s
366: learn: 0.0526757 total: 57.1s remaining: 2m 9s
367: learn: 0.0526015 total: 57.3s remaining: 2m 9s
368: learn: 0.0525368 total: 57.4s remaining: 2m 9s
369: learn: 0.0523744 total: 57.6s remaining: 2m 9s
370: learn: 0.0522526 total: 57.8s remaining: 2m 9s
371: learn: 0.0521982 total: 57.9s remaining: 2m 8s
372: learn: 0.0520886 total: 58.1s remaining: 2m 8s
373: learn: 0.0520070 total: 58.2s remaining: 2m 8s
374: learn: 0.0519303 total: 58.4s remaining: 2m 8s
375: learn: 0.0518784 total: 58.5s remaining: 2m 8s
376: learn: 0.0517071 total: 58.7s remaining: 2m 8s

377: learn: 0.0516457 total: 58.9s remaining: 2m 8s
378: learn: 0.0515490 total: 59s remaining: 2m 7s
379: learn: 0.0514722 total: 59.1s remaining: 2m 7s
380: learn: 0.0514359 total: 59.3s remaining: 2m 7s
381: learn: 0.0513177 total: 59.4s remaining: 2m 7s
382: learn: 0.0512693 total: 59.5s remaining: 2m 6s
383: learn: 0.0512081 total: 59.6s remaining: 2m 6s
384: learn: 0.0510996 total: 59.8s remaining: 2m 6s
385: learn: 0.0510386 total: 59.9s remaining: 2m 6s
386: learn: 0.0508130 total: 1m remaining: 2m 6s
387: learn: 0.0506974 total: 1m remaining: 2m 5s
388: learn: 0.0506231 total: 1m remaining: 2m 5s
389: learn: 0.0505104 total: 1m remaining: 2m 5s
390: learn: 0.0503999 total: 1m remaining: 2m 5s
391: learn: 0.0502628 total: 1m remaining: 2m 5s
392: learn: 0.0501854 total: 1m remaining: 2m 4s
393: learn: 0.0501468 total: 1m remaining: 2m 4s
394: learn: 0.0500672 total: 1m 1s remaining: 2m 4s
395: learn: 0.0499436 total: 1m 1s remaining: 2m 4s
396: learn: 0.0498485 total: 1m 1s remaining: 2m 4s
397: learn: 0.0497021 total: 1m 1s remaining: 2m 3s
398: learn: 0.0495890 total: 1m 1s remaining: 2m 3s
399: learn: 0.0495078 total: 1m 1s remaining: 2m 3s
400: learn: 0.0493874 total: 1m 1s remaining: 2m 3s
401: learn: 0.0492721 total: 1m 2s remaining: 2m 3s
402: learn: 0.0491579 total: 1m 2s remaining: 2m 2s
403: learn: 0.0490700 total: 1m 2s remaining: 2m 2s
404: learn: 0.0490182 total: 1m 2s remaining: 2m 2s
405: learn: 0.0488662 total: 1m 2s remaining: 2m 2s
406: learn: 0.0488271 total: 1m 2s remaining: 2m 2s
407: learn: 0.0487054 total: 1m 2s remaining: 2m 1s
408: learn: 0.0486332 total: 1m 2s remaining: 2m 1s
409: learn: 0.0486075 total: 1m 3s remaining: 2m 1s
410: learn: 0.0485285 total: 1m 3s remaining: 2m 1s
411: learn: 0.0484596 total: 1m 3s remaining: 2m
412: learn: 0.0483633 total: 1m 3s remaining: 2m
413: learn: 0.0482821 total: 1m 3s remaining: 2m
414: learn: 0.0482067 total: 1m 3s remaining: 2m
415: learn: 0.0480948 total: 1m 3s remaining: 2m
416: learn: 0.0479664 total: 1m 3s remaining: 1m 59s
417: learn: 0.0479034 total: 1m 4s remaining: 1m 59s
418: learn: 0.0478535 total: 1m 4s remaining: 1m 59s
419: learn: 0.0477905 total: 1m 4s remaining: 1m 59s
420: learn: 0.0476955 total: 1m 4s remaining: 1m 59s
421: learn: 0.0475564 total: 1m 4s remaining: 1m 58s
422: learn: 0.0475047 total: 1m 4s remaining: 1m 58s
423: learn: 0.0474127 total: 1m 4s remaining: 1m 58s
424: learn: 0.0473466 total: 1m 4s remaining: 1m 58s
425: learn: 0.0472199 total: 1m 5s remaining: 1m 58s
426: learn: 0.0471597 total: 1m 5s remaining: 1m 57s
427: learn: 0.0470624 total: 1m 5s remaining: 1m 57s
428: learn: 0.0469566 total: 1m 5s remaining: 1m 57s
429: learn: 0.0469247 total: 1m 5s remaining: 1m 57s
430: learn: 0.0468313 total: 1m 5s remaining: 1m 57s
431: learn: 0.0466662 total: 1m 5s remaining: 1m 56s
432: learn: 0.0466043 total: 1m 5s remaining: 1m 56s
433: learn: 0.0465371 total: 1m 5s remaining: 1m 56s
434: learn: 0.0464576 total: 1m 6s remaining: 1m 56s
435: learn: 0.0463913 total: 1m 6s remaining: 1m 55s
436: learn: 0.0463319 total: 1m 6s remaining: 1m 55s
437: learn: 0.0462067 total: 1m 6s remaining: 1m 55s
438: learn: 0.0460393 total: 1m 6s remaining: 1m 55s
439: learn: 0.0459427 total: 1m 6s remaining: 1m 55s
440: learn: 0.0458499 total: 1m 6s remaining: 1m 54s
441: learn: 0.0458129 total: 1m 6s remaining: 1m 54s
442: learn: 0.0456332 total: 1m 7s remaining: 1m 54s
443: learn: 0.0455121 total: 1m 7s remaining: 1m 54s
444: learn: 0.0454453 total: 1m 7s remaining: 1m 54s
445: learn: 0.0453446 total: 1m 7s remaining: 1m 53s
446: learn: 0.0453154 total: 1m 7s remaining: 1m 53s
447: learn: 0.0452373 total: 1m 7s remaining: 1m 53s
448: learn: 0.0451594 total: 1m 7s remaining: 1m 53s

449: learn: 0.0450918 total: 1m 7s remaining: 1m 53s
450: learn: 0.0449878 total: 1m 8s remaining: 1m 53s
451: learn: 0.0449304 total: 1m 8s remaining: 1m 52s
452: learn: 0.0448761 total: 1m 8s remaining: 1m 52s
453: learn: 0.0447141 total: 1m 8s remaining: 1m 52s
454: learn: 0.0446206 total: 1m 8s remaining: 1m 52s
455: learn: 0.0445473 total: 1m 8s remaining: 1m 52s
456: learn: 0.0444716 total: 1m 8s remaining: 1m 51s
457: learn: 0.0443743 total: 1m 8s remaining: 1m 51s
458: learn: 0.0443147 total: 1m 9s remaining: 1m 51s
459: learn: 0.0442215 total: 1m 9s remaining: 1m 51s
460: learn: 0.0441072 total: 1m 9s remaining: 1m 51s
461: learn: 0.0440520 total: 1m 9s remaining: 1m 51s
462: learn: 0.0439714 total: 1m 9s remaining: 1m 50s
463: learn: 0.0438992 total: 1m 9s remaining: 1m 50s
464: learn: 0.0438195 total: 1m 9s remaining: 1m 50s
465: learn: 0.0437406 total: 1m 10s remaining: 1m 50s
466: learn: 0.0436155 total: 1m 10s remaining: 1m 50s
467: learn: 0.0435745 total: 1m 10s remaining: 1m 49s
468: learn: 0.0435481 total: 1m 10s remaining: 1m 49s
469: learn: 0.0434890 total: 1m 10s remaining: 1m 49s
470: learn: 0.0433824 total: 1m 10s remaining: 1m 49s
471: learn: 0.0433048 total: 1m 10s remaining: 1m 49s
472: learn: 0.0431837 total: 1m 10s remaining: 1m 49s
473: learn: 0.0431603 total: 1m 11s remaining: 1m 48s
474: learn: 0.0431210 total: 1m 11s remaining: 1m 48s
475: learn: 0.0430425 total: 1m 11s remaining: 1m 48s
476: learn: 0.0429015 total: 1m 11s remaining: 1m 48s
477: learn: 0.0428127 total: 1m 11s remaining: 1m 48s
478: learn: 0.0427248 total: 1m 11s remaining: 1m 48s
479: learn: 0.0426565 total: 1m 12s remaining: 1m 48s
480: learn: 0.0426133 total: 1m 12s remaining: 1m 47s
481: learn: 0.0425110 total: 1m 12s remaining: 1m 47s
482: learn: 0.0424358 total: 1m 12s remaining: 1m 47s
483: learn: 0.0423825 total: 1m 12s remaining: 1m 47s
484: learn: 0.0423381 total: 1m 12s remaining: 1m 47s
485: learn: 0.0422930 total: 1m 12s remaining: 1m 47s
486: learn: 0.0422543 total: 1m 13s remaining: 1m 46s
487: learn: 0.0422018 total: 1m 13s remaining: 1m 46s
488: learn: 0.0421358 total: 1m 13s remaining: 1m 46s
489: learn: 0.0420876 total: 1m 13s remaining: 1m 46s
490: learn: 0.0420513 total: 1m 13s remaining: 1m 46s
491: learn: 0.0419744 total: 1m 13s remaining: 1m 46s
492: learn: 0.0419128 total: 1m 13s remaining: 1m 45s
493: learn: 0.0418520 total: 1m 14s remaining: 1m 45s
494: learn: 0.0418011 total: 1m 14s remaining: 1m 45s
495: learn: 0.0417564 total: 1m 14s remaining: 1m 45s
496: learn: 0.0416471 total: 1m 14s remaining: 1m 45s
497: learn: 0.0415560 total: 1m 14s remaining: 1m 45s
498: learn: 0.0415088 total: 1m 14s remaining: 1m 44s
499: learn: 0.0414383 total: 1m 14s remaining: 1m 44s
500: learn: 0.0413577 total: 1m 14s remaining: 1m 44s
501: learn: 0.0413349 total: 1m 15s remaining: 1m 44s
502: learn: 0.0412951 total: 1m 15s remaining: 1m 44s
503: learn: 0.0412352 total: 1m 15s remaining: 1m 43s
504: learn: 0.0411531 total: 1m 15s remaining: 1m 43s
505: learn: 0.0411302 total: 1m 15s remaining: 1m 43s
506: learn: 0.0410737 total: 1m 15s remaining: 1m 43s
507: learn: 0.0410116 total: 1m 15s remaining: 1m 43s
508: learn: 0.0409201 total: 1m 15s remaining: 1m 42s
509: learn: 0.0408687 total: 1m 15s remaining: 1m 42s
510: learn: 0.0408042 total: 1m 16s remaining: 1m 42s
511: learn: 0.0407441 total: 1m 16s remaining: 1m 42s
512: learn: 0.0406859 total: 1m 16s remaining: 1m 42s
513: learn: 0.0405849 total: 1m 16s remaining: 1m 42s
514: learn: 0.0405321 total: 1m 16s remaining: 1m 41s
515: learn: 0.0404809 total: 1m 16s remaining: 1m 41s
516: learn: 0.0403845 total: 1m 16s remaining: 1m 41s
517: learn: 0.0403186 total: 1m 17s remaining: 1m 41s
518: learn: 0.0402360 total: 1m 17s remaining: 1m 41s
519: learn: 0.0400468 total: 1m 17s remaining: 1m 41s
520: learn: 0.0399943 total: 1m 17s remaining: 1m 40s

521: learn: 0.0399549 total: 1m 17s remaining: 1m 40s
522: learn: 0.0398902 total: 1m 17s remaining: 1m 40s
523: learn: 0.0398233 total: 1m 17s remaining: 1m 40s
524: learn: 0.0397312 total: 1m 17s remaining: 1m 40s
525: learn: 0.0397017 total: 1m 17s remaining: 1m 39s
526: learn: 0.0396622 total: 1m 18s remaining: 1m 39s
527: learn: 0.0396292 total: 1m 18s remaining: 1m 39s
528: learn: 0.0395353 total: 1m 18s remaining: 1m 39s
529: learn: 0.0394671 total: 1m 18s remaining: 1m 39s
530: learn: 0.0394004 total: 1m 18s remaining: 1m 38s
531: learn: 0.0393207 total: 1m 18s remaining: 1m 38s
532: learn: 0.0392564 total: 1m 18s remaining: 1m 38s
533: learn: 0.0391961 total: 1m 18s remaining: 1m 38s
534: learn: 0.0391311 total: 1m 19s remaining: 1m 38s
535: learn: 0.0390560 total: 1m 19s remaining: 1m 38s
536: learn: 0.0390138 total: 1m 19s remaining: 1m 37s
537: learn: 0.0389756 total: 1m 19s remaining: 1m 37s
538: learn: 0.0389168 total: 1m 19s remaining: 1m 37s
539: learn: 0.0388979 total: 1m 19s remaining: 1m 37s
540: learn: 0.0387894 total: 1m 19s remaining: 1m 37s
541: learn: 0.0386976 total: 1m 20s remaining: 1m 37s
542: learn: 0.0385531 total: 1m 20s remaining: 1m 37s
543: learn: 0.0385097 total: 1m 20s remaining: 1m 37s
544: learn: 0.0384324 total: 1m 20s remaining: 1m 36s
545: learn: 0.0384033 total: 1m 20s remaining: 1m 36s
546: learn: 0.0383719 total: 1m 20s remaining: 1m 36s
547: learn: 0.0383464 total: 1m 20s remaining: 1m 36s
548: learn: 0.0382935 total: 1m 21s remaining: 1m 36s
549: learn: 0.0382571 total: 1m 21s remaining: 1m 35s
550: learn: 0.0382046 total: 1m 21s remaining: 1m 35s
551: learn: 0.0381512 total: 1m 21s remaining: 1m 35s
552: learn: 0.0380988 total: 1m 21s remaining: 1m 35s
553: learn: 0.0379366 total: 1m 21s remaining: 1m 35s
554: learn: 0.0378954 total: 1m 21s remaining: 1m 35s
555: learn: 0.0378177 total: 1m 22s remaining: 1m 35s
556: learn: 0.0377291 total: 1m 22s remaining: 1m 34s
557: learn: 0.0376107 total: 1m 22s remaining: 1m 34s
558: learn: 0.0375524 total: 1m 22s remaining: 1m 34s
559: learn: 0.0374864 total: 1m 22s remaining: 1m 34s
560: learn: 0.0374354 total: 1m 22s remaining: 1m 34s
561: learn: 0.0373688 total: 1m 22s remaining: 1m 34s
562: learn: 0.0372850 total: 1m 22s remaining: 1m 33s
563: learn: 0.0372508 total: 1m 23s remaining: 1m 33s
564: learn: 0.0371763 total: 1m 23s remaining: 1m 33s
565: learn: 0.0371137 total: 1m 23s remaining: 1m 33s
566: learn: 0.0370338 total: 1m 23s remaining: 1m 33s
567: learn: 0.0369340 total: 1m 23s remaining: 1m 33s
568: learn: 0.0368607 total: 1m 23s remaining: 1m 32s
569: learn: 0.0368222 total: 1m 23s remaining: 1m 32s
570: learn: 0.0367663 total: 1m 24s remaining: 1m 32s
571: learn: 0.0367025 total: 1m 24s remaining: 1m 32s
572: learn: 0.0366632 total: 1m 24s remaining: 1m 32s
573: learn: 0.0366239 total: 1m 24s remaining: 1m 32s
574: learn: 0.0365751 total: 1m 24s remaining: 1m 31s
575: learn: 0.0364904 total: 1m 24s remaining: 1m 31s
576: learn: 0.0364351 total: 1m 24s remaining: 1m 31s
577: learn: 0.0363915 total: 1m 24s remaining: 1m 31s
578: learn: 0.0363699 total: 1m 25s remaining: 1m 31s
579: learn: 0.0363189 total: 1m 25s remaining: 1m 31s
580: learn: 0.0362837 total: 1m 25s remaining: 1m 30s
581: learn: 0.0362078 total: 1m 25s remaining: 1m 30s
582: learn: 0.0361340 total: 1m 25s remaining: 1m 30s
583: learn: 0.0360971 total: 1m 25s remaining: 1m 30s
584: learn: 0.0360409 total: 1m 25s remaining: 1m 30s
585: learn: 0.0360195 total: 1m 25s remaining: 1m 30s
586: learn: 0.0359593 total: 1m 26s remaining: 1m 29s
587: learn: 0.0358813 total: 1m 26s remaining: 1m 29s
588: learn: 0.0358408 total: 1m 26s remaining: 1m 29s
589: learn: 0.0358134 total: 1m 26s remaining: 1m 29s
590: learn: 0.0357483 total: 1m 26s remaining: 1m 29s
591: learn: 0.0356633 total: 1m 26s remaining: 1m 29s
592: learn: 0.0356075 total: 1m 26s remaining: 1m 28s

