

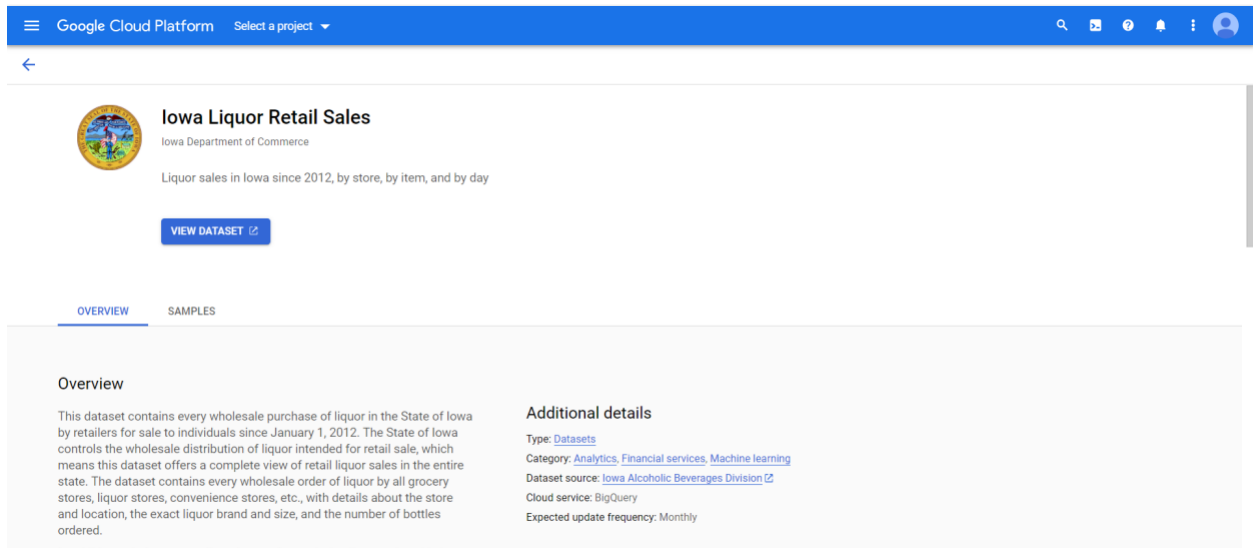
1) Build an AutoML Forecasting Model with Vertex AI

Reference: <https://codelabs.developers.google.com/codelabs/automl-forecasting-with-vertex-ai#0>

Objectives:

- Create a managed dataset
- Import data from a Google Cloud Storage Bucket
- Update the column metadata for appropriate use with AutoML
- Train a model using options such as a budget and optimization objective
- Make online batch predictions

Data review



The screenshot displays the Google Cloud Platform (GCP) interface for a dataset named "Iowa Liquor Retail Sales". The header bar is blue with the GCP logo, a search icon, and a user profile icon. Below the header, there's a navigation bar with a back arrow and a "VIEW DATASET" button. The main content area is divided into two tabs: "OVERVIEW" (selected) and "SAMPLES". The "OVERVIEW" tab shows a detailed description of the dataset, which contains every wholesale purchase of liquor in the State of Iowa by retailers for sale to individuals since January 1, 2012. It also includes a section for "Additional details" such as Type, Category, Dataset source, Cloud service, and Expected update frequency.

Iowa Liquor Retail Sales
Iowa Department of Commerce
Liquor sales in Iowa since 2012, by store, by item, and by day

[VIEW DATASET](#)

OVERVIEW | **SAMPLES**

Overview

This dataset contains every wholesale purchase of liquor in the State of Iowa by retailers for sale to individuals since January 1, 2012. The State of Iowa controls the wholesale distribution of liquor intended for retail sale, which means this dataset offers a complete view of retail liquor sales in the entire state. The dataset contains every wholesale order of liquor by all grocery stores, liquor stores, convenience stores, etc., with details about the store and location, the exact liquor brand and size, and the number of bottles ordered.