593: learn: 0.0355370 total: 1m 27s remaining: 1m 28s
594: learn: 0.0354800 total: 1m 27s remaining: 1m 28s
595: learn: 0.0353695 total: 1m 27s remaining: 1m 28s
596: learn: 0.0353026 total: 1m 27s remaining: 1m 28s
597: learn: 0.0352663 total: 1m 27s remaining: 1m 28s
598: learn: 0.0352167 total: 1m 27s remaining: 1m 28s
599: learn: 0.0351242 total: 1m 27s remaining: 1m 27s
600: learn: 0.0350798 total: 1m 28s remaining: 1m 27s
601: learn: 0.0350455 total: 1m 28s remaining: 1m 27s
602: learn: 0.0350018 total: 1m 28s remaining: 1m 27s
603: learn: 0.0349521 total: 1m 28s remaining: 1m 27s
604: learn: 0.0349147 total: 1m 28s remaining: 1m 27s
605: learn: 0.0348637 total: 1m 28s remaining: 1m 26s
606: learn: 0.0347923 total: 1m 28s remaining: 1m 26s
607: learn: 0.0347015 total: 1m 29s remaining: 1m 26s
608: learn: 0.0346615 total: 1m 29s remaining: 1m 26s
609: learn: 0.0346146 total: 1m 29s remaining: 1m 26s
610: learn: 0.0345808 total: 1m 29s remaining: 1m 26s
611: learn: 0.0345579 total: 1m 29s remaining: 1m 26s
612: learn: 0.0345117 total: 1m 29s remaining: 1m 25s
613: learn: 0.0344037 total: 1m 29s remaining: 1m 25s
614: learn: 0.0343697 total: 1m 30s remaining: 1m 25s
615: learn: 0.0343302 total: 1m 30s remaining: 1m 25s
616: learn: 0.0342251 total: 1m 30s remaining: 1m 25s
617: learn: 0.0341560 total: 1m 30s remaining: 1m 25s
618: learn: 0.0341109 total: 1m 30s remaining: 1m 25s
619: learn: 0.0340778 total: 1m 30s remaining: 1m 25s
620: learn: 0.0340486 total: 1m 31s remaining: 1m 24s
621: learn: 0.0339540 total: 1m 31s remaining: 1m 24s
622: learn: 0.0338902 total: 1m 31s remaining: 1m 24s
623: learn: 0.0338322 total: 1m 31s remaining: 1m 24s
624: learn: 0.0337645 total: 1m 31s remaining: 1m 24s
625: learn: 0.0336863 total: 1m 31s remaining: 1m 24s
626: learn: 0.0336302 total: 1m 32s remaining: 1m 24s
627: learn: 0.0336066 total: 1m 32s remaining: 1m 24s
628: learn: 0.0335629 total: 1m 32s remaining: 1m 23s
629: learn: 0.0335382 total: 1m 32s remaining: 1m 23s
630: learn: 0.0334997 total: 1m 32s remaining: 1m 23s
631: learn: 0.0334517 total: 1m 32s remaining: 1m 23s
632: learn: 0.0334035 total: 1m 32s remaining: 1m 23s
633: learn: 0.0333775 total: 1m 33s remaining: 1m 23s
634: learn: 0.0333483 total: 1m 33s remaining: 1m 22s
635: learn: 0.0333204 total: 1m 33s remaining: 1m 22s
636: learn: 0.0332991 total: 1m 33s remaining: 1m 22s
637: learn: 0.0332483 total: 1m 33s remaining: 1m 22s
638: learn: 0.0332034 total: 1m 33s remaining: 1m 22s
639: learn: 0.0331708 total: 1m 33s remaining: 1m 22s
640: learn: 0.0331358 total: 1m 34s remaining: 1m 22s
641: learn: 0.0331017 total: 1m 34s remaining: 1m 21s
642: learn: 0.0330599 total: 1m 34s remaining: 1m 21s
643: learn: 0.0329862 total: 1m 34s remaining: 1m 21s
644: learn: 0.0329498 total: 1m 34s remaining: 1m 21s
645: learn: 0.0328334 total: 1m 34s remaining: 1m 21s
646: learn: 0.0328112 total: 1m 34s remaining: 1m 21s
647: learn: 0.0327508 total: 1m 35s remaining: 1m 20s
648: learn: 0.0327009 total: 1m 35s remaining: 1m 20s
649: learn: 0.0326719 total: 1m 35s remaining: 1m 20s
650: learn: 0.0326302 total: 1m 35s remaining: 1m 20s
651: learn: 0.0325976 total: 1m 35s remaining: 1m 20s
652: learn: 0.0325341 total: 1m 35s remaining: 1m 20s
653: learn: 0.0325035 total: 1m 36s remaining: 1m 20s
654: learn: 0.0324290 total: 1m 36s remaining: 1m 20s
655: learn: 0.0323986 total: 1m 36s remaining: 1m 19s
656: learn: 0.0323675 total: 1m 36s remaining: 1m 19s
657: learn: 0.0323298 total: 1m 36s remaining: 1m 19s
658: learn: 0.0322703 total: 1m 36s remaining: 1m 19s
659: learn: 0.0321801 total: 1m 36s remaining: 1m 19s
660: learn: 0.0321581 total: 1m 37s remaining: 1m 19s
661: learn: 0.0321258 total: 1m 37s remaining: 1m 18s
662: learn: 0.0320966 total: 1m 37s remaining: 1m 18s
663: learn: 0.0320714 total: 1m 37s remaining: 1m 18s
664: learn: 0.0320306 total: 1m 37s remaining: 1m 18s

665: learn: 0.0319518 total: 1m 37s remaining: 1m 18s
666: learn: 0.0319013 total: 1m 37s remaining: 1m 18s
667: learn: 0.0318726 total: 1m 38s remaining: 1m 18s
668: learn: 0.0318335 total: 1m 38s remaining: 1m 17s
669: learn: 0.0318122 total: 1m 38s remaining: 1m 17s
670: learn: 0.0317963 total: 1m 38s remaining: 1m 17s
671: learn: 0.0317480 total: 1m 38s remaining: 1m 17s
672: learn: 0.0316953 total: 1m 38s remaining: 1m 17s
673: learn: 0.0316541 total: 1m 38s remaining: 1m 17s
674: learn: 0.0316231 total: 1m 38s remaining: 1m 16s
675: learn: 0.0315033 total: 1m 39s remaining: 1m 16s
676: learn: 0.0314900 total: 1m 39s remaining: 1m 16s
677: learn: 0.0314738 total: 1m 39s remaining: 1m 16s
678: learn: 0.0314447 total: 1m 39s remaining: 1m 16s
679: learn: 0.0314062 total: 1m 39s remaining: 1m 16s
680: learn: 0.0313276 total: 1m 39s remaining: 1m 16s
681: learn: 0.0312878 total: 1m 39s remaining: 1m 15s
682: learn: 0.0312590 total: 1m 39s remaining: 1m 15s
683: learn: 0.0312259 total: 1m 40s remaining: 1m 15s
684: learn: 0.0312139 total: 1m 40s remaining: 1m 15s
685: learn: 0.0311494 total: 1m 40s remaining: 1m 15s
686: learn: 0.0311160 total: 1m 40s remaining: 1m 15s
687: learn: 0.0310908 total: 1m 40s remaining: 1m 14s
688: learn: 0.0310418 total: 1m 40s remaining: 1m 14s
689: learn: 0.0309890 total: 1m 40s remaining: 1m 14s
690: learn: 0.0309669 total: 1m 41s remaining: 1m 14s
691: learn: 0.0309032 total: 1m 41s remaining: 1m 14s
692: learn: 0.0308253 total: 1m 41s remaining: 1m 14s
693: learn: 0.0307988 total: 1m 41s remaining: 1m 14s
694: learn: 0.0307642 total: 1m 41s remaining: 1m 13s
695: learn: 0.0307042 total: 1m 41s remaining: 1m 13s
696: learn: 0.0306598 total: 1m 42s remaining: 1m 13s
697: learn: 0.0306464 total: 1m 42s remaining: 1m 13s
698: learn: 0.0306035 total: 1m 42s remaining: 1m 13s
699: learn: 0.0305849 total: 1m 42s remaining: 1m 13s
700: learn: 0.0305430 total: 1m 42s remaining: 1m 13s
701: learn: 0.0304697 total: 1m 42s remaining: 1m 12s
702: learn: 0.0304162 total: 1m 42s remaining: 1m 12s
703: learn: 0.0303832 total: 1m 43s remaining: 1m 12s
704: learn: 0.0303635 total: 1m 43s remaining: 1m 12s
705: learn: 0.0303292 total: 1m 43s remaining: 1m 12s
706: learn: 0.0302940 total: 1m 43s remaining: 1m 12s
707: learn: 0.0302605 total: 1m 43s remaining: 1m 12s
708: learn: 0.0302081 total: 1m 43s remaining: 1m 11s
709: learn: 0.0301971 total: 1m 44s remaining: 1m 11s
710: learn: 0.0301452 total: 1m 44s remaining: 1m 11s
711: learn: 0.0300583 total: 1m 44s remaining: 1m 11s
712: learn: 0.0300024 total: 1m 44s remaining: 1m 11s
713: learn: 0.0299377 total: 1m 44s remaining: 1m 11s
714: learn: 0.0298711 total: 1m 45s remaining: 1m 11s
715: learn: 0.0297617 total: 1m 45s remaining: 1m 11s
716: learn: 0.0296749 total: 1m 45s remaining: 1m 11s
717: learn: 0.0296074 total: 1m 45s remaining: 1m 10s
718: learn: 0.0295782 total: 1m 45s remaining: 1m 10s
719: learn: 0.0294712 total: 1m 45s remaining: 1m 10s
720: learn: 0.0294477 total: 1m 45s remaining: 1m 10s
721: learn: 0.0294037 total: 1m 46s remaining: 1m 10s
722: learn: 0.0293869 total: 1m 46s remaining: 1m 10s
723: learn: 0.0293293 total: 1m 46s remaining: 1m 9s
724: learn: 0.0292618 total: 1m 46s remaining: 1m 9s
725: learn: 0.0291918 total: 1m 46s remaining: 1m 9s
726: learn: 0.0291293 total: 1m 46s remaining: 1m 9s
727: learn: 0.0290963 total: 1m 46s remaining: 1m 9s
728: learn: 0.0290384 total: 1m 47s remaining: 1m 9s
729: learn: 0.0289856 total: 1m 47s remaining: 1m 9s
730: learn: 0.0289300 total: 1m 47s remaining: 1m 8s
731: learn: 0.0288924 total: 1m 47s remaining: 1m 8s
732: learn: 0.0288335 total: 1m 47s remaining: 1m 8s
733: learn: 0.0288094 total: 1m 47s remaining: 1m 8s
734: learn: 0.0287741 total: 1m 47s remaining: 1m 8s
735: learn: 0.0287181 total: 1m 47s remaining: 1m 8s
736: learn: 0.0286672 total: 1m 48s remaining: 1m 7s

737: learn: 0.0285869 total: 1m 48s remaining: 1m 7s
738: learn: 0.0285207 total: 1m 48s remaining: 1m 7s
739: learn: 0.0284559 total: 1m 48s remaining: 1m 7s
740: learn: 0.0283927 total: 1m 48s remaining: 1m 7s
741: learn: 0.0283571 total: 1m 48s remaining: 1m 7s
742: learn: 0.0283075 total: 1m 48s remaining: 1m 6s
743: learn: 0.0282760 total: 1m 48s remaining: 1m 6s
744: learn: 0.0282510 total: 1m 49s remaining: 1m 6s
745: learn: 0.0282388 total: 1m 49s remaining: 1m 6s
746: learn: 0.0281923 total: 1m 49s remaining: 1m 6s
747: learn: 0.0281704 total: 1m 49s remaining: 1m 6s
748: learn: 0.0281319 total: 1m 49s remaining: 1m 6s
749: learn: 0.0281155 total: 1m 49s remaining: 1m 5s
750: learn: 0.0280969 total: 1m 50s remaining: 1m 5s
751: learn: 0.0280697 total: 1m 50s remaining: 1m 5s
752: learn: 0.0280458 total: 1m 50s remaining: 1m 5s
753: learn: 0.0280181 total: 1m 50s remaining: 1m 5s
754: learn: 0.0279921 total: 1m 50s remaining: 1m 5s
755: learn: 0.0279670 total: 1m 51s remaining: 1m 5s
756: learn: 0.0279385 total: 1m 51s remaining: 1m 5s
757: learn: 0.0279013 total: 1m 51s remaining: 1m 4s
758: learn: 0.0278578 total: 1m 51s remaining: 1m 4s
759: learn: 0.0278133 total: 1m 51s remaining: 1m 4s
760: learn: 0.0277933 total: 1m 51s remaining: 1m 4s
761: learn: 0.0277556 total: 1m 51s remaining: 1m 4s
762: learn: 0.0277096 total: 1m 51s remaining: 1m 4s
763: learn: 0.0276574 total: 1m 52s remaining: 1m 3s
764: learn: 0.0275726 total: 1m 52s remaining: 1m 3s
765: learn: 0.0275182 total: 1m 52s remaining: 1m 3s
766: learn: 0.0274904 total: 1m 52s remaining: 1m 3s
767: learn: 0.0274555 total: 1m 52s remaining: 1m 3s
768: learn: 0.0274080 total: 1m 52s remaining: 1m 3s
769: learn: 0.0273773 total: 1m 52s remaining: 1m 3s
770: learn: 0.0272999 total: 1m 53s remaining: 1m 2s
771: learn: 0.0272544 total: 1m 53s remaining: 1m 2s
772: learn: 0.0271997 total: 1m 53s remaining: 1m 2s
773: learn: 0.0271334 total: 1m 53s remaining: 1m 2s
774: learn: 0.0271133 total: 1m 53s remaining: 1m 2s
775: learn: 0.0270915 total: 1m 53s remaining: 1m 2s
776: learn: 0.0270424 total: 1m 53s remaining: 1m 1s
777: learn: 0.0270027 total: 1m 53s remaining: 1m 1s
778: learn: 0.0269779 total: 1m 54s remaining: 1m 1s
779: learn: 0.0269013 total: 1m 54s remaining: 1m 1s
780: learn: 0.0268653 total: 1m 54s remaining: 1m 1s
781: learn: 0.0268298 total: 1m 54s remaining: 1m 1s
782: learn: 0.0267533 total: 1m 54s remaining: 1m
783: learn: 0.0266904 total: 1m 54s remaining: 1m
784: learn: 0.0266428 total: 1m 54s remaining: 1m
785: learn: 0.0265740 total: 1m 54s remaining: 1m
786: learn: 0.0265409 total: 1m 55s remaining: 1m
787: learn: 0.0264847 total: 1m 55s remaining: 1m
788: learn: 0.0264438 total: 1m 55s remaining: 1m
789: learn: 0.0264292 total: 1m 55s remaining: 59.9s
790: learn: 0.0264049 total: 1m 55s remaining: 59.7s
791: learn: 0.0263178 total: 1m 55s remaining: 59.5s
792: learn: 0.0262415 total: 1m 55s remaining: 59.4s
793: learn: 0.0262137 total: 1m 55s remaining: 59.2s
794: learn: 0.0261592 total: 1m 55s remaining: 59.1s
795: learn: 0.0261328 total: 1m 56s remaining: 58.9s
796: learn: 0.0260815 total: 1m 56s remaining: 58.7s
797: learn: 0.0260480 total: 1m 56s remaining: 58.6s
798: learn: 0.0259859 total: 1m 56s remaining: 58.4s
799: learn: 0.0259606 total: 1m 56s remaining: 58.2s
800: learn: 0.0259518 total: 1m 56s remaining: 58.1s
801: learn: 0.0259199 total: 1m 56s remaining: 57.9s
802: learn: 0.0258532 total: 1m 56s remaining: 57.8s
803: learn: 0.0258012 total: 1m 56s remaining: 57.6s
804: learn: 0.0257733 total: 1m 57s remaining: 57.5s
805: learn: 0.0257338 total: 1m 57s remaining: 57.3s
806: learn: 0.0256758 total: 1m 57s remaining: 57.1s
807: learn: 0.0256534 total: 1m 57s remaining: 57s
808: learn: 0.0256107 total: 1m 57s remaining: 56.8s

809: learn: 0.0255815 total: 1m 57s remaining: 56.6s
810: learn: 0.0255480 total: 1m 57s remaining: 56.5s
811: learn: 0.0254773 total: 1m 57s remaining: 56.4s
812: learn: 0.0254688 total: 1m 58s remaining: 56.2s
813: learn: 0.0254384 total: 1m 58s remaining: 56.1s
814: learn: 0.0253845 total: 1m 58s remaining: 56s
815: learn: 0.0253704 total: 1m 58s remaining: 55.8s
816: learn: 0.0253195 total: 1m 58s remaining: 55.7s
817: learn: 0.0252723 total: 1m 58s remaining: 55.5s
818: learn: 0.0252284 total: 1m 59s remaining: 55.4s
819: learn: 0.0251784 total: 1m 59s remaining: 55.2s
820: learn: 0.0251401 total: 1m 59s remaining: 55.1s
821: learn: 0.0251092 total: 1m 59s remaining: 55s
822: learn: 0.0250606 total: 1m 59s remaining: 54.8s
823: learn: 0.0249918 total: 1m 59s remaining: 54.7s
824: learn: 0.0249354 total: 2m remaining: 54.6s
825: learn: 0.0249078 total: 2m remaining: 54.5s
826: learn: 0.0248905 total: 2m remaining: 54.3s
827: learn: 0.0248464 total: 2m remaining: 54.2s
828: learn: 0.0247977 total: 2m remaining: 54.1s
829: learn: 0.0247788 total: 2m remaining: 53.9s
830: learn: 0.0247352 total: 2m 1s remaining: 53.8s
831: learn: 0.0247107 total: 2m 1s remaining: 53.7s
832: learn: 0.0246859 total: 2m 1s remaining: 53.5s
833: learn: 0.0246568 total: 2m 1s remaining: 53.4s
834: learn: 0.0246137 total: 2m 1s remaining: 53.3s
835: learn: 0.0245815 total: 2m 2s remaining: 53.1s
836: learn: 0.0245517 total: 2m 2s remaining: 53s
837: learn: 0.0245060 total: 2m 2s remaining: 52.9s
838: learn: 0.0244523 total: 2m 2s remaining: 52.8s
839: learn: 0.0244297 total: 2m 2s remaining: 52.6s
840: learn: 0.0243414 total: 2m 2s remaining: 52.5s
841: learn: 0.0243169 total: 2m 3s remaining: 52.3s
842: learn: 0.0242608 total: 2m 3s remaining: 52.2s
843: learn: 0.0242131 total: 2m 3s remaining: 52.1s
844: learn: 0.0241632 total: 2m 3s remaining: 51.9s
845: learn: 0.0241320 total: 2m 3s remaining: 51.8s
846: learn: 0.0241128 total: 2m 3s remaining: 51.6s
847: learn: 0.0240976 total: 2m 3s remaining: 51.5s
848: learn: 0.0240467 total: 2m 4s remaining: 51.3s
849: learn: 0.0239928 total: 2m 4s remaining: 51.2s
850: learn: 0.0239456 total: 2m 4s remaining: 51.1s
851: learn: 0.0239211 total: 2m 4s remaining: 50.9s
852: learn: 0.0238833 total: 2m 4s remaining: 50.7s
853: learn: 0.0238418 total: 2m 4s remaining: 50.6s
854: learn: 0.0237923 total: 2m 5s remaining: 50.4s
855: learn: 0.0237499 total: 2m 5s remaining: 50.3s
856: learn: 0.0236681 total: 2m 5s remaining: 50.1s
857: learn: 0.0236233 total: 2m 5s remaining: 50s
858: learn: 0.0235807 total: 2m 5s remaining: 49.8s
859: learn: 0.0235492 total: 2m 5s remaining: 49.7s
860: learn: 0.0235114 total: 2m 5s remaining: 49.5s
861: learn: 0.0234933 total: 2m 5s remaining: 49.4s
862: learn: 0.0234592 total: 2m 6s remaining: 49.2s
863: learn: 0.0234396 total: 2m 6s remaining: 49.1s
864: learn: 0.0234119 total: 2m 6s remaining: 48.9s
865: learn: 0.0233864 total: 2m 6s remaining: 48.8s
866: learn: 0.0233477 total: 2m 6s remaining: 48.6s
867: learn: 0.0233092 total: 2m 6s remaining: 48.4s
868: learn: 0.0232857 total: 2m 6s remaining: 48.3s
869: learn: 0.0232499 total: 2m 6s remaining: 48.1s
870: learn: 0.0232334 total: 2m 7s remaining: 48s
871: learn: 0.0232174 total: 2m 7s remaining: 47.8s
872: learn: 0.0231920 total: 2m 7s remaining: 47.7s
873: learn: 0.0231295 total: 2m 7s remaining: 47.5s
874: learn: 0.0230850 total: 2m 7s remaining: 47.4s
875: learn: 0.0230424 total: 2m 7s remaining: 47.2s
876: learn: 0.0229911 total: 2m 7s remaining: 47s
877: learn: 0.0229530 total: 2m 7s remaining: 46.9s
878: learn: 0.0228796 total: 2m 8s remaining: 46.7s
879: learn: 0.0228556 total: 2m 8s remaining: 46.6s
880: learn: 0.0228368 total: 2m 8s remaining: 46.4s

	learn:	total:	2m	8s	remaining:
881:	learn: 0.0228167	total: 2m 8s	remaining: 46.3s		
882:	learn: 0.0227947	total: 2m 8s	remaining: 46.1s		
883:	learn: 0.0227503	total: 2m 8s	remaining: 46s		
884:	learn: 0.0227138	total: 2m 8s	remaining: 45.8s		
885:	learn: 0.0226355	total: 2m 8s	remaining: 45.7s		
886:	learn: 0.0225928	total: 2m 9s	remaining: 45.6s		
887:	learn: 0.0225715	total: 2m 9s	remaining: 45.4s		
888:	learn: 0.0225550	total: 2m 9s	remaining: 45.3s		
889:	learn: 0.0225171	total: 2m 9s	remaining: 45.1s		
890:	learn: 0.0224924	total: 2m 9s	remaining: 45s		
891:	learn: 0.0224422	total: 2m 9s	remaining: 44.9s		
892:	learn: 0.0224101	total: 2m 10s	remaining: 44.7s		
893:	learn: 0.0223761	total: 2m 10s	remaining: 44.6s		
894:	learn: 0.0223493	total: 2m 10s	remaining: 44.4s		
895:	learn: 0.0223029	total: 2m 10s	remaining: 44.3s		
896:	learn: 0.0222286	total: 2m 10s	remaining: 44.1s		
897:	learn: 0.0221841	total: 2m 10s	remaining: 44s		
898:	learn: 0.0221477	total: 2m 10s	remaining: 43.8s		
899:	learn: 0.0220950	total: 2m 11s	remaining: 43.7s		
900:	learn: 0.0220506	total: 2m 11s	remaining: 43.5s		
901:	learn: 0.0220108	total: 2m 11s	remaining: 43.4s		
902:	learn: 0.0219696	total: 2m 11s	remaining: 43.2s		
903:	learn: 0.0219118	total: 2m 11s	remaining: 43.1s		
904:	learn: 0.0218912	total: 2m 11s	remaining: 42.9s		
905:	learn: 0.0218477	total: 2m 11s	remaining: 42.8s		
906:	learn: 0.0218009	total: 2m 11s	remaining: 42.6s		
907:	learn: 0.0217797	total: 2m 12s	remaining: 42.5s		
908:	learn: 0.0217463	total: 2m 12s	remaining: 42.3s		
909:	learn: 0.0217140	total: 2m 12s	remaining: 42.2s		
910:	learn: 0.0216633	total: 2m 12s	remaining: 42s		
911:	learn: 0.0216432	total: 2m 12s	remaining: 41.9s		
912:	learn: 0.0216038	total: 2m 12s	remaining: 41.7s		
913:	learn: 0.0215576	total: 2m 12s	remaining: 41.6s		
914:	learn: 0.0215272	total: 2m 13s	remaining: 41.4s		
915:	learn: 0.0215047	total: 2m 13s	remaining: 41.3s		
916:	learn: 0.0214938	total: 2m 13s	remaining: 41.1s		
917:	learn: 0.0214765	total: 2m 13s	remaining: 41s		
918:	learn: 0.0214276	total: 2m 13s	remaining: 40.8s		
919:	learn: 0.0214099	total: 2m 13s	remaining: 40.7s		
920:	learn: 0.0214046	total: 2m 13s	remaining: 40.6s		
921:	learn: 0.0213712	total: 2m 14s	remaining: 40.4s		
922:	learn: 0.0213381	total: 2m 14s	remaining: 40.3s		
923:	learn: 0.0213071	total: 2m 14s	remaining: 40.1s		
924:	learn: 0.0212823	total: 2m 14s	remaining: 40s		
925:	learn: 0.0212554	total: 2m 14s	remaining: 39.8s		
926:	learn: 0.0212360	total: 2m 14s	remaining: 39.7s		
927:	learn: 0.0211991	total: 2m 14s	remaining: 39.5s		
928:	learn: 0.0211535	total: 2m 15s	remaining: 39.4s		
929:	learn: 0.0211149	total: 2m 15s	remaining: 39.2s		
930:	learn: 0.0210689	total: 2m 15s	remaining: 39.1s		
931:	learn: 0.0210379	total: 2m 15s	remaining: 39s		
932:	learn: 0.0209812	total: 2m 15s	remaining: 38.8s		
933:	learn: 0.0209578	total: 2m 15s	remaining: 38.7s		
934:	learn: 0.0209257	total: 2m 15s	remaining: 38.5s		
935:	learn: 0.0208946	total: 2m 16s	remaining: 38.4s		
936:	learn: 0.0208593	total: 2m 16s	remaining: 38.2s		
937:	learn: 0.0208019	total: 2m 16s	remaining: 38.1s		
938:	learn: 0.0207562	total: 2m 16s	remaining: 37.9s		
939:	learn: 0.0207326	total: 2m 16s	remaining: 37.8s		
940:	learn: 0.0207138	total: 2m 16s	remaining: 37.6s		
941:	learn: 0.0206737	total: 2m 16s	remaining: 37.5s		
942:	learn: 0.0206402	total: 2m 17s	remaining: 37.3s		
943:	learn: 0.0206026	total: 2m 17s	remaining: 37.2s		
944:	learn: 0.0205920	total: 2m 17s	remaining: 37.1s		
945:	learn: 0.0205595	total: 2m 17s	remaining: 36.9s		
946:	learn: 0.0205462	total: 2m 17s	remaining: 36.8s		
947:	learn: 0.0205236	total: 2m 17s	remaining: 36.6s		
948:	learn: 0.0205067	total: 2m 17s	remaining: 36.5s		
949:	learn: 0.0204854	total: 2m 18s	remaining: 36.3s		
950:	learn: 0.0204644	total: 2m 18s	remaining: 36.2s		
951:	learn: 0.0204165	total: 2m 18s	remaining: 36s		
952:	learn: 0.0203729	total: 2m 18s	remaining: 35.9s		

953: learn: 0.0203420 total: 2m 18s remaining: 35.8s
954: learn: 0.0203084 total: 2m 18s remaining: 35.6s
955: learn: 0.0202786 total: 2m 18s remaining: 35.5s
956: learn: 0.0202616 total: 2m 19s remaining: 35.3s
957: learn: 0.0202399 total: 2m 19s remaining: 35.2s
958: learn: 0.0201814 total: 2m 19s remaining: 35s
959: learn: 0.0201650 total: 2m 19s remaining: 34.9s
960: learn: 0.0201386 total: 2m 19s remaining: 34.7s
961: learn: 0.0201292 total: 2m 19s remaining: 34.6s
962: learn: 0.0200907 total: 2m 19s remaining: 34.4s
963: learn: 0.0200678 total: 2m 20s remaining: 34.3s
964: learn: 0.0200228 total: 2m 20s remaining: 34.1s
965: learn: 0.0199929 total: 2m 20s remaining: 34s
966: learn: 0.0199429 total: 2m 20s remaining: 33.9s
967: learn: 0.0199251 total: 2m 20s remaining: 33.7s
968: learn: 0.0198927 total: 2m 20s remaining: 33.6s
969: learn: 0.0198832 total: 2m 20s remaining: 33.4s
970: learn: 0.0198542 total: 2m 21s remaining: 33.3s
971: learn: 0.0198257 total: 2m 21s remaining: 33.1s
972: learn: 0.0198106 total: 2m 21s remaining: 33s
973: learn: 0.0197788 total: 2m 21s remaining: 32.8s
974: learn: 0.0197560 total: 2m 21s remaining: 32.7s
975: learn: 0.0197300 total: 2m 21s remaining: 32.5s
976: learn: 0.0197095 total: 2m 21s remaining: 32.4s
977: learn: 0.0196837 total: 2m 21s remaining: 32.2s
978: learn: 0.0196712 total: 2m 22s remaining: 32.1s
979: learn: 0.0196619 total: 2m 22s remaining: 31.9s
980: learn: 0.0196330 total: 2m 22s remaining: 31.8s
981: learn: 0.0196137 total: 2m 22s remaining: 31.6s
982: learn: 0.0195774 total: 2m 22s remaining: 31.5s
983: learn: 0.0195485 total: 2m 22s remaining: 31.3s
984: learn: 0.0195056 total: 2m 22s remaining: 31.2s
985: learn: 0.0194764 total: 2m 22s remaining: 31s
986: learn: 0.0194684 total: 2m 23s remaining: 30.9s
987: learn: 0.0194447 total: 2m 23s remaining: 30.7s
988: learn: 0.0194161 total: 2m 23s remaining: 30.6s
989: learn: 0.0193856 total: 2m 23s remaining: 30.4s
990: learn: 0.0193483 total: 2m 23s remaining: 30.3s
991: learn: 0.0193304 total: 2m 23s remaining: 30.1s
992: learn: 0.0193078 total: 2m 23s remaining: 30s
993: learn: 0.0192774 total: 2m 23s remaining: 29.8s
994: learn: 0.0192650 total: 2m 24s remaining: 29.7s
995: learn: 0.0192391 total: 2m 24s remaining: 29.5s
996: learn: 0.0192083 total: 2m 24s remaining: 29.4s
997: learn: 0.0191662 total: 2m 24s remaining: 29.2s
998: learn: 0.0191527 total: 2m 24s remaining: 29.1s
999: learn: 0.0191162 total: 2m 24s remaining: 28.9s
1000: learn: 0.0190887 total: 2m 24s remaining: 28.8s
1001: learn: 0.0190618 total: 2m 24s remaining: 28.6s
1002: learn: 0.0190265 total: 2m 25s remaining: 28.5s
1003: learn: 0.0189906 total: 2m 25s remaining: 28.3s
1004: learn: 0.0189752 total: 2m 25s remaining: 28.2s
1005: learn: 0.0189641 total: 2m 25s remaining: 28s
1006: learn: 0.0189346 total: 2m 25s remaining: 27.9s
1007: learn: 0.0189187 total: 2m 25s remaining: 27.7s
1008: learn: 0.0188887 total: 2m 25s remaining: 27.6s
1009: learn: 0.0188580 total: 2m 25s remaining: 27.4s
1010: learn: 0.0188458 total: 2m 25s remaining: 27.3s
1011: learn: 0.0187981 total: 2m 26s remaining: 27.1s
1012: learn: 0.0187729 total: 2m 26s remaining: 27s
1013: learn: 0.0187371 total: 2m 26s remaining: 26.8s
1014: learn: 0.0187121 total: 2m 26s remaining: 26.7s
1015: learn: 0.0186867 total: 2m 26s remaining: 26.5s
1016: learn: 0.0186741 total: 2m 26s remaining: 26.4s
1017: learn: 0.0186422 total: 2m 26s remaining: 26.2s
1018: learn: 0.0186286 total: 2m 26s remaining: 26.1s
1019: learn: 0.0185991 total: 2m 27s remaining: 26s
1020: learn: 0.0185887 total: 2m 27s remaining: 25.8s
1021: learn: 0.0185699 total: 2m 27s remaining: 25.7s
1022: learn: 0.0185474 total: 2m 27s remaining: 25.5s
1023: learn: 0.0185235 total: 2m 27s remaining: 25.4s
1024: learn: 0.0184930 total: 2m 27s remaining: 25.2s

1025:	learn:	0.0184598	total:	2m 27s	remaining:	25.1s
1026:	learn:	0.0184330	total:	2m 27s	remaining:	24.9s
1027:	learn:	0.0184063	total:	2m 28s	remaining:	24.8s
1028:	learn:	0.0183927	total:	2m 28s	remaining:	24.6s
1029:	learn:	0.0183656	total:	2m 28s	remaining:	24.5s
1030:	learn:	0.0183508	total:	2m 28s	remaining:	24.4s
1031:	learn:	0.0183193	total:	2m 28s	remaining:	24.2s
1032:	learn:	0.0182881	total:	2m 28s	remaining:	24.1s
1033:	learn:	0.0182602	total:	2m 29s	remaining:	23.9s
1034:	learn:	0.0182403	total:	2m 29s	remaining:	23.8s
1035:	learn:	0.0182197	total:	2m 29s	remaining:	23.7s
1036:	learn:	0.0182048	total:	2m 29s	remaining:	23.5s
1037:	learn:	0.0181857	total:	2m 29s	remaining:	23.4s
1038:	learn:	0.0181630	total:	2m 30s	remaining:	23.2s
1039:	learn:	0.0181335	total:	2m 30s	remaining:	23.1s
1040:	learn:	0.0181040	total:	2m 30s	remaining:	23s
1041:	learn:	0.0180842	total:	2m 30s	remaining:	22.8s
1042:	learn:	0.0180715	total:	2m 30s	remaining:	22.7s
1043:	learn:	0.0180460	total:	2m 30s	remaining:	22.6s
1044:	learn:	0.0180225	total:	2m 31s	remaining:	22.4s
1045:	learn:	0.0180030	total:	2m 31s	remaining:	22.3s
1046:	learn:	0.0179906	total:	2m 31s	remaining:	22.1s
1047:	learn:	0.0179826	total:	2m 31s	remaining:	22s
1048:	learn:	0.0179766	total:	2m 31s	remaining:	21.8s
1049:	learn:	0.0179669	total:	2m 31s	remaining:	21.7s
1050:	learn:	0.0179499	total:	2m 31s	remaining:	21.5s
1051:	learn:	0.0179004	total:	2m 32s	remaining:	21.4s
1052:	learn:	0.0178720	total:	2m 32s	remaining:	21.3s
1053:	learn:	0.0178406	total:	2m 32s	remaining:	21.1s
1054:	learn:	0.0178240	total:	2m 32s	remaining:	21s
1055:	learn:	0.0177979	total:	2m 32s	remaining:	20.8s
1056:	learn:	0.0177671	total:	2m 32s	remaining:	20.7s
1057:	learn:	0.0177411	total:	2m 33s	remaining:	20.5s
1058:	learn:	0.0177316	total:	2m 33s	remaining:	20.4s
1059:	learn:	0.0176838	total:	2m 33s	remaining:	20.3s
1060:	learn:	0.0176585	total:	2m 33s	remaining:	20.1s
1061:	learn:	0.0176185	total:	2m 33s	remaining:	20s
1062:	learn:	0.0175879	total:	2m 33s	remaining:	19.8s
1063:	learn:	0.0175585	total:	2m 33s	remaining:	19.7s
1064:	learn:	0.0175474	total:	2m 34s	remaining:	19.5s
1065:	learn:	0.0175276	total:	2m 34s	remaining:	19.4s
1066:	learn:	0.0175006	total:	2m 34s	remaining:	19.2s
1067:	learn:	0.0174920	total:	2m 34s	remaining:	19.1s
1068:	learn:	0.0174654	total:	2m 34s	remaining:	18.9s
1069:	learn:	0.0174466	total:	2m 34s	remaining:	18.8s
1070:	learn:	0.0174359	total:	2m 34s	remaining:	18.6s
1071:	learn:	0.0173958	total:	2m 34s	remaining:	18.5s
1072:	learn:	0.0173615	total:	2m 35s	remaining:	18.3s
1073:	learn:	0.0173256	total:	2m 35s	remaining:	18.2s
1074:	learn:	0.0173082	total:	2m 35s	remaining:	18.1s
1075:	learn:	0.0172726	total:	2m 35s	remaining:	17.9s
1076:	learn:	0.0172726	total:	2m 35s	remaining:	17.8s
1077:	learn:	0.0172589	total:	2m 35s	remaining:	17.6s
1078:	learn:	0.0172412	total:	2m 35s	remaining:	17.5s
1079:	learn:	0.0172186	total:	2m 35s	remaining:	17.3s
1080:	learn:	0.0172080	total:	2m 35s	remaining:	17.2s
1081:	learn:	0.0171910	total:	2m 36s	remaining:	17s
1082:	learn:	0.0171608	total:	2m 36s	remaining:	16.9s
1083:	learn:	0.0171344	total:	2m 36s	remaining:	16.7s
1084:	learn:	0.0171017	total:	2m 36s	remaining:	16.6s
1085:	learn:	0.0170911	total:	2m 36s	remaining:	16.4s
1086:	learn:	0.0170760	total:	2m 36s	remaining:	16.3s
1087:	learn:	0.0170475	total:	2m 36s	remaining:	16.1s
1088:	learn:	0.0170144	total:	2m 36s	remaining:	16s
1089:	learn:	0.0170034	total:	2m 37s	remaining:	15.8s
1090:	learn:	0.0169790	total:	2m 37s	remaining:	15.7s
1091:	learn:	0.0169614	total:	2m 37s	remaining:	15.6s
1092:	learn:	0.0169480	total:	2m 37s	remaining:	15.4s
1093:	learn:	0.0169323	total:	2m 37s	remaining:	15.3s
1094:	learn:	0.0169193	total:	2m 37s	remaining:	15.1s
1095:	learn:	0.0168920	total:	2m 37s	remaining:	15s
1096:	learn:	0.0168614	total:	2m 37s	remaining:	14.8s