Additional details

Type: [Datasets](#)
Category: [Analytics](#), [Financial services](#), [Machine learning](#)
Dataset source: [Iowa Alcoholic Beverages Division](#)
Cloud service: BigQuery
Expected update frequency: Monthly

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FEATURES & INFO SHORTCUT DISABLE EDITOR TABS

Explorer + ADD DATA

Q Type to search

Viewing pinned projects.

- ldc_v2
- ldc_v3
- ldc_v4
- ldc_v5
- immune_epitope_db
- lowa_liquor_sales
 - sales
 - sales-2021-11-13T14_50_...
- lowa_liquor_sales_forecasting
- irs_990
- labeled_patents
- libraries_10
- london_bicycles
- london_crime
- london_fire_brigade
- medicare

sales

SCHEMA DETAILS PREVIEW

Table schema

Filter Enter property name or value

Field name	Type	Mode	Policy Tags	Description
invoice_and_item_number	STRING	NULLABLE		Concatenated invoice and line number associated with the liquor order. This provides a unique identifier for the individual liquor products included in the store order.
date	DATE	NULLABLE		Date of order
store_number	STRING	NULLABLE		Unique number assigned to the store who ordered the liquor.
store_name	STRING	NULLABLE		Name of store who ordered the liquor.
address	STRING	NULLABLE		Address of store who ordered the liquor.
city	STRING	NULLABLE		City where the store who ordered the liquor is located
zip_code	STRING	NULLABLE		Zip code where the store who ordered the liquor is located
store_location	STRING	NULLABLE		Location of store who ordered the liquor. The Address, City, State and Zip Code are geocoded to provide geographic coordinates. Accuracy of geocoding is dependent on how well the address is interpreted and the completeness of the reference data used.
county_number	STRING	NULLABLE		Iowa county number for the county where store who ordered the liquor is located
county	STRING	NULLABLE		County where the store who ordered the liquor is located

PERSONAL HISTORY PROJECT HISTORY SAVED QUERIES

Data import

Navigate to Vertex AI Datasets

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Vertex AI

Datasets + CREATE REFRESH

Managed datasets contain data used to train a machine learning model. [Learn more](#)

Region us-central1 (Iowa)

Filter Enter a property name

Name	ID	Status	Region	Type	Items	Last updated	Labels
No results to display							

You haven't created any datasets in this project yet

CREATE DATASET

Dataset creation

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Vertex AI

Dashboard

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Workbench

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Batch predictions

Metadata

Marketplace

Create dataset

dataset name

iowa_daily

Can use up to 128 characters.

Select a data type and objective

First select the type of data your dataset will contain. Then select an objective, which is the outcome that you want to achieve with the trained model. [Learn more about model types](#)

IMAGE

TABULAR

TEXT

VIDEO

Regression/classification

Predict a target column's value. Supports tables with hundreds of columns and millions of rows.

Forecasting PREVIEW

Predict the likelihood of certain events or demand.

Region

us-central1 (Iowa)

CREATE

CANCEL

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iowa_daily

CREATE LABELING TASK

SOURCE

ANALYZE

Before you begin, read the [data guide](#) to learn how to prepare your data. Then choose a data source.

Select a data source

• CSV file: Can be uploaded from your computer or on Cloud Storage. [Learn more](#)

• BigQuery: Select a table or view from BigQuery. [Learn more](#)

Upload CSV files from your computer

Select CSV files from Cloud Storage

Select a table or view from BigQuery

Select CSV files from Cloud Storage

Enter the Cloud Storage path to one or more CSV files. Data from multiple files will be referenced as one dataset.

Import file path *

gs://automl-demo-240614-km/iowa_liquor/iowa_daily.csv

BROWSE

ADD ANOTHER FILE

What happens next?

The selected CSV file will be associated with your dataset. Making changes to the referenced CSV file will affect the dataset.