1097:	learn:	0.0168362	total:	2m 38s	remaining:	14.7s
1098:	learn:	0.0168033	total:	2m 38s	remaining:	14.5s
1099:	learn:	0.0167847	total:	2m 38s	remaining:	14.4s
1100:	learn:	0.0167610	total:	2m 38s	remaining:	14.2s
1101:	learn:	0.0167522	total:	2m 38s	remaining:	14.1s
1102:	learn:	0.0167374	total:	2m 38s	remaining:	14s
1103:	learn:	0.0167254	total:	2m 38s	remaining:	13.8s
1104:	learn:	0.0167053	total:	2m 39s	remaining:	13.7s
1105:	learn:	0.0166823	total:	2m 39s	remaining:	13.5s
1106:	learn:	0.0166631	total:	2m 39s	remaining:	13.4s
1107:	learn:	0.0166563	total:	2m 39s	remaining:	13.2s
1108:	learn:	0.0166441	total:	2m 39s	remaining:	13.1s
1109:	learn:	0.0166257	total:	2m 39s	remaining:	13s
1110:	learn:	0.0165930	total:	2m 39s	remaining:	12.8s
1111:	learn:	0.0165805	total:	2m 40s	remaining:	12.7s
1112:	learn:	0.0165676	total:	2m 40s	remaining:	12.5s
1113:	learn:	0.0165374	total:	2m 40s	remaining:	12.4s
1114:	learn:	0.0165220	total:	2m 40s	remaining:	12.2s
1115:	learn:	0.0165062	total:	2m 40s	remaining:	12.1s
1116:	learn:	0.0164865	total:	2m 40s	remaining:	11.9s
1117:	learn:	0.0164589	total:	2m 40s	remaining:	11.8s
1118:	learn:	0.0164276	total:	2m 40s	remaining:	11.6s
1119:	learn:	0.0164068	total:	2m 41s	remaining:	11.5s
1120:	learn:	0.0163962	total:	2m 41s	remaining:	11.4s
1121:	learn:	0.0163707	total:	2m 41s	remaining:	11.2s
1122:	learn:	0.0163412	total:	2m 41s	remaining:	11.1s
1123:	learn:	0.0163335	total:	2m 41s	remaining:	10.9s
1124:	learn:	0.0163080	total:	2m 41s	remaining:	10.8s
1125:	learn:	0.0162859	total:	2m 41s	remaining:	10.6s
1126:	learn:	0.0162445	total:	2m 41s	remaining:	10.5s
1127:	learn:	0.0162139	total:	2m 42s	remaining:	10.3s
1128:	learn:	0.0161875	total:	2m 42s	remaining:	10.2s
1129:	learn:	0.0161761	total:	2m 42s	remaining:	10.1s
1130:	learn:	0.0161591	total:	2m 42s	remaining:	9.91s
1131:	learn:	0.0161406	total:	2m 42s	remaining:	9.77s
1132:	learn:	0.0161212	total:	2m 42s	remaining:	9.62s
1133:	learn:	0.0160966	total:	2m 42s	remaining:	9.48s
1134:	learn:	0.0160772	total:	2m 43s	remaining:	9.34s
1135:	learn:	0.0160641	total:	2m 43s	remaining:	9.19s
1136:	learn:	0.0160360	total:	2m 43s	remaining:	9.05s
1137:	learn:	0.0160081	total:	2m 43s	remaining:	8.9s
1138:	learn:	0.0159806	total:	2m 43s	remaining:	8.76s
1139:	learn:	0.0159654	total:	2m 43s	remaining:	8.61s
1140:	learn:	0.0159370	total:	2m 43s	remaining:	8.47s
1141:	learn:	0.0159270	total:	2m 43s	remaining:	8.32s
1142:	learn:	0.0159104	total:	2m 43s	remaining:	8.18s
1143:	learn:	0.0158883	total:	2m 44s	remaining:	8.03s
1144:	learn:	0.0158742	total:	2m 44s	remaining:	7.89s
1145:	learn:	0.0158441	total:	2m 44s	remaining:	7.75s
1146:	learn:	0.0158213	total:	2m 44s	remaining:	7.6s
1147:	learn:	0.0158058	total:	2m 44s	remaining:	7.46s
1148:	learn:	0.0157990	total:	2m 44s	remaining:	7.31s
1149:	learn:	0.0157752	total:	2m 44s	remaining:	7.17s
1150:	learn:	0.0157622	total:	2m 45s	remaining:	7.03s
1151:	learn:	0.0157385	total:	2m 45s	remaining:	6.88s
1152:	learn:	0.0157262	total:	2m 45s	remaining:	6.74s
1153:	learn:	0.0157069	total:	2m 45s	remaining:	6.59s
1154:	learn:	0.0156936	total:	2m 45s	remaining:	6.45s
1155:	learn:	0.0156811	total:	2m 45s	remaining:	6.31s
1156:	learn:	0.0156671	total:	2m 45s	remaining:	6.16s
1157:	learn:	0.0156553	total:	2m 45s	remaining:	6.02s
1158:	learn:	0.0156497	total:	2m 46s	remaining:	5.88s
1159:	learn:	0.0156246	total:	2m 46s	remaining:	5.73s
1160:	learn:	0.0155903	total:	2m 46s	remaining:	5.59s
1161:	learn:	0.0155718	total:	2m 46s	remaining:	5.45s
1162:	learn:	0.0155461	total:	2m 46s	remaining:	5.3s
1163:	learn:	0.0155297	total:	2m 46s	remaining:	5.16s
1164:	learn:	0.0155116	total:	2m 46s	remaining:	5.02s
1165:	learn:	0.0154918	total:	2m 47s	remaining:	4.87s
1166:	learn:	0.0154798	total:	2m 47s	remaining:	4.73s
1167:	learn:	0.0154611	total:	2m 47s	remaining:	4.59s
1168:	learn:	0.0154345	total:	2m 47s	remaining:	4.44s

1169: learn: 0.0154154 total: 2m 47s remaining: 4.3s
1170: learn: 0.0153926 total: 2m 47s remaining: 4.16s
1171: learn: 0.0153660 total: 2m 48s remaining: 4.02s
1172: learn: 0.0153360 total: 2m 48s remaining: 3.87s
1173: learn: 0.0153020 total: 2m 48s remaining: 3.73s
1174: learn: 0.0152908 total: 2m 48s remaining: 3.59s
1175: learn: 0.0152657 total: 2m 48s remaining: 3.44s
1176: learn: 0.0152487 total: 2m 48s remaining: 3.3s
1177: learn: 0.0152357 total: 2m 49s remaining: 3.16s
1178: learn: 0.0152163 total: 2m 49s remaining: 3.01s
1179: learn: 0.0152107 total: 2m 49s remaining: 2.87s
1180: learn: 0.0151789 total: 2m 49s remaining: 2.73s
1181: learn: 0.0151584 total: 2m 49s remaining: 2.58s
1182: learn: 0.0151362 total: 2m 49s remaining: 2.44s
1183: learn: 0.0151079 total: 2m 49s remaining: 2.3s
1184: learn: 0.0151079 total: 2m 50s remaining: 2.15s
1185: learn: 0.0150910 total: 2m 50s remaining: 2.01s
1186: learn: 0.0150591 total: 2m 50s remaining: 1.86s
1187: learn: 0.0150370 total: 2m 50s remaining: 1.72s
1188: learn: 0.0150179 total: 2m 50s remaining: 1.58s
1189: learn: 0.0150063 total: 2m 50s remaining: 1.43s
1190: learn: 0.0149889 total: 2m 50s remaining: 1.29s
1191: learn: 0.0149687 total: 2m 51s remaining: 1.15s
1192: learn: 0.0149449 total: 2m 51s remaining: 1s
1193: learn: 0.0149198 total: 2m 51s remaining: 861ms
1194: learn: 0.0148969 total: 2m 51s remaining: 717ms
1195: learn: 0.0148825 total: 2m 51s remaining: 574ms
1196: learn: 0.0148624 total: 2m 51s remaining: 430ms
1197: learn: 0.0148462 total: 2m 51s remaining: 287ms
1198: learn: 0.0148248 total: 2m 51s remaining: 143ms
1199: learn: 0.0147985 total: 2m 52s remaining: 0us

In [32]:

```
# Categorical variables that impacts Overall Experience
print(pd.DataFrame({'Training Accuracy':scores_train,'Test Accuracy': scores_test},
                    index=['CatBoost']))
```

	Training Accuracy	Test Accuracy
CatBoost	0.999743	0.954298

Performance Metrics

In [34]:

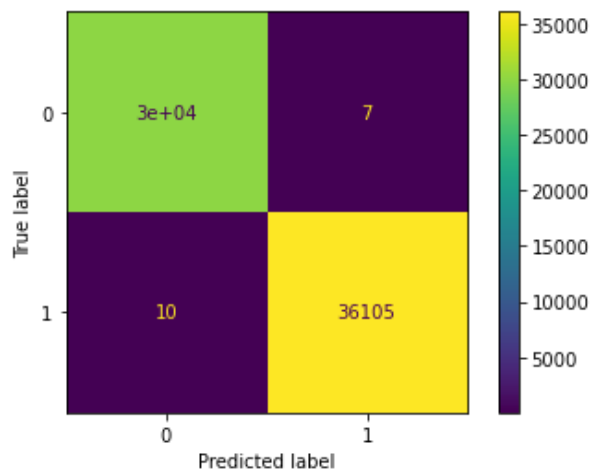
```
# Prediction on the training and test set with cut off 0.5
ytrain_predict = cb.predict(X_train)
ytest_predict = cb.predict(X_test)
```

In [35]:

```
# Confusion matrix on the train data
plot_confusion_matrix(cb,X_train,y_train)
print(classification_report(y_train, ytrain_predict),'\n');
```

C:\Users\User\anaconda3\lib\site-packages\sklearn\utils\deprecation.py:87: FutureWarning: Function plot_confusion_matrix is deprecated; Function `plot_confusion_matrix` is deprecated in 1.0 and will be removed in 1.2. Use one of the class methods: ConfusionMatrixDisplay.from_predictions or ConfusionMatrixDisplay.from_estimator.
warnings.warn(msg, category=FutureWarning)

	precision	recall	f1-score	support
0	1.00	1.00	1.00	29950
1	1.00	1.00	1.00	36115
accuracy			1.00	66065
macro avg	1.00	1.00	1.00	66065
weighted avg	1.00	1.00	1.00	66065

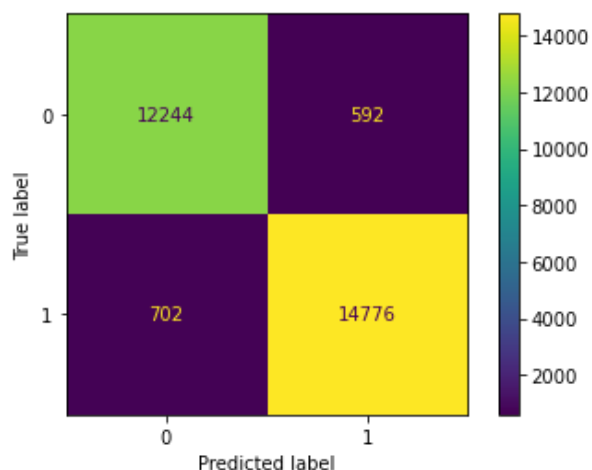


In [36]:

```
# Confusion matrix on the test data
plot_confusion_matrix(cb,X_test,y_test)
print(classification_report(y_test, ytest_predict),'\n');
```

C:\Users\User\anaconda3\lib\site-packages\sklearn\utils\deprecation.py:87: FutureWarning: Function plot_confusion_matrix is deprecated; Function `plot_confusion_matrix` is deprecated in 1.0 and will be removed in 1.2. Use one of the class methods: ConfusionMatrixDisplay.from_predictions or ConfusionMatrixDisplay.from_estimator.
warnings.warn(msg, category=FutureWarning)

	precision	recall	f1-score	support
0	0.95	0.95	0.95	12836
1	0.96	0.95	0.96	15478
accuracy			0.95	28314
macro avg	0.95	0.95	0.95	28314
weighted avg	0.95	0.95	0.95	28314



Chosen Model for Submission

In [1334]:

```
full_model=CatBoostClassifier(iterations=1200, depth = 10,learning_rate=0.06)
full_model.fit(X,y)
```

```
0: learn: 0.6049497 total: 550ms remaining: 10m 59s
1: learn: 0.5349024 total: 974ms remaining: 9m 43s
2: learn: 0.4765135 total: 1.46s remaining: 9m 42s
3: learn: 0.4302161 total: 1.96s remaining: 9m 46s
4: learn: 0.3956794 total: 2.44s remaining: 9m 44s
5: learn: 0.3673583 total: 2.89s remaining: 9m 34s
```

6: learn: 0.3383145 total: 3.34s remaining: 9m 28s
7: learn: 0.3168382 total: 3.86s remaining: 9m 35s
8: learn: 0.2944946 total: 4.35s remaining: 9m 36s
9: learn: 0.2825743 total: 4.84s remaining: 9m 35s
10: learn: 0.2677662 total: 5.41s remaining: 9m 44s
11: learn: 0.2556197 total: 5.89s remaining: 9m 42s
12: learn: 0.2443052 total: 6.4s remaining: 9m 44s
13: learn: 0.2340979 total: 6.89s remaining: 9m 43s
14: learn: 0.2265303 total: 7.44s remaining: 9m 47s
15: learn: 0.2208973 total: 7.92s remaining: 9m 46s
16: learn: 0.2145325 total: 8.38s remaining: 9m 42s
17: learn: 0.2067372 total: 9s remaining: 9m 51s
18: learn: 0.2008084 total: 9.53s remaining: 9m 52s
19: learn: 0.1964461 total: 10s remaining: 9m 50s
20: learn: 0.1926649 total: 10.5s remaining: 9m 49s
21: learn: 0.1893010 total: 10.9s remaining: 9m 42s
22: learn: 0.1856122 total: 11.4s remaining: 9m 42s
23: learn: 0.1820323 total: 11.8s remaining: 9m 36s
24: learn: 0.1789226 total: 12.5s remaining: 9m 47s
25: learn: 0.1755175 total: 13s remaining: 9m 48s
26: learn: 0.1729779 total: 13.6s remaining: 9m 51s
27: learn: 0.1712246 total: 14.1s remaining: 9m 52s
28: learn: 0.1692494 total: 14.6s remaining: 9m 49s
29: learn: 0.1670718 total: 15s remaining: 9m 45s
30: learn: 0.1654968 total: 15.5s remaining: 9m 43s
31: learn: 0.1633013 total: 15.9s remaining: 9m 41s
32: learn: 0.1619177 total: 16.4s remaining: 9m 39s
33: learn: 0.1600973 total: 16.9s remaining: 9m 38s
34: learn: 0.1577033 total: 17.3s remaining: 9m 36s
35: learn: 0.1553057 total: 17.8s remaining: 9m 34s
36: learn: 0.1542149 total: 18.3s remaining: 9m 35s
37: learn: 0.1527505 total: 18.8s remaining: 9m 35s
38: learn: 0.1514141 total: 19.4s remaining: 9m 37s
39: learn: 0.1493588 total: 20s remaining: 9m 39s
40: learn: 0.1475074 total: 20.7s remaining: 9m 45s
41: learn: 0.1461541 total: 21.3s remaining: 9m 47s
42: learn: 0.1445435 total: 22s remaining: 9m 51s
43: learn: 0.1430512 total: 22.6s remaining: 9m 52s
44: learn: 0.1422473 total: 23.3s remaining: 9m 56s
45: learn: 0.1407347 total: 23.8s remaining: 9m 58s
46: learn: 0.1396163 total: 24.4s remaining: 9m 58s
47: learn: 0.1385847 total: 24.9s remaining: 9m 56s
48: learn: 0.1375300 total: 25.4s remaining: 9m 55s
49: learn: 0.1368346 total: 25.9s remaining: 9m 54s
50: learn: 0.1362641 total: 26.4s remaining: 9m 54s
51: learn: 0.1354198 total: 26.8s remaining: 9m 51s
52: learn: 0.1337938 total: 27.3s remaining: 9m 50s
53: learn: 0.1328453 total: 27.7s remaining: 9m 48s
54: learn: 0.1321691 total: 28.3s remaining: 9m 48s
55: learn: 0.1313290 total: 28.8s remaining: 9m 47s
56: learn: 0.1304392 total: 29.3s remaining: 9m 46s
57: learn: 0.1294753 total: 29.7s remaining: 9m 45s
58: learn: 0.1283839 total: 30.1s remaining: 9m 42s
59: learn: 0.1274470 total: 30.5s remaining: 9m 40s
60: learn: 0.1267341 total: 31s remaining: 9m 39s
61: learn: 0.1258350 total: 31.6s remaining: 9m 40s
62: learn: 0.1249486 total: 32.2s remaining: 9m 41s
63: learn: 0.1239727 total: 32.9s remaining: 9m 43s
64: learn: 0.1234044 total: 33.4s remaining: 9m 43s
65: learn: 0.1230444 total: 34s remaining: 9m 43s
66: learn: 0.1221518 total: 34.5s remaining: 9m 42s
67: learn: 0.1214892 total: 35s remaining: 9m 43s
68: learn: 0.1205965 total: 35.5s remaining: 9m 41s
69: learn: 0.1201577 total: 35.9s remaining: 9m 39s
70: learn: 0.1195563 total: 36.5s remaining: 9m 39s
71: learn: 0.1189640 total: 37s remaining: 9m 39s
72: learn: 0.1182158 total: 37.5s remaining: 9m 39s
73: learn: 0.1179593 total: 38.3s remaining: 9m 42s
74: learn: 0.1172131 total: 38.8s remaining: 9m 41s
75: learn: 0.1167403 total: 39.4s remaining: 9m 42s
76: learn: 0.1162366 total: 40s remaining: 9m 42s
77: learn: 0.1160319 total: 40.5s remaining: 9m 43s

78: learn: 0.1157043 total: 41.2s remaining: 9m 44s
79: learn: 0.1153591 total: 41.7s remaining: 9m 44s
80: learn: 0.1146724 total: 42.3s remaining: 9m 43s
81: learn: 0.1139961 total: 42.8s remaining: 9m 43s
82: learn: 0.1136698 total: 43.3s remaining: 9m 42s
83: learn: 0.1129215 total: 43.9s remaining: 9m 43s
84: learn: 0.1124409 total: 44.5s remaining: 9m 43s
85: learn: 0.1119041 total: 44.9s remaining: 9m 42s
86: learn: 0.1114814 total: 45.4s remaining: 9m 41s
87: learn: 0.1109362 total: 45.9s remaining: 9m 39s
88: learn: 0.1103365 total: 46.4s remaining: 9m 38s
89: learn: 0.1098610 total: 46.9s remaining: 9m 38s
90: learn: 0.1096230 total: 47.4s remaining: 9m 37s
91: learn: 0.1093276 total: 47.8s remaining: 9m 36s
92: learn: 0.1087167 total: 48.3s remaining: 9m 35s
93: learn: 0.1084868 total: 48.7s remaining: 9m 33s
94: learn: 0.1080973 total: 49.2s remaining: 9m 32s
95: learn: 0.1077108 total: 49.6s remaining: 9m 30s
96: learn: 0.1074582 total: 50.1s remaining: 9m 30s
97: learn: 0.1071637 total: 50.6s remaining: 9m 29s
98: learn: 0.1068134 total: 51s remaining: 9m 27s
99: learn: 0.1064216 total: 51.5s remaining: 9m 26s
100: learn: 0.1062633 total: 51.9s remaining: 9m 25s
101: learn: 0.1059544 total: 52.4s remaining: 9m 24s
102: learn: 0.1055206 total: 53s remaining: 9m 24s
103: learn: 0.1050715 total: 53.5s remaining: 9m 23s
104: learn: 0.1044211 total: 53.9s remaining: 9m 22s
105: learn: 0.1039503 total: 54.5s remaining: 9m 21s
106: learn: 0.1033792 total: 55s remaining: 9m 21s
107: learn: 0.1032231 total: 55.4s remaining: 9m 20s
108: learn: 0.1027899 total: 55.9s remaining: 9m 19s
109: learn: 0.1026082 total: 56.3s remaining: 9m 18s
110: learn: 0.1020998 total: 56.8s remaining: 9m 17s
111: learn: 0.1017566 total: 57.2s remaining: 9m 15s
112: learn: 0.1015442 total: 57.6s remaining: 9m 14s
113: learn: 0.1012380 total: 58.1s remaining: 9m 13s
114: learn: 0.1010200 total: 58.6s remaining: 9m 12s
115: learn: 0.1006112 total: 59s remaining: 9m 11s
116: learn: 0.1004754 total: 59.4s remaining: 9m 10s
117: learn: 0.0999925 total: 60s remaining: 9m 9s
118: learn: 0.0996344 total: 1m remaining: 9m 8s
119: learn: 0.0994201 total: 1m remaining: 9m 7s
120: learn: 0.0989912 total: 1m 1s remaining: 9m 6s
121: learn: 0.0984977 total: 1m 1s remaining: 9m 5s
122: learn: 0.0982274 total: 1m 2s remaining: 9m 4s
123: learn: 0.0977268 total: 1m 2s remaining: 9m 3s
124: learn: 0.0974804 total: 1m 3s remaining: 9m 2s
125: learn: 0.0973152 total: 1m 3s remaining: 9m 1s
126: learn: 0.0971336 total: 1m 3s remaining: 9m
127: learn: 0.0968193 total: 1m 4s remaining: 8m 59s
128: learn: 0.0967106 total: 1m 4s remaining: 8m 58s
129: learn: 0.0963822 total: 1m 5s remaining: 8m 57s
130: learn: 0.0961563 total: 1m 5s remaining: 8m 57s
131: learn: 0.0959373 total: 1m 6s remaining: 8m 57s
132: learn: 0.0955711 total: 1m 6s remaining: 8m 56s
133: learn: 0.0953737 total: 1m 7s remaining: 8m 55s
134: learn: 0.0951772 total: 1m 7s remaining: 8m 54s
135: learn: 0.0949719 total: 1m 8s remaining: 8m 54s
136: learn: 0.0946683 total: 1m 8s remaining: 8m 53s
137: learn: 0.0944616 total: 1m 9s remaining: 8m 52s
138: learn: 0.0941794 total: 1m 9s remaining: 8m 51s
139: learn: 0.0936885 total: 1m 10s remaining: 8m 51s
140: learn: 0.0933482 total: 1m 10s remaining: 8m 50s
141: learn: 0.0931072 total: 1m 11s remaining: 8m 49s
142: learn: 0.0928240 total: 1m 11s remaining: 8m 48s
143: learn: 0.0925762 total: 1m 12s remaining: 8m 48s
144: learn: 0.0924144 total: 1m 12s remaining: 8m 48s
145: learn: 0.0921114 total: 1m 13s remaining: 8m 47s
146: learn: 0.0920364 total: 1m 13s remaining: 8m 46s
147: learn: 0.0917877 total: 1m 14s remaining: 8m 46s
148: learn: 0.0914939 total: 1m 14s remaining: 8m 46s
149: learn: 0.0913486 total: 1m 15s remaining: 8m 47s

150: learn: 0.0908935 total: 1m 15s remaining: 8m 47s
151: learn: 0.0905948 total: 1m 16s remaining: 8m 47s
152: learn: 0.0904124 total: 1m 16s remaining: 8m 46s
153: learn: 0.0902105 total: 1m 17s remaining: 8m 45s
154: learn: 0.0900282 total: 1m 17s remaining: 8m 44s
155: learn: 0.0898050 total: 1m 18s remaining: 8m 44s
156: learn: 0.0895707 total: 1m 18s remaining: 8m 44s
157: learn: 0.0894160 total: 1m 19s remaining: 8m 43s
158: learn: 0.0893486 total: 1m 19s remaining: 8m 42s
159: learn: 0.0891363 total: 1m 20s remaining: 8m 42s
160: learn: 0.0888179 total: 1m 20s remaining: 8m 41s
161: learn: 0.0886002 total: 1m 21s remaining: 8m 40s
162: learn: 0.0883867 total: 1m 21s remaining: 8m 40s
163: learn: 0.0882306 total: 1m 22s remaining: 8m 39s
164: learn: 0.0882183 total: 1m 22s remaining: 8m 37s
165: learn: 0.0881041 total: 1m 22s remaining: 8m 36s
166: learn: 0.0879245 total: 1m 23s remaining: 8m 35s
167: learn: 0.0877327 total: 1m 23s remaining: 8m 35s
168: learn: 0.0875425 total: 1m 24s remaining: 8m 34s
169: learn: 0.0870889 total: 1m 24s remaining: 8m 33s
170: learn: 0.0868938 total: 1m 25s remaining: 8m 33s
171: learn: 0.0866046 total: 1m 25s remaining: 8m 32s
172: learn: 0.0864561 total: 1m 26s remaining: 8m 31s
173: learn: 0.0862755 total: 1m 26s remaining: 8m 31s
174: learn: 0.0860498 total: 1m 27s remaining: 8m 30s
175: learn: 0.0859392 total: 1m 27s remaining: 8m 30s
176: learn: 0.0854998 total: 1m 28s remaining: 8m 29s
177: learn: 0.0853451 total: 1m 28s remaining: 8m 29s
178: learn: 0.0852026 total: 1m 29s remaining: 8m 28s
179: learn: 0.0849849 total: 1m 29s remaining: 8m 27s
180: learn: 0.0846660 total: 1m 30s remaining: 8m 27s
181: learn: 0.0844945 total: 1m 30s remaining: 8m 26s
182: learn: 0.0843340 total: 1m 30s remaining: 8m 25s
183: learn: 0.0841366 total: 1m 31s remaining: 8m 25s
184: learn: 0.0840039 total: 1m 31s remaining: 8m 24s
185: learn: 0.0837606 total: 1m 32s remaining: 8m 23s
186: learn: 0.0836185 total: 1m 32s remaining: 8m 22s
187: learn: 0.0834171 total: 1m 33s remaining: 8m 22s
188: learn: 0.0832224 total: 1m 33s remaining: 8m 21s
189: learn: 0.0830378 total: 1m 34s remaining: 8m 21s
190: learn: 0.0828600 total: 1m 34s remaining: 8m 20s
191: learn: 0.0826807 total: 1m 35s remaining: 8m 19s
192: learn: 0.0824679 total: 1m 35s remaining: 8m 19s
193: learn: 0.0821771 total: 1m 36s remaining: 8m 18s
194: learn: 0.0820211 total: 1m 36s remaining: 8m 17s
195: learn: 0.0818147 total: 1m 37s remaining: 8m 17s
196: learn: 0.0816677 total: 1m 37s remaining: 8m 16s
197: learn: 0.0815120 total: 1m 38s remaining: 8m 16s
198: learn: 0.0812225 total: 1m 38s remaining: 8m 15s
199: learn: 0.0810071 total: 1m 38s remaining: 8m 14s
200: learn: 0.0807339 total: 1m 39s remaining: 8m 14s
201: learn: 0.0804739 total: 1m 39s remaining: 8m 13s
202: learn: 0.0802317 total: 1m 40s remaining: 8m 13s
203: learn: 0.0800063 total: 1m 40s remaining: 8m 12s
204: learn: 0.0798243 total: 1m 41s remaining: 8m 11s
205: learn: 0.0795752 total: 1m 41s remaining: 8m 10s
206: learn: 0.0793271 total: 1m 42s remaining: 8m 10s
207: learn: 0.0791910 total: 1m 42s remaining: 8m 10s
208: learn: 0.0790578 total: 1m 43s remaining: 8m 9s
209: learn: 0.0788808 total: 1m 43s remaining: 8m 9s
210: learn: 0.0787705 total: 1m 44s remaining: 8m 8s
211: learn: 0.0786224 total: 1m 44s remaining: 8m 7s
212: learn: 0.0784353 total: 1m 45s remaining: 8m 7s
213: learn: 0.0782147 total: 1m 45s remaining: 8m 6s
214: learn: 0.0780459 total: 1m 46s remaining: 8m 5s
215: learn: 0.0778816 total: 1m 46s remaining: 8m 4s
216: learn: 0.0777580 total: 1m 46s remaining: 8m 3s
217: learn: 0.0775057 total: 1m 47s remaining: 8m 3s
218: learn: 0.0773563 total: 1m 47s remaining: 8m 2s
219: learn: 0.0771449 total: 1m 48s remaining: 8m 1s
220: learn: 0.0768753 total: 1m 48s remaining: 8m
221: learn: 0.0767223 total: 1m 48s remaining: 8m

222: learn: 0.0766493 total: 1m 49s remaining: 7m 59s
223: learn: 0.0764990 total: 1m 49s remaining: 7m 58s
224: learn: 0.0763892 total: 1m 50s remaining: 7m 58s
225: learn: 0.0762376 total: 1m 50s remaining: 7m 57s
226: learn: 0.0760794 total: 1m 51s remaining: 7m 57s
227: learn: 0.0759781 total: 1m 51s remaining: 7m 56s
228: learn: 0.0758155 total: 1m 52s remaining: 7m 55s
229: learn: 0.0756683 total: 1m 52s remaining: 7m 55s
230: learn: 0.0754893 total: 1m 53s remaining: 7m 54s
231: learn: 0.0753089 total: 1m 53s remaining: 7m 53s
232: learn: 0.0751577 total: 1m 54s remaining: 7m 53s
233: learn: 0.0750179 total: 1m 54s remaining: 7m 52s
234: learn: 0.0749416 total: 1m 54s remaining: 7m 52s
235: learn: 0.0747839 total: 1m 55s remaining: 7m 51s
236: learn: 0.0746767 total: 1m 55s remaining: 7m 51s
237: learn: 0.0744798 total: 1m 56s remaining: 7m 50s
238: learn: 0.0742608 total: 1m 56s remaining: 7m 50s
239: learn: 0.0740855 total: 1m 57s remaining: 7m 49s
240: learn: 0.0738857 total: 1m 57s remaining: 7m 49s
241: learn: 0.0737475 total: 1m 58s remaining: 7m 49s
242: learn: 0.0736676 total: 1m 58s remaining: 7m 48s
243: learn: 0.0734927 total: 1m 59s remaining: 7m 47s
244: learn: 0.0733675 total: 1m 59s remaining: 7m 47s
245: learn: 0.0732635 total: 2m remaining: 7m 46s
246: learn: 0.0730524 total: 2m remaining: 7m 45s
247: learn: 0.0729396 total: 2m 1s remaining: 7m 45s
248: learn: 0.0728320 total: 2m 1s remaining: 7m 44s
249: learn: 0.0727421 total: 2m 2s remaining: 7m 44s
250: learn: 0.0726492 total: 2m 2s remaining: 7m 43s
251: learn: 0.0724247 total: 2m 3s remaining: 7m 42s
252: learn: 0.0722858 total: 2m 3s remaining: 7m 42s
253: learn: 0.0722140 total: 2m 4s remaining: 7m 41s
254: learn: 0.0720434 total: 2m 4s remaining: 7m 41s
255: learn: 0.0718957 total: 2m 4s remaining: 7m 40s
256: learn: 0.0717607 total: 2m 5s remaining: 7m 40s
257: learn: 0.0715971 total: 2m 5s remaining: 7m 39s
258: learn: 0.0714857 total: 2m 6s remaining: 7m 38s
259: learn: 0.0713759 total: 2m 6s remaining: 7m 37s
260: learn: 0.0712574 total: 2m 7s remaining: 7m 37s
261: learn: 0.0711862 total: 2m 7s remaining: 7m 36s
262: learn: 0.0711343 total: 2m 7s remaining: 7m 35s
263: learn: 0.0710188 total: 2m 8s remaining: 7m 35s
264: learn: 0.0708522 total: 2m 8s remaining: 7m 34s
265: learn: 0.0706921 total: 2m 9s remaining: 7m 33s
266: learn: 0.0706085 total: 2m 9s remaining: 7m 33s
267: learn: 0.0704225 total: 2m 10s remaining: 7m 32s
268: learn: 0.0702543 total: 2m 10s remaining: 7m 32s
269: learn: 0.0701536 total: 2m 11s remaining: 7m 31s
270: learn: 0.0700110 total: 2m 11s remaining: 7m 30s
271: learn: 0.0698967 total: 2m 12s remaining: 7m 30s
272: learn: 0.0697995 total: 2m 12s remaining: 7m 29s
273: learn: 0.0695180 total: 2m 13s remaining: 7m 29s
274: learn: 0.0693882 total: 2m 13s remaining: 7m 29s
275: learn: 0.0690489 total: 2m 14s remaining: 7m 28s
276: learn: 0.0689171 total: 2m 14s remaining: 7m 28s
277: learn: 0.0687878 total: 2m 15s remaining: 7m 27s
278: learn: 0.0686364 total: 2m 15s remaining: 7m 27s
279: learn: 0.0685904 total: 2m 16s remaining: 7m 26s
280: learn: 0.0683505 total: 2m 16s remaining: 7m 26s
281: learn: 0.0682619 total: 2m 16s remaining: 7m 25s
282: learn: 0.0681886 total: 2m 17s remaining: 7m 25s
283: learn: 0.0679982 total: 2m 17s remaining: 7m 24s
284: learn: 0.0679394 total: 2m 18s remaining: 7m 24s
285: learn: 0.0678288 total: 2m 18s remaining: 7m 23s
286: learn: 0.0676845 total: 2m 19s remaining: 7m 22s
287: learn: 0.0675975 total: 2m 19s remaining: 7m 22s
288: learn: 0.0675312 total: 2m 20s remaining: 7m 21s
289: learn: 0.0673983 total: 2m 20s remaining: 7m 20s
290: learn: 0.0672862 total: 2m 20s remaining: 7m 20s
291: learn: 0.0671466 total: 2m 21s remaining: 7m 19s
292: learn: 0.0670890 total: 2m 21s remaining: 7m 19s
293: learn: 0.0670004 total: 2m 22s remaining: 7m 18s