CONTINUE

Train Model

Step 1: Configure Model Features

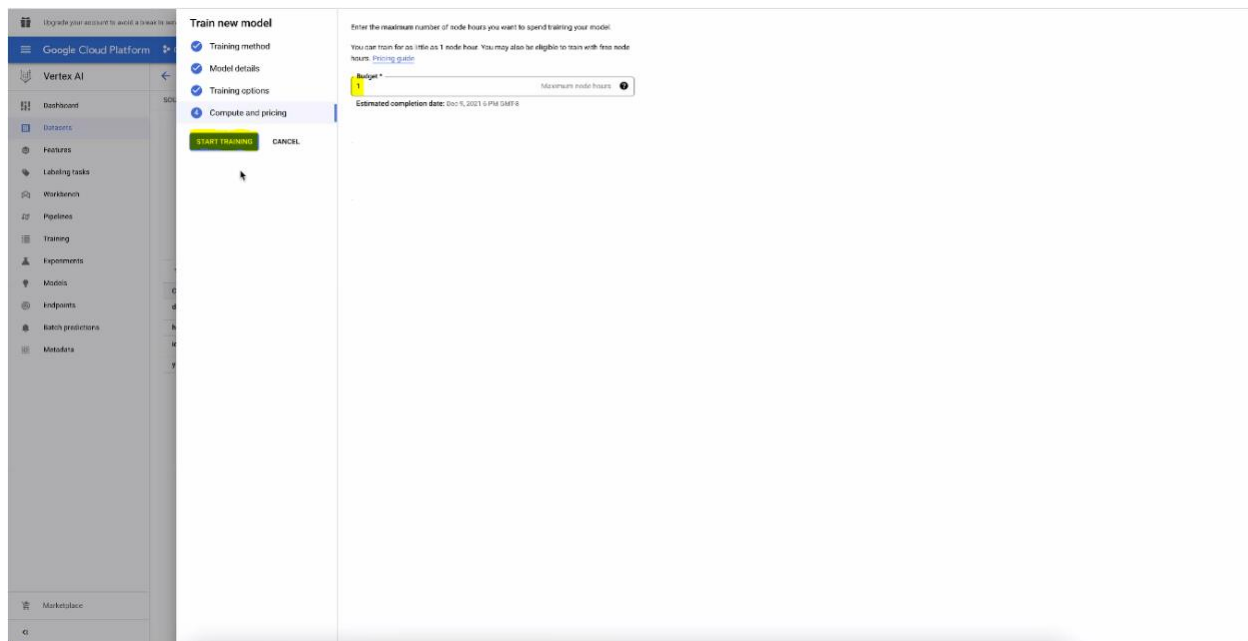
The screenshot shows the Google Cloud Platform interface for the Vertex AI dataset named 'iowa_daily'. The left sidebar contains navigation links for Dashboard, Datasets, Features, Labeling tasks, Workbench, Pipelines, Training, Experiments, Models, Endpoints, Batch predictions, and Metadata. The main panel is divided into 'SOURCE' and 'ANALYZE' tabs, with 'ANALYZE' currently selected. Under 'ANALYZE', there is a 'Dataset Info' section showing creation date (Dec 09, 2021 3:08 PM), format (CSV), and location. A 'Summary' section indicates 4 total columns and 0 total rows. On the right, there are dropdowns for 'Series identifier column' (set to 'id') and 'Timestamp column' (set to 'ds'). A 'GENERATING STATISTICS' button is visible. Below this is a 'Filter' section with a table showing column statistics:

Column name	Missing % (count)	Distinct values
ds (Timestamp column)	-	-
holiday	-	-
id (Series identifier)	-	-
y	-	-

On the far right, the 'Training jobs and models' section provides instructions on using the dataset for training and includes a 'TRAIN NEW MODEL' button.

The screenshot shows the 'Train new model' configuration page in the Vertex AI console. The left sidebar is the same as the previous screenshot. The main panel has a 'Train new model' header and a sidebar with options: Training method, Model details (selected), Training options, and Compute and pricing. The 'Model details' sidebar includes 'START TRAINING' and 'CANCEL' buttons. The main configuration area includes:

- Model name:** iowa_daily_2021121902247
- Target column:** y
- Series identifier column:** id
- Timestamp column:** ds
- Forecasting configuration:**
 - Data granularity:** Daily
 - Forecast horizon:** 7
 - Context window:** 7
- Export test dataset to BigQuery:** A checkbox that is checked, with a text box for the BigQuery path and a 'BROWSE' button.
- Data validation options:** Radio buttons for 'Cancel training' (selected), 'Ignore validation', and 'Ignore validation'.
- Data split:** A radio button for 'Chronological' (selected).