294: learn: 0.0668827 total: 2m 22s remaining: 7m 17s
295: learn: 0.0667771 total: 2m 23s remaining: 7m 17s
296: learn: 0.0665734 total: 2m 23s remaining: 7m 17s
297: learn: 0.0663337 total: 2m 24s remaining: 7m 16s
298: learn: 0.0662634 total: 2m 24s remaining: 7m 16s
299: learn: 0.0661725 total: 2m 25s remaining: 7m 15s
300: learn: 0.0659929 total: 2m 25s remaining: 7m 14s
301: learn: 0.0659004 total: 2m 26s remaining: 7m 14s
302: learn: 0.0657623 total: 2m 26s remaining: 7m 13s
303: learn: 0.0657155 total: 2m 26s remaining: 7m 13s
304: learn: 0.0656402 total: 2m 27s remaining: 7m 12s
305: learn: 0.0654969 total: 2m 27s remaining: 7m 12s
306: learn: 0.0654024 total: 2m 28s remaining: 7m 11s
307: learn: 0.0652942 total: 2m 28s remaining: 7m 11s
308: learn: 0.0651613 total: 2m 29s remaining: 7m 10s
309: learn: 0.0649972 total: 2m 29s remaining: 7m 9s
310: learn: 0.0648827 total: 2m 30s remaining: 7m 9s
311: learn: 0.0646788 total: 2m 30s remaining: 7m 9s
312: learn: 0.0645309 total: 2m 31s remaining: 7m 8s
313: learn: 0.0644785 total: 2m 31s remaining: 7m 8s
314: learn: 0.0643725 total: 2m 32s remaining: 7m 7s
315: learn: 0.0642475 total: 2m 32s remaining: 7m 7s
316: learn: 0.0641109 total: 2m 33s remaining: 7m 6s
317: learn: 0.0639909 total: 2m 33s remaining: 7m 6s
318: learn: 0.0638499 total: 2m 34s remaining: 7m 5s
319: learn: 0.0637074 total: 2m 34s remaining: 7m 4s
320: learn: 0.0636841 total: 2m 35s remaining: 7m 4s
321: learn: 0.0635909 total: 2m 35s remaining: 7m 3s
322: learn: 0.0634906 total: 2m 35s remaining: 7m 3s
323: learn: 0.0633836 total: 2m 36s remaining: 7m 2s
324: learn: 0.0633483 total: 2m 36s remaining: 7m 2s
325: learn: 0.0632919 total: 2m 37s remaining: 7m 1s
326: learn: 0.0632185 total: 2m 37s remaining: 7m
327: learn: 0.0631064 total: 2m 38s remaining: 7m
328: learn: 0.0629992 total: 2m 38s remaining: 6m 59s
329: learn: 0.0628966 total: 2m 38s remaining: 6m 58s
330: learn: 0.0628427 total: 2m 39s remaining: 6m 58s
331: learn: 0.0626689 total: 2m 39s remaining: 6m 57s
332: learn: 0.0625925 total: 2m 40s remaining: 6m 57s
333: learn: 0.0625498 total: 2m 40s remaining: 6m 56s
334: learn: 0.0624034 total: 2m 41s remaining: 6m 56s
335: learn: 0.0622780 total: 2m 41s remaining: 6m 55s
336: learn: 0.0621871 total: 2m 42s remaining: 6m 55s
337: learn: 0.0620988 total: 2m 42s remaining: 6m 54s
338: learn: 0.0620070 total: 2m 43s remaining: 6m 54s
339: learn: 0.0619099 total: 2m 43s remaining: 6m 53s
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344: learn: 0.0613567 total: 2m 45s remaining: 6m 51s
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346: learn: 0.0612360 total: 2m 46s remaining: 6m 50s
347: learn: 0.0611471 total: 2m 47s remaining: 6m 49s
348: learn: 0.0611158 total: 2m 47s remaining: 6m 49s
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351: learn: 0.0609604 total: 2m 49s remaining: 6m 47s
352: learn: 0.0608584 total: 2m 49s remaining: 6m 47s
353: learn: 0.0606883 total: 2m 50s remaining: 6m 46s
354: learn: 0.0606203 total: 2m 50s remaining: 6m 46s
355: learn: 0.0605434 total: 2m 51s remaining: 6m 45s
356: learn: 0.0604072 total: 2m 51s remaining: 6m 45s
357: learn: 0.0602845 total: 2m 52s remaining: 6m 44s
358: learn: 0.0602334 total: 2m 52s remaining: 6m 43s
359: learn: 0.0601024 total: 2m 52s remaining: 6m 43s
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361: learn: 0.0598290 total: 2m 53s remaining: 6m 42s
362: learn: 0.0597487 total: 2m 54s remaining: 6m 41s
363: learn: 0.0596267 total: 2m 54s remaining: 6m 41s
364: learn: 0.0595321 total: 2m 55s remaining: 6m 40s
365: learn: 0.0593848 total: 2m 55s remaining: 6m 39s

366: learn: 0.0593368 total: 2m 55s remaining: 6m 39s
367: learn: 0.0592643 total: 2m 56s remaining: 6m 38s
368: learn: 0.0592050 total: 2m 56s remaining: 6m 38s
369: learn: 0.0590067 total: 2m 57s remaining: 6m 37s
370: learn: 0.0588942 total: 2m 57s remaining: 6m 37s
371: learn: 0.0588256 total: 2m 58s remaining: 6m 36s
372: learn: 0.0587613 total: 2m 58s remaining: 6m 36s
373: learn: 0.0587270 total: 2m 59s remaining: 6m 35s
374: learn: 0.0586840 total: 2m 59s remaining: 6m 35s
375: learn: 0.0585745 total: 3m remaining: 6m 34s
376: learn: 0.0584914 total: 3m remaining: 6m 34s
377: learn: 0.0583838 total: 3m 1s remaining: 6m 33s
378: learn: 0.0582721 total: 3m 1s remaining: 6m 33s
379: learn: 0.0581766 total: 3m 2s remaining: 6m 32s
380: learn: 0.0580954 total: 3m 2s remaining: 6m 32s
381: learn: 0.0580187 total: 3m 2s remaining: 6m 31s
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383: learn: 0.0578637 total: 3m 3s remaining: 6m 30s
384: learn: 0.0577158 total: 3m 4s remaining: 6m 30s
385: learn: 0.0576524 total: 3m 4s remaining: 6m 29s
386: learn: 0.0576127 total: 3m 5s remaining: 6m 29s
387: learn: 0.0575170 total: 3m 5s remaining: 6m 28s
388: learn: 0.0574162 total: 3m 6s remaining: 6m 28s
389: learn: 0.0572883 total: 3m 6s remaining: 6m 27s
390: learn: 0.0571952 total: 3m 7s remaining: 6m 27s
391: learn: 0.0571035 total: 3m 7s remaining: 6m 26s
392: learn: 0.0570369 total: 3m 8s remaining: 6m 26s
393: learn: 0.0569602 total: 3m 8s remaining: 6m 25s
394: learn: 0.0568850 total: 3m 8s remaining: 6m 24s
395: learn: 0.0568059 total: 3m 9s remaining: 6m 24s
396: learn: 0.0566968 total: 3m 9s remaining: 6m 23s
397: learn: 0.0566283 total: 3m 10s remaining: 6m 23s
398: learn: 0.0565635 total: 3m 10s remaining: 6m 22s
399: learn: 0.0564207 total: 3m 11s remaining: 6m 22s
400: learn: 0.0563469 total: 3m 11s remaining: 6m 21s
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403: learn: 0.0560272 total: 3m 12s remaining: 6m 20s
404: learn: 0.0559272 total: 3m 13s remaining: 6m 19s
405: learn: 0.0558470 total: 3m 14s remaining: 6m 19s
406: learn: 0.0557877 total: 3m 14s remaining: 6m 18s
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413: learn: 0.0552572 total: 3m 17s remaining: 6m 15s
414: learn: 0.0552003 total: 3m 18s remaining: 6m 15s
415: learn: 0.0550031 total: 3m 18s remaining: 6m 14s
416: learn: 0.0549686 total: 3m 19s remaining: 6m 14s
417: learn: 0.0548846 total: 3m 19s remaining: 6m 13s
418: learn: 0.0548463 total: 3m 20s remaining: 6m 13s
419: learn: 0.0547601 total: 3m 20s remaining: 6m 12s
420: learn: 0.0547005 total: 3m 21s remaining: 6m 12s
421: learn: 0.0546211 total: 3m 21s remaining: 6m 12s
422: learn: 0.0545339 total: 3m 22s remaining: 6m 11s
423: learn: 0.0544816 total: 3m 22s remaining: 6m 10s
424: learn: 0.0543588 total: 3m 23s remaining: 6m 10s
425: learn: 0.0542912 total: 3m 23s remaining: 6m 9s
426: learn: 0.0542315 total: 3m 24s remaining: 6m 9s
427: learn: 0.0541984 total: 3m 24s remaining: 6m 8s
428: learn: 0.0540952 total: 3m 24s remaining: 6m 8s
429: learn: 0.0540151 total: 3m 25s remaining: 6m 7s
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431: learn: 0.0538273 total: 3m 26s remaining: 6m 6s
432: learn: 0.0537290 total: 3m 26s remaining: 6m 6s
433: learn: 0.0536625 total: 3m 27s remaining: 6m 5s
434: learn: 0.0536327 total: 3m 27s remaining: 6m 5s
435: learn: 0.0535549 total: 3m 28s remaining: 6m 4s
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439: learn: 0.0532869 total: 3m 30s remaining: 6m 2s
440: learn: 0.0532354 total: 3m 30s remaining: 6m 2s
441: learn: 0.0531652 total: 3m 30s remaining: 6m 1s
442: learn: 0.0530936 total: 3m 31s remaining: 6m 1s
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445: learn: 0.0528685 total: 3m 32s remaining: 5m 59s
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458: learn: 0.0519858 total: 3m 38s remaining: 5m 53s
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460: learn: 0.0518827 total: 3m 39s remaining: 5m 52s
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462: learn: 0.0517691 total: 3m 40s remaining: 5m 51s
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464: learn: 0.0516278 total: 3m 41s remaining: 5m 50s
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466: learn: 0.0514302 total: 3m 42s remaining: 5m 48s
467: learn: 0.0513781 total: 3m 42s remaining: 5m 48s
468: learn: 0.0513017 total: 3m 43s remaining: 5m 47s
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471: learn: 0.0511583 total: 3m 44s remaining: 5m 46s
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509: learn: 0.0483359 total: 4m 3s remaining: 5m 28s

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515: learn: 0.0478912 total: 4m 6s remaining: 5m 26s
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525: learn: 0.0472856 total: 4m 11s remaining: 5m 22s
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528: learn: 0.0471015 total: 4m 13s remaining: 5m 21s
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531: learn: 0.0469377 total: 4m 14s remaining: 5m 20s
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562: learn: 0.0450223 total: 4m 30s remaining: 5m 6s
563: learn: 0.0449807 total: 4m 31s remaining: 5m 6s
564: learn: 0.0449433 total: 4m 31s remaining: 5m 5s
565: learn: 0.0448727 total: 4m 32s remaining: 5m 5s
566: learn: 0.0447651 total: 4m 32s remaining: 5m 4s
567: learn: 0.0447070 total: 4m 33s remaining: 5m 4s
568: learn: 0.0445985 total: 4m 33s remaining: 5m 3s
569: learn: 0.0445435 total: 4m 34s remaining: 5m 3s
570: learn: 0.0445080 total: 4m 34s remaining: 5m 2s
571: learn: 0.0444801 total: 4m 35s remaining: 5m 1s
572: learn: 0.0444369 total: 4m 35s remaining: 5m 1s
573: learn: 0.0443826 total: 4m 36s remaining: 5m 1s
574: learn: 0.0443317 total: 4m 36s remaining: 5m
575: learn: 0.0442808 total: 4m 37s remaining: 5m
576: learn: 0.0442226 total: 4m 37s remaining: 4m 59s
577: learn: 0.0441772 total: 4m 38s remaining: 4m 59s
578: learn: 0.0441337 total: 4m 38s remaining: 4m 58s
579: learn: 0.0440683 total: 4m 39s remaining: 4m 58s
580: learn: 0.0440317 total: 4m 39s remaining: 4m 58s
581: learn: 0.0439771 total: 4m 40s remaining: 4m 57s

582: learn: 0.0439102 total: 4m 40s remaining: 4m 57s
583: learn: 0.0438413 total: 4m 41s remaining: 4m 56s
584: learn: 0.0438099 total: 4m 41s remaining: 4m 56s
585: learn: 0.0437640 total: 4m 41s remaining: 4m 55s
586: learn: 0.0437299 total: 4m 42s remaining: 4m 55s
587: learn: 0.0436983 total: 4m 43s remaining: 4m 54s
588: learn: 0.0436661 total: 4m 43s remaining: 4m 54s
589: learn: 0.0436084 total: 4m 43s remaining: 4m 53s
590: learn: 0.0435595 total: 4m 44s remaining: 4m 53s
591: learn: 0.0435263 total: 4m 44s remaining: 4m 52s
592: learn: 0.0434511 total: 4m 45s remaining: 4m 52s
593: learn: 0.0434291 total: 4m 45s remaining: 4m 51s
594: learn: 0.0433470 total: 4m 46s remaining: 4m 50s
595: learn: 0.0432724 total: 4m 46s remaining: 4m 50s
596: learn: 0.0431979 total: 4m 47s remaining: 4m 49s
597: learn: 0.0431034 total: 4m 47s remaining: 4m 49s
598: learn: 0.0430452 total: 4m 48s remaining: 4m 49s
599: learn: 0.0429801 total: 4m 48s remaining: 4m 48s
600: learn: 0.0429745 total: 4m 48s remaining: 4m 47s
601: learn: 0.0429236 total: 4m 49s remaining: 4m 47s
602: learn: 0.0428054 total: 4m 49s remaining: 4m 47s
603: learn: 0.0427317 total: 4m 50s remaining: 4m 46s
604: learn: 0.0427071 total: 4m 50s remaining: 4m 46s
605: learn: 0.0426337 total: 4m 51s remaining: 4m 45s
606: learn: 0.0425664 total: 4m 51s remaining: 4m 45s
607: learn: 0.0425463 total: 4m 52s remaining: 4m 44s
608: learn: 0.0425050 total: 4m 52s remaining: 4m 44s
609: learn: 0.0424802 total: 4m 53s remaining: 4m 43s
610: learn: 0.0423706 total: 4m 53s remaining: 4m 43s
611: learn: 0.0423336 total: 4m 54s remaining: 4m 42s
612: learn: 0.0422882 total: 4m 54s remaining: 4m 42s
613: learn: 0.0422627 total: 4m 55s remaining: 4m 41s
614: learn: 0.0422446 total: 4m 55s remaining: 4m 41s
615: learn: 0.0422074 total: 4m 56s remaining: 4m 40s
616: learn: 0.0421305 total: 4m 56s remaining: 4m 40s
617: learn: 0.0420720 total: 4m 57s remaining: 4m 39s
618: learn: 0.0420495 total: 4m 57s remaining: 4m 39s
619: learn: 0.0419886 total: 4m 58s remaining: 4m 38s
620: learn: 0.0419252 total: 4m 58s remaining: 4m 38s
621: learn: 0.0418749 total: 4m 59s remaining: 4m 37s
622: learn: 0.0417998 total: 4m 59s remaining: 4m 37s
623: learn: 0.0417386 total: 4m 59s remaining: 4m 36s
624: learn: 0.0417202 total: 5m remaining: 4m 36s
625: learn: 0.0416669 total: 5m remaining: 4m 35s
626: learn: 0.0415797 total: 5m 1s remaining: 4m 35s
627: learn: 0.0415443 total: 5m 1s remaining: 4m 34s
628: learn: 0.0415062 total: 5m 2s remaining: 4m 34s
629: learn: 0.0414717 total: 5m 2s remaining: 4m 33s
630: learn: 0.0414281 total: 5m 3s remaining: 4m 33s
631: learn: 0.0413806 total: 5m 3s remaining: 4m 32s
632: learn: 0.0413688 total: 5m 3s remaining: 4m 32s
633: learn: 0.0413170 total: 5m 4s remaining: 4m 31s
634: learn: 0.0412614 total: 5m 4s remaining: 4m 31s
635: learn: 0.0411676 total: 5m 5s remaining: 4m 30s
636: learn: 0.0411261 total: 5m 5s remaining: 4m 30s
637: learn: 0.0410919 total: 5m 6s remaining: 4m 29s
638: learn: 0.0410037 total: 5m 6s remaining: 4m 29s
639: learn: 0.0409650 total: 5m 7s remaining: 4m 28s
640: learn: 0.0409253 total: 5m 7s remaining: 4m 28s
641: learn: 0.0408744 total: 5m 8s remaining: 4m 27s
642: learn: 0.0408228 total: 5m 8s remaining: 4m 27s
643: learn: 0.0407147 total: 5m 9s remaining: 4m 26s
644: learn: 0.0406400 total: 5m 9s remaining: 4m 26s
645: learn: 0.0405822 total: 5m 10s remaining: 4m 25s
646: learn: 0.0405473 total: 5m 10s remaining: 4m 25s
647: learn: 0.0404622 total: 5m 11s remaining: 4m 24s
648: learn: 0.0404212 total: 5m 11s remaining: 4m 24s
649: learn: 0.0403914 total: 5m 12s remaining: 4m 24s
650: learn: 0.0403784 total: 5m 12s remaining: 4m 23s
651: learn: 0.0403476 total: 5m 12s remaining: 4m 23s
652: learn: 0.0402975 total: 5m 13s remaining: 4m 22s
653: learn: 0.0402537 total: 5m 13s remaining: 4m 22s

654: learn: 0.0401861 total: 5m 14s remaining: 4m 21s
655: learn: 0.0401359 total: 5m 14s remaining: 4m 21s
656: learn: 0.0400845 total: 5m 15s remaining: 4m 20s
657: learn: 0.0400525 total: 5m 15s remaining: 4m 20s
658: learn: 0.0399837 total: 5m 16s remaining: 4m 19s
659: learn: 0.0399605 total: 5m 16s remaining: 4m 19s
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661: learn: 0.0398432 total: 5m 17s remaining: 4m 18s
662: learn: 0.0397924 total: 5m 17s remaining: 4m 17s
663: learn: 0.0396722 total: 5m 18s remaining: 4m 17s
664: learn: 0.0396379 total: 5m 18s remaining: 4m 16s
665: learn: 0.0395809 total: 5m 19s remaining: 4m 15s
666: learn: 0.0395204 total: 5m 19s remaining: 4m 15s
667: learn: 0.0395066 total: 5m 20s remaining: 4m 14s
668: learn: 0.0394663 total: 5m 20s remaining: 4m 14s
669: learn: 0.0394385 total: 5m 20s remaining: 4m 13s
670: learn: 0.0393917 total: 5m 21s remaining: 4m 13s
671: learn: 0.0392915 total: 5m 21s remaining: 4m 12s
672: learn: 0.0392567 total: 5m 22s remaining: 4m 12s
673: learn: 0.0391994 total: 5m 22s remaining: 4m 12s
674: learn: 0.0391247 total: 5m 23s remaining: 4m 11s
675: learn: 0.0390649 total: 5m 24s remaining: 4m 11s
676: learn: 0.0390417 total: 5m 24s remaining: 4m 10s
677: learn: 0.0390174 total: 5m 25s remaining: 4m 10s
678: learn: 0.0389805 total: 5m 25s remaining: 4m 9s
679: learn: 0.0389283 total: 5m 25s remaining: 4m 9s
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681: learn: 0.0388624 total: 5m 26s remaining: 4m 8s
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683: learn: 0.0387376 total: 5m 27s remaining: 4m 7s
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686: learn: 0.0386018 total: 5m 29s remaining: 4m 5s
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689: learn: 0.0385105 total: 5m 30s remaining: 4m 4s
690: learn: 0.0384695 total: 5m 30s remaining: 4m 3s
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694: learn: 0.0382498 total: 5m 32s remaining: 4m 1s
695: learn: 0.0381662 total: 5m 33s remaining: 4m 1s
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697: learn: 0.0380673 total: 5m 34s remaining: 4m
698: learn: 0.0380105 total: 5m 34s remaining: 3m 59s
699: learn: 0.0379836 total: 5m 35s remaining: 3m 59s
700: learn: 0.0379645 total: 5m 35s remaining: 3m 58s
701: learn: 0.0379324 total: 5m 35s remaining: 3m 58s
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705: learn: 0.0377425 total: 5m 37s remaining: 3m 56s
706: learn: 0.0377091 total: 5m 38s remaining: 3m 55s
707: learn: 0.0376507 total: 5m 38s remaining: 3m 55s
708: learn: 0.0376072 total: 5m 39s remaining: 3m 54s
709: learn: 0.0375683 total: 5m 39s remaining: 3m 54s
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712: learn: 0.0374246 total: 5m 41s remaining: 3m 52s
713: learn: 0.0373981 total: 5m 41s remaining: 3m 52s
714: learn: 0.0373665 total: 5m 42s remaining: 3m 52s
715: learn: 0.0373434 total: 5m 42s remaining: 3m 51s
716: learn: 0.0372977 total: 5m 43s remaining: 3m 51s
717: learn: 0.0372336 total: 5m 43s remaining: 3m 50s
718: learn: 0.0371616 total: 5m 43s remaining: 3m 50s
719: learn: 0.0370880 total: 5m 44s remaining: 3m 49s
720: learn: 0.0370045 total: 5m 44s remaining: 3m 49s
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722: learn: 0.0369306 total: 5m 45s remaining: 3m 48s
723: learn: 0.0369093 total: 5m 46s remaining: 3m 47s
724: learn: 0.0368858 total: 5m 46s remaining: 3m 47s
725: learn: 0.0368256 total: 5m 47s remaining: 3m 46s

726: learn: 0.0368140 total: 5m 47s remaining: 3m 46s
727: learn: 0.0367991 total: 5m 48s remaining: 3m 45s
728: learn: 0.0367329 total: 5m 48s remaining: 3m 45s
729: learn: 0.0367185 total: 5m 48s remaining: 3m 44s
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731: learn: 0.0366228 total: 5m 49s remaining: 3m 43s
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741: learn: 0.0360318 total: 5m 54s remaining: 3m 38s
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743: learn: 0.0359168 total: 5m 55s remaining: 3m 37s
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746: learn: 0.0357398 total: 5m 57s remaining: 3m 36s
747: learn: 0.0356765 total: 5m 57s remaining: 3m 36s
748: learn: 0.0356150 total: 5m 58s remaining: 3m 35s
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751: learn: 0.0355257 total: 5m 59s remaining: 3m 34s
752: learn: 0.0354959 total: 5m 59s remaining: 3m 33s
753: learn: 0.0354413 total: 6m remaining: 3m 33s
754: learn: 0.0354102 total: 6m remaining: 3m 32s
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756: learn: 0.0353263 total: 6m 1s remaining: 3m 31s
757: learn: 0.0352971 total: 6m 2s remaining: 3m 31s
758: learn: 0.0352703 total: 6m 2s remaining: 3m 30s
759: learn: 0.0352275 total: 6m 2s remaining: 3m 30s
760: learn: 0.0352120 total: 6m 3s remaining: 3m 29s
761: learn: 0.0351681 total: 6m 3s remaining: 3m 29s
762: learn: 0.0351308 total: 6m 4s remaining: 3m 28s
763: learn: 0.0351157 total: 6m 4s remaining: 3m 28s
764: learn: 0.0350601 total: 6m 5s remaining: 3m 27s
765: learn: 0.0350250 total: 6m 5s remaining: 3m 27s
766: learn: 0.0349570 total: 6m 6s remaining: 3m 26s
767: learn: 0.0349087 total: 6m 6s remaining: 3m 26s
768: learn: 0.0348814 total: 6m 7s remaining: 3m 25s
769: learn: 0.0348298 total: 6m 7s remaining: 3m 25s
770: learn: 0.0348124 total: 6m 8s remaining: 3m 24s
771: learn: 0.0347727 total: 6m 8s remaining: 3m 24s
772: learn: 0.0347129 total: 6m 9s remaining: 3m 23s
773: learn: 0.0346496 total: 6m 9s remaining: 3m 23s
774: learn: 0.0345761 total: 6m 10s remaining: 3m 22s
775: learn: 0.0345536 total: 6m 10s remaining: 3m 22s
776: learn: 0.0345055 total: 6m 11s remaining: 3m 22s
777: learn: 0.0344431 total: 6m 11s remaining: 3m 21s
778: learn: 0.0343901 total: 6m 12s remaining: 3m 21s
779: learn: 0.0342784 total: 6m 12s remaining: 3m 20s
780: learn: 0.0342307 total: 6m 13s remaining: 3m 20s
781: learn: 0.0341908 total: 6m 13s remaining: 3m 19s
782: learn: 0.0341475 total: 6m 14s remaining: 3m 19s
783: learn: 0.0340768 total: 6m 14s remaining: 3m 18s
784: learn: 0.0340436 total: 6m 15s remaining: 3m 18s
785: learn: 0.0339830 total: 6m 15s remaining: 3m 18s
786: learn: 0.0339107 total: 6m 16s remaining: 3m 17s
787: learn: 0.0338587 total: 6m 17s remaining: 3m 17s
788: learn: 0.0338157 total: 6m 17s remaining: 3m 16s
789: learn: 0.0337884 total: 6m 18s remaining: 3m 16s
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791: learn: 0.0337118 total: 6m 19s remaining: 3m 15s
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793: learn: 0.0336208 total: 6m 20s remaining: 3m 14s
794: learn: 0.0335803 total: 6m 20s remaining: 3m 14s
795: learn: 0.0335104 total: 6m 21s remaining: 3m 13s
796: learn: 0.0334647 total: 6m 21s remaining: 3m 13s
797: learn: 0.0334409 total: 6m 22s remaining: 3m 12s

798: learn: 0.0333750 total: 6m 22s remaining: 3m 12s
799: learn: 0.0333369 total: 6m 23s remaining: 3m 11s
800: learn: 0.0333066 total: 6m 23s remaining: 3m 11s
801: learn: 0.0332804 total: 6m 23s remaining: 3m 10s
802: learn: 0.0332553 total: 6m 24s remaining: 3m 10s
803: learn: 0.0332081 total: 6m 24s remaining: 3m 9s
804: learn: 0.0331534 total: 6m 25s remaining: 3m 9s
805: learn: 0.0331022 total: 6m 25s remaining: 3m 8s
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807: learn: 0.0329388 total: 6m 26s remaining: 3m 7s
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809: learn: 0.0328204 total: 6m 27s remaining: 3m 6s
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811: learn: 0.0327500 total: 6m 28s remaining: 3m 5s
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813: learn: 0.0326711 total: 6m 29s remaining: 3m 4s
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819: learn: 0.0322872 total: 6m 32s remaining: 3m 1s
820: learn: 0.0322575 total: 6m 33s remaining: 3m 1s
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822: learn: 0.0321946 total: 6m 33s remaining: 3m
823: learn: 0.0321690 total: 6m 34s remaining: 2m 59s
824: learn: 0.0321408 total: 6m 34s remaining: 2m 59s
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826: learn: 0.0320521 total: 6m 35s remaining: 2m 58s
827: learn: 0.0320162 total: 6m 36s remaining: 2m 58s
828: learn: 0.0320011 total: 6m 36s remaining: 2m 57s
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833: learn: 0.0318028 total: 6m 39s remaining: 2m 55s
834: learn: 0.0317143 total: 6m 39s remaining: 2m 54s
835: learn: 0.0316612 total: 6m 40s remaining: 2m 54s
836: learn: 0.0316408 total: 6m 40s remaining: 2m 53s
837: learn: 0.0316242 total: 6m 41s remaining: 2m 53s
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839: learn: 0.0315389 total: 6m 42s remaining: 2m 52s
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842: learn: 0.0314736 total: 6m 43s remaining: 2m 50s
843: learn: 0.0314663 total: 6m 43s remaining: 2m 50s
844: learn: 0.0314378 total: 6m 44s remaining: 2m 49s
845: learn: 0.0313871 total: 6m 44s remaining: 2m 49s
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847: learn: 0.0313502 total: 6m 45s remaining: 2m 48s
848: learn: 0.0313300 total: 6m 46s remaining: 2m 47s
849: learn: 0.0312819 total: 6m 46s remaining: 2m 47s
850: learn: 0.0312378 total: 6m 47s remaining: 2m 47s
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852: learn: 0.0311607 total: 6m 48s remaining: 2m 46s
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854: learn: 0.0310846 total: 6m 48s remaining: 2m 45s
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862: learn: 0.0308017 total: 6m 52s remaining: 2m 41s
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864: learn: 0.0306567 total: 6m 53s remaining: 2m 40s
865: learn: 0.0306448 total: 6m 54s remaining: 2m 39s
866: learn: 0.0306241 total: 6m 54s remaining: 2m 39s
867: learn: 0.0306088 total: 6m 54s remaining: 2m 38s
868: learn: 0.0305620 total: 6m 55s remaining: 2m 38s
869: learn: 0.0305156 total: 6m 55s remaining: 2m 37s

870: learn: 0.0304551 total: 6m 56s remaining: 2m 37s
871: learn: 0.0304301 total: 6m 56s remaining: 2m 36s
872: learn: 0.0304017 total: 6m 57s remaining: 2m 36s
873: learn: 0.0303850 total: 6m 57s remaining: 2m 35s
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875: learn: 0.0303279 total: 6m 58s remaining: 2m 34s
876: learn: 0.0302877 total: 6m 59s remaining: 2m 34s
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878: learn: 0.0302336 total: 6m 59s remaining: 2m 33s
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880: learn: 0.0301882 total: 7m remaining: 2m 32s
881: learn: 0.0301632 total: 7m 1s remaining: 2m 31s
882: learn: 0.0301431 total: 7m 1s remaining: 2m 31s
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885: learn: 0.0299623 total: 7m 3s remaining: 2m 29s
886: learn: 0.0299077 total: 7m 3s remaining: 2m 29s
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889: learn: 0.0297785 total: 7m 5s remaining: 2m 28s
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891: learn: 0.0297115 total: 7m 6s remaining: 2m 27s
892: learn: 0.0296925 total: 7m 6s remaining: 2m 26s
893: learn: 0.0296729 total: 7m 7s remaining: 2m 26s
894: learn: 0.0296529 total: 7m 7s remaining: 2m 25s
895: learn: 0.0296318 total: 7m 8s remaining: 2m 25s
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897: learn: 0.0295543 total: 7m 9s remaining: 2m 24s
898: learn: 0.0295239 total: 7m 9s remaining: 2m 23s
899: learn: 0.0294790 total: 7m 9s remaining: 2m 23s
900: learn: 0.0294503 total: 7m 10s remaining: 2m 22s
901: learn: 0.0294232 total: 7m 10s remaining: 2m 22s
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903: learn: 0.0293595 total: 7m 11s remaining: 2m 21s
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905: learn: 0.0293060 total: 7m 12s remaining: 2m 20s
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907: learn: 0.0292132 total: 7m 13s remaining: 2m 19s
908: learn: 0.0291895 total: 7m 13s remaining: 2m 18s
909: learn: 0.0291772 total: 7m 14s remaining: 2m 18s
910: learn: 0.0291295 total: 7m 14s remaining: 2m 17s
911: learn: 0.0291195 total: 7m 15s remaining: 2m 17s
912: learn: 0.0290881 total: 7m 15s remaining: 2m 17s
913: learn: 0.0290545 total: 7m 16s remaining: 2m 16s
914: learn: 0.0290300 total: 7m 16s remaining: 2m 16s
915: learn: 0.0289959 total: 7m 17s remaining: 2m 15s
916: learn: 0.0289805 total: 7m 17s remaining: 2m 15s
917: learn: 0.0289362 total: 7m 18s remaining: 2m 14s
918: learn: 0.0289040 total: 7m 18s remaining: 2m 14s
919: learn: 0.0288639 total: 7m 19s remaining: 2m 13s
920: learn: 0.0288393 total: 7m 19s remaining: 2m 13s
921: learn: 0.0287951 total: 7m 20s remaining: 2m 12s
922: learn: 0.0287604 total: 7m 20s remaining: 2m 12s
923: learn: 0.0287336 total: 7m 21s remaining: 2m 11s
924: learn: 0.0287231 total: 7m 21s remaining: 2m 11s
925: learn: 0.0287084 total: 7m 22s remaining: 2m 10s
926: learn: 0.0286908 total: 7m 22s remaining: 2m 10s
927: learn: 0.0286551 total: 7m 23s remaining: 2m 9s
928: learn: 0.0285938 total: 7m 23s remaining: 2m 9s
929: learn: 0.0285684 total: 7m 24s remaining: 2m 8s
930: learn: 0.0285400 total: 7m 24s remaining: 2m 8s
931: learn: 0.0285207 total: 7m 24s remaining: 2m 7s
932: learn: 0.0284787 total: 7m 25s remaining: 2m 7s
933: learn: 0.0284197 total: 7m 25s remaining: 2m 6s
934: learn: 0.0283813 total: 7m 26s remaining: 2m 6s
935: learn: 0.0283466 total: 7m 26s remaining: 2m 6s
936: learn: 0.0283154 total: 7m 27s remaining: 2m 5s
937: learn: 0.0282587 total: 7m 27s remaining: 2m 5s
938: learn: 0.0281995 total: 7m 28s remaining: 2m 4s
939: learn: 0.0281665 total: 7m 28s remaining: 2m 4s
940: learn: 0.0281399 total: 7m 28s remaining: 2m 3s
941: learn: 0.0281081 total: 7m 29s remaining: 2m 3s