Results

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Vertex AI

← iowa_daily_20211121002247 VIEW DATASET

EVALUATE BATCH PREDICTIONS MODEL PROPERTIES

Target column	MAE	MAPE	RMSE	RMSLE	r ²
y numeric	235.397.72	90	372.578.06	-	0.735

Dashboard

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FEATURES & INFOSHORTCUTDISABLE EDITOR TABS

Explorer

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cmpe260-334300

dataset_5716044293458624512_tables_2021_12...

export_evaluated_data_items_iowa_daily_202112...

evaluated_data_items

bigquery-public-data

EDITOR

evaluated_data_items

COMPOSE NEW QUERY

QUERYSHARECOPYSNAPSHOTDELETEDEXPORT

SCHEMADETAILSPREVIEW

Table schema

Filter Enter property name or value

Field name	Type	Mode	Policy Tags	Description
ds	STRING	NULLABLE		
holiday	STRING	NULLABLE		
id	STRING	NULLABLE		
predicted_on_ds	STRING	NULLABLE		
y	STRING	NULLABLE		
predicted_y	RECORD	NULLABLE		

EDIT SCHEMAVIEW ROW ACCESS POLICIES

PERSONAL HISTORY

PROJECT HISTORY

SAVED QUERIES

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Explorer

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Type to search

Viewing pinned projects.

cmpe260-334300

dataset_5716044293458624512_tables_2021_12...

export_evaluated_data_items_iowa_daily_202112...

evaluated_data_items

bigquery-public-data

EDITOR

evaluated_data_items

COMPOSE NEW QUERY

QUERYSHARECOPYSNAPSHOTDELETEDEXPORT

SCHEMADETAILSPREVIEW

Preview

Row	ds	holiday	id	predicted_on_ds	y	predicted_y.value
1	1/4/20	0	0	1/1/20	0	26.002988815307617
2	1/4/20	0	0	12/30/19	0	9.3418703079223633
3	1/4/20	0	0	1/2/20	0	3.0197560787200928
4	1/4/20	0	0	1/3/20	0	0.13746261596679688
5	1/4/20	0	0	1/4/20	0	18.519977569580078
6	1/4/20	0	0	12/31/19	0	5.1635699272155762
7	1/4/20	0	0	12/29/19	0	12.094734191894531
8	1/5/20	0	0	1/1/20	0	14.930747032165527
9	1/5/20	0	0	1/5/20	0	151.37579345703125
10	1/5/20	0	0	12/30/19	0	12.4290132522583
11	1/5/20	0	0	1/2/20	0	14.205635070800781
12	1/5/20	0	0	1/3/20	0	17.112651824951172
13	1/5/20	0	0	1/4/20	0	14.523508071899414

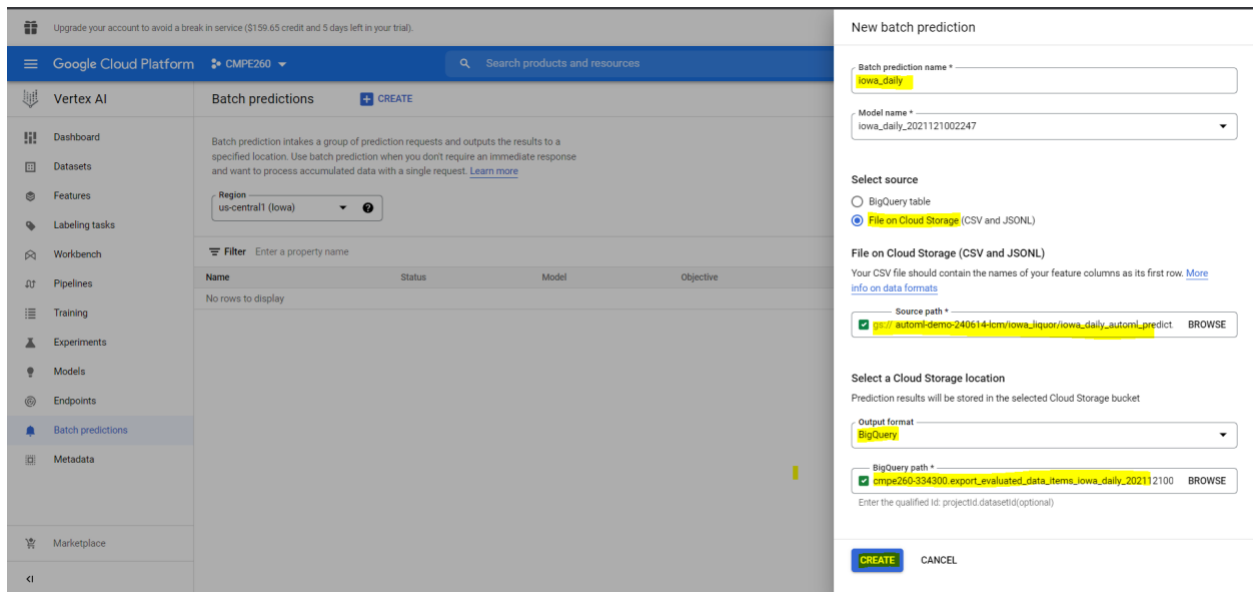
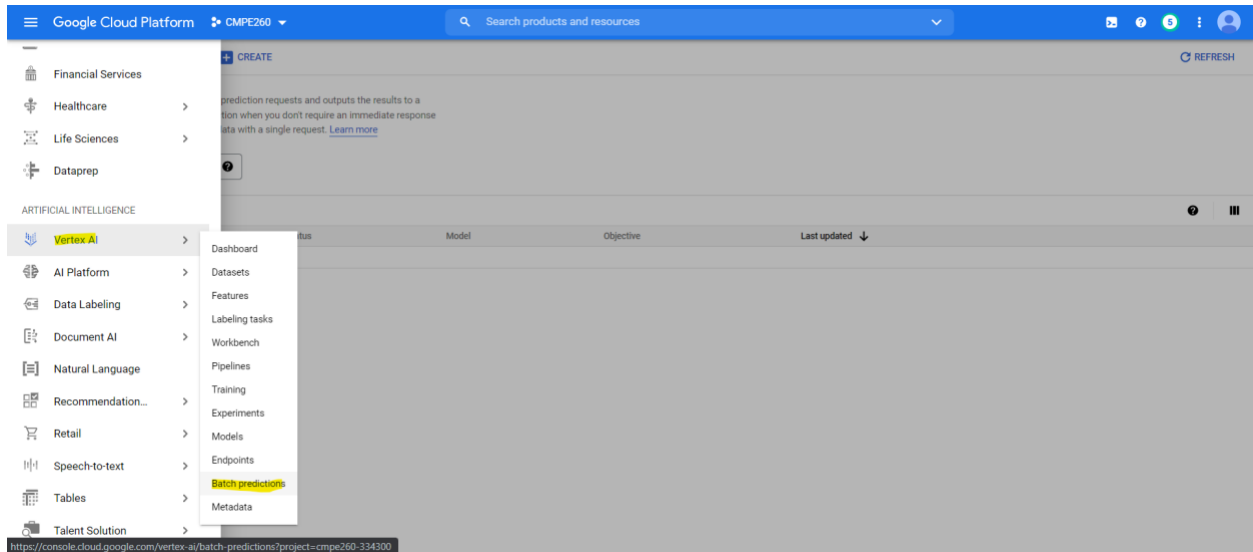
Rows per page: 1001 - 100 of 2128First page14<>>Last page

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Batch Predictions



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REFRESH

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Batch prediction intakes a group of prediction requests and outputs the results to a specified location. Use batch prediction when you don't require an immediate response and want to process accumulated data with a single request. [Learn more](