942: learn: 0.0280636 total: 7m 29s remaining: 2m 2s
943: learn: 0.0280229 total: 7m 30s remaining: 2m 2s
944: learn: 0.0280063 total: 7m 30s remaining: 2m 1s
945: learn: 0.0279584 total: 7m 31s remaining: 2m 1s
946: learn: 0.0279277 total: 7m 31s remaining: 2m
947: learn: 0.0278941 total: 7m 32s remaining: 2m
948: learn: 0.0278638 total: 7m 32s remaining: 1m 59s
949: learn: 0.0278199 total: 7m 32s remaining: 1m 59s
950: learn: 0.0277657 total: 7m 33s remaining: 1m 58s
951: learn: 0.0277113 total: 7m 33s remaining: 1m 58s
952: learn: 0.0276846 total: 7m 34s remaining: 1m 57s
953: learn: 0.0276724 total: 7m 34s remaining: 1m 57s
954: learn: 0.0276369 total: 7m 35s remaining: 1m 56s
955: learn: 0.0276195 total: 7m 35s remaining: 1m 56s
956: learn: 0.0275978 total: 7m 36s remaining: 1m 55s
957: learn: 0.0275822 total: 7m 36s remaining: 1m 55s
958: learn: 0.0275604 total: 7m 37s remaining: 1m 54s
959: learn: 0.0275464 total: 7m 37s remaining: 1m 54s
960: learn: 0.0275224 total: 7m 37s remaining: 1m 53s
961: learn: 0.0275017 total: 7m 38s remaining: 1m 53s
962: learn: 0.0274789 total: 7m 38s remaining: 1m 52s
963: learn: 0.0274487 total: 7m 39s remaining: 1m 52s
964: learn: 0.0274299 total: 7m 39s remaining: 1m 51s
965: learn: 0.0273680 total: 7m 40s remaining: 1m 51s
966: learn: 0.0273528 total: 7m 40s remaining: 1m 50s
967: learn: 0.0273124 total: 7m 41s remaining: 1m 50s
968: learn: 0.0272849 total: 7m 41s remaining: 1m 50s
969: learn: 0.0272394 total: 7m 41s remaining: 1m 49s
970: learn: 0.0272227 total: 7m 42s remaining: 1m 49s
971: learn: 0.0271852 total: 7m 42s remaining: 1m 48s
972: learn: 0.0271452 total: 7m 43s remaining: 1m 48s
973: learn: 0.0271115 total: 7m 43s remaining: 1m 47s
974: learn: 0.0271040 total: 7m 44s remaining: 1m 47s
975: learn: 0.0270887 total: 7m 44s remaining: 1m 46s
976: learn: 0.0270730 total: 7m 44s remaining: 1m 46s
977: learn: 0.0270415 total: 7m 45s remaining: 1m 45s
978: learn: 0.0270030 total: 7m 45s remaining: 1m 45s
979: learn: 0.0269657 total: 7m 46s remaining: 1m 44s
980: learn: 0.0269542 total: 7m 46s remaining: 1m 44s
981: learn: 0.0269269 total: 7m 47s remaining: 1m 43s
982: learn: 0.0269048 total: 7m 47s remaining: 1m 43s
983: learn: 0.0268761 total: 7m 47s remaining: 1m 42s
984: learn: 0.0268382 total: 7m 48s remaining: 1m 42s
985: learn: 0.0268273 total: 7m 48s remaining: 1m 41s
986: learn: 0.0267996 total: 7m 49s remaining: 1m 41s
987: learn: 0.0267707 total: 7m 49s remaining: 1m 40s
988: learn: 0.0267342 total: 7m 50s remaining: 1m 40s
989: learn: 0.0266915 total: 7m 50s remaining: 1m 39s
990: learn: 0.0266279 total: 7m 51s remaining: 1m 39s
991: learn: 0.0266099 total: 7m 51s remaining: 1m 38s
992: learn: 0.0265649 total: 7m 52s remaining: 1m 38s
993: learn: 0.0265119 total: 7m 52s remaining: 1m 37s
994: learn: 0.0264747 total: 7m 52s remaining: 1m 37s
995: learn: 0.0264254 total: 7m 53s remaining: 1m 36s
996: learn: 0.0264070 total: 7m 53s remaining: 1m 36s
997: learn: 0.0263881 total: 7m 54s remaining: 1m 36s
998: learn: 0.0263704 total: 7m 54s remaining: 1m 35s
999: learn: 0.0263421 total: 7m 55s remaining: 1m 35s
1000: learn: 0.0263173 total: 7m 55s remaining: 1m 34s
1001: learn: 0.0262852 total: 7m 55s remaining: 1m 34s
1002: learn: 0.0262618 total: 7m 56s remaining: 1m 33s
1003: learn: 0.0262449 total: 7m 57s remaining: 1m 33s
1004: learn: 0.0262275 total: 7m 57s remaining: 1m 32s
1005: learn: 0.0262041 total: 7m 57s remaining: 1m 32s
1006: learn: 0.0261816 total: 7m 58s remaining: 1m 31s
1007: learn: 0.0261593 total: 7m 58s remaining: 1m 31s
1008: learn: 0.0261241 total: 7m 59s remaining: 1m 30s
1009: learn: 0.0260924 total: 7m 59s remaining: 1m 30s
1010: learn: 0.0260681 total: 8m remaining: 1m 29s
1011: learn: 0.0260339 total: 8m remaining: 1m 29s
1012: learn: 0.0260210 total: 8m remaining: 1m 28s
1013: learn: 0.0260015 total: 8m 1s remaining: 1m 28s

1014: learn: 0.0259855 total: 8m 1s remaining: 1m 27s
1015: learn: 0.0259545 total: 8m 2s remaining: 1m 27s
1016: learn: 0.0259235 total: 8m 2s remaining: 1m 26s
1017: learn: 0.0259069 total: 8m 3s remaining: 1m 26s
1018: learn: 0.0258787 total: 8m 3s remaining: 1m 25s
1019: learn: 0.0258562 total: 8m 4s remaining: 1m 25s
1020: learn: 0.0258102 total: 8m 4s remaining: 1m 24s
1021: learn: 0.0257748 total: 8m 5s remaining: 1m 24s
1022: learn: 0.0257600 total: 8m 5s remaining: 1m 24s
1023: learn: 0.0257107 total: 8m 6s remaining: 1m 23s
1024: learn: 0.0256945 total: 8m 6s remaining: 1m 23s
1025: learn: 0.0256633 total: 8m 7s remaining: 1m 22s
1026: learn: 0.0256347 total: 8m 7s remaining: 1m 22s
1027: learn: 0.0255909 total: 8m 7s remaining: 1m 21s
1028: learn: 0.0255751 total: 8m 8s remaining: 1m 21s
1029: learn: 0.0255588 total: 8m 8s remaining: 1m 20s
1030: learn: 0.0255325 total: 8m 9s remaining: 1m 20s
1031: learn: 0.0255114 total: 8m 9s remaining: 1m 19s
1032: learn: 0.0254470 total: 8m 10s remaining: 1m 19s
1033: learn: 0.0254290 total: 8m 10s remaining: 1m 18s
1034: learn: 0.0254033 total: 8m 10s remaining: 1m 18s
1035: learn: 0.0253576 total: 8m 11s remaining: 1m 17s
1036: learn: 0.0253178 total: 8m 11s remaining: 1m 17s
1037: learn: 0.0253029 total: 8m 12s remaining: 1m 16s
1038: learn: 0.0252796 total: 8m 12s remaining: 1m 16s
1039: learn: 0.0252574 total: 8m 13s remaining: 1m 15s
1040: learn: 0.0252369 total: 8m 13s remaining: 1m 15s
1041: learn: 0.0251537 total: 8m 14s remaining: 1m 14s
1042: learn: 0.0251298 total: 8m 14s remaining: 1m 14s
1043: learn: 0.0251195 total: 8m 14s remaining: 1m 13s
1044: learn: 0.0250906 total: 8m 15s remaining: 1m 13s
1045: learn: 0.0250568 total: 8m 15s remaining: 1m 12s
1046: learn: 0.0249864 total: 8m 16s remaining: 1m 12s
1047: learn: 0.0249507 total: 8m 16s remaining: 1m 12s
1048: learn: 0.0249303 total: 8m 17s remaining: 1m 11s
1049: learn: 0.0248985 total: 8m 17s remaining: 1m 11s
1050: learn: 0.0248807 total: 8m 18s remaining: 1m 10s
1051: learn: 0.0248608 total: 8m 18s remaining: 1m 10s
1052: learn: 0.0248013 total: 8m 19s remaining: 1m 9s
1053: learn: 0.0247661 total: 8m 19s remaining: 1m 9s
1054: learn: 0.0247431 total: 8m 19s remaining: 1m 8s
1055: learn: 0.0247088 total: 8m 20s remaining: 1m 8s
1056: learn: 0.0246752 total: 8m 20s remaining: 1m 7s
1057: learn: 0.0246615 total: 8m 21s remaining: 1m 7s
1058: learn: 0.0246496 total: 8m 21s remaining: 1m 6s
1059: learn: 0.0246274 total: 8m 22s remaining: 1m 6s
1060: learn: 0.0246006 total: 8m 22s remaining: 1m 5s
1061: learn: 0.0245648 total: 8m 23s remaining: 1m 5s
1062: learn: 0.0245405 total: 8m 23s remaining: 1m 4s
1063: learn: 0.0245315 total: 8m 24s remaining: 1m 4s
1064: learn: 0.0245140 total: 8m 25s remaining: 1m 4s
1065: learn: 0.0244939 total: 8m 26s remaining: 1m 3s
1066: learn: 0.0244610 total: 8m 27s remaining: 1m 3s
1067: learn: 0.0244369 total: 8m 27s remaining: 1m 2s
1068: learn: 0.0244308 total: 8m 28s remaining: 1m 2s
1069: learn: 0.0244031 total: 8m 29s remaining: 1m 1s
1070: learn: 0.0243942 total: 8m 29s remaining: 1m 1s
1071: learn: 0.0243839 total: 8m 30s remaining: 1m
1072: learn: 0.0243726 total: 8m 30s remaining: 1m
1073: learn: 0.0243701 total: 8m 31s remaining: 60s
1074: learn: 0.0243619 total: 8m 31s remaining: 59.5s
1075: learn: 0.0243386 total: 8m 31s remaining: 59s
1076: learn: 0.0243173 total: 8m 32s remaining: 58.5s
1077: learn: 0.0243009 total: 8m 32s remaining: 58s
1078: learn: 0.0242732 total: 8m 33s remaining: 57.6s
1079: learn: 0.0242393 total: 8m 33s remaining: 57.1s
1080: learn: 0.0242268 total: 8m 34s remaining: 56.6s
1081: learn: 0.0242068 total: 8m 34s remaining: 56.1s
1082: learn: 0.0241865 total: 8m 35s remaining: 55.7s
1083: learn: 0.0241459 total: 8m 35s remaining: 55.2s
1084: learn: 0.0241065 total: 8m 36s remaining: 54.7s
1085: learn: 0.0240885 total: 8m 36s remaining: 54.2s

1086: learn: 0.0240612 total: 8m 37s remaining: 53.7s
1087: learn: 0.0240386 total: 8m 37s remaining: 53.3s
1088: learn: 0.0240155 total: 8m 37s remaining: 52.8s
1089: learn: 0.0240027 total: 8m 38s remaining: 52.3s
1090: learn: 0.0239815 total: 8m 38s remaining: 51.8s
1091: learn: 0.0239502 total: 8m 39s remaining: 51.4s
1092: learn: 0.0239170 total: 8m 39s remaining: 50.9s
1093: learn: 0.0238895 total: 8m 40s remaining: 50.4s
1094: learn: 0.0238562 total: 8m 40s remaining: 49.9s
1095: learn: 0.0237993 total: 8m 41s remaining: 49.5s
1096: learn: 0.0237858 total: 8m 41s remaining: 49s
1097: learn: 0.0237530 total: 8m 42s remaining: 48.5s
1098: learn: 0.0237085 total: 8m 42s remaining: 48s
1099: learn: 0.0236546 total: 8m 43s remaining: 47.6s
1100: learn: 0.0236268 total: 8m 43s remaining: 47.1s
1101: learn: 0.0235994 total: 8m 43s remaining: 46.6s
1102: learn: 0.0235830 total: 8m 44s remaining: 46.1s
1103: learn: 0.0235764 total: 8m 44s remaining: 45.6s
1104: learn: 0.0235492 total: 8m 45s remaining: 45.2s
1105: learn: 0.0235139 total: 8m 45s remaining: 44.7s
1106: learn: 0.0234885 total: 8m 46s remaining: 44.2s
1107: learn: 0.0234435 total: 8m 46s remaining: 43.7s
1108: learn: 0.0234075 total: 8m 46s remaining: 43.2s
1109: learn: 0.0233509 total: 8m 47s remaining: 42.8s
1110: learn: 0.0233240 total: 8m 47s remaining: 42.3s
1111: learn: 0.0232922 total: 8m 48s remaining: 41.8s
1112: learn: 0.0232617 total: 8m 48s remaining: 41.3s
1113: learn: 0.0232314 total: 8m 49s remaining: 40.9s
1114: learn: 0.0232102 total: 8m 49s remaining: 40.4s
1115: learn: 0.0231884 total: 8m 50s remaining: 39.9s
1116: learn: 0.0231537 total: 8m 50s remaining: 39.4s
1117: learn: 0.0231404 total: 8m 51s remaining: 39s
1118: learn: 0.0231170 total: 8m 51s remaining: 38.5s
1119: learn: 0.0230890 total: 8m 52s remaining: 38s
1120: learn: 0.0230714 total: 8m 52s remaining: 37.5s
1121: learn: 0.0230327 total: 8m 52s remaining: 37s
1122: learn: 0.0230132 total: 8m 53s remaining: 36.6s
1123: learn: 0.0229962 total: 8m 53s remaining: 36.1s
1124: learn: 0.0229723 total: 8m 54s remaining: 35.6s
1125: learn: 0.0229581 total: 8m 54s remaining: 35.1s
1126: learn: 0.0229221 total: 8m 55s remaining: 34.7s
1127: learn: 0.0229055 total: 8m 55s remaining: 34.2s
1128: learn: 0.0228949 total: 8m 56s remaining: 33.7s
1129: learn: 0.0228776 total: 8m 56s remaining: 33.2s
1130: learn: 0.0228437 total: 8m 57s remaining: 32.8s
1131: learn: 0.0228123 total: 8m 57s remaining: 32.3s
1132: learn: 0.0227762 total: 8m 57s remaining: 31.8s
1133: learn: 0.0227501 total: 8m 58s remaining: 31.3s
1134: learn: 0.0227066 total: 8m 58s remaining: 30.9s
1135: learn: 0.0226506 total: 8m 59s remaining: 30.4s
1136: learn: 0.0226147 total: 8m 59s remaining: 29.9s
1137: learn: 0.0225773 total: 9m remaining: 29.4s
1138: learn: 0.0225679 total: 9m remaining: 28.9s
1139: learn: 0.0225337 total: 9m 1s remaining: 28.5s
1140: learn: 0.0225024 total: 9m 1s remaining: 28s
1141: learn: 0.0224926 total: 9m 1s remaining: 27.5s
1142: learn: 0.0224627 total: 9m 2s remaining: 27s
1143: learn: 0.0224421 total: 9m 2s remaining: 26.6s
1144: learn: 0.0224099 total: 9m 3s remaining: 26.1s
1145: learn: 0.0224099 total: 9m 3s remaining: 25.6s
1146: learn: 0.0223954 total: 9m 3s remaining: 25.1s
1147: learn: 0.0223953 total: 9m 4s remaining: 24.7s
1148: learn: 0.0223875 total: 9m 4s remaining: 24.2s
1149: learn: 0.0223628 total: 9m 5s remaining: 23.7s
1150: learn: 0.0223441 total: 9m 5s remaining: 23.2s
1151: learn: 0.0223197 total: 9m 6s remaining: 22.8s
1152: learn: 0.0223101 total: 9m 6s remaining: 22.3s
1153: learn: 0.0222916 total: 9m 6s remaining: 21.8s
1154: learn: 0.0222756 total: 9m 7s remaining: 21.3s
1155: learn: 0.0222572 total: 9m 7s remaining: 20.9s
1156: learn: 0.0222337 total: 9m 8s remaining: 20.4s
1157: learn: 0.0222036 total: 9m 8s remaining: 19.9s

```
1158: learn: 0.0221940 total: 9m 9s remaining: 19.4s
1159: learn: 0.0221648 total: 9m 9s remaining: 19s
1160: learn: 0.0221326 total: 9m 10s remaining: 18.5s
1161: learn: 0.0221073 total: 9m 10s remaining: 18s
1162: learn: 0.0220959 total: 9m 10s remaining: 17.5s
1163: learn: 0.0220735 total: 9m 11s remaining: 17.1s
1164: learn: 0.0220634 total: 9m 11s remaining: 16.6s
1165: learn: 0.0220320 total: 9m 12s remaining: 16.1s
1166: learn: 0.0220135 total: 9m 12s remaining: 15.6s
1167: learn: 0.0220010 total: 9m 13s remaining: 15.2s
1168: learn: 0.0219820 total: 9m 13s remaining: 14.7s
1169: learn: 0.0219372 total: 9m 14s remaining: 14.2s
1170: learn: 0.0218987 total: 9m 14s remaining: 13.7s
1171: learn: 0.0218853 total: 9m 14s remaining: 13.3s
1172: learn: 0.0218590 total: 9m 15s remaining: 12.8s
1173: learn: 0.0218464 total: 9m 15s remaining: 12.3s
1174: learn: 0.0218190 total: 9m 16s remaining: 11.8s
1175: learn: 0.0217936 total: 9m 16s remaining: 11.4s
1176: learn: 0.0217670 total: 9m 17s remaining: 10.9s
1177: learn: 0.0217499 total: 9m 17s remaining: 10.4s
1178: learn: 0.0217323 total: 9m 18s remaining: 9.94s
1179: learn: 0.0217102 total: 9m 18s remaining: 9.47s
1180: learn: 0.0216381 total: 9m 19s remaining: 8.99s
1181: learn: 0.0215692 total: 9m 19s remaining: 8.52s
1182: learn: 0.0215303 total: 9m 19s remaining: 8.05s
1183: learn: 0.0214901 total: 9m 20s remaining: 7.57s
1184: learn: 0.0214504 total: 9m 20s remaining: 7.1s
1185: learn: 0.0214332 total: 9m 21s remaining: 6.63s
1186: learn: 0.0214013 total: 9m 21s remaining: 6.15s
1187: learn: 0.0213566 total: 9m 22s remaining: 5.68s
1188: learn: 0.0213307 total: 9m 23s remaining: 5.21s
1189: learn: 0.0213084 total: 9m 23s remaining: 4.74s
1190: learn: 0.0212670 total: 9m 23s remaining: 4.26s
1191: learn: 0.0212497 total: 9m 24s remaining: 3.79s
1192: learn: 0.0212312 total: 9m 24s remaining: 3.31s
1193: learn: 0.0212216 total: 9m 25s remaining: 2.84s
1194: learn: 0.0212216 total: 9m 25s remaining: 2.37s
1195: learn: 0.0212104 total: 9m 26s remaining: 1.89s
1196: learn: 0.0211959 total: 9m 26s remaining: 1.42s
1197: learn: 0.0211959 total: 9m 27s remaining: 947ms
1198: learn: 0.0211959 total: 9m 27s remaining: 473ms
1199: learn: 0.0211938 total: 9m 27s remaining: 0us
```

Out[1334]:

```
<catboost.core.CatBoostClassifier at 0x21425cd5250>
```

In []:

```
#df_test
```

In [119]:

```
#df_test=df_test.drop(['DepartureDelay_in_Mins'],axis=1)
```

In [1335]:

```
df_test.shape
```

Out[1335]:

```
(35602, 23)
```

In [1336]:

```
final_predictions = full_model.predict(df_test)
final_predictions
```

Out[1336]:

```
array([1, 1, 1, ..., 1, 1, 0], dtype=int64)
```

~ 512271

In [1337]:

```
submission=pd.DataFrame([test_file_ids,final_predictions]).T
```

In [1339]:

```
submission.rename(columns={"Unnamed 0": "Overall_Experience"},inplace=True)
```

In [1341]:

```
submission.to_csv('submission21.csv',index = False)
```

In []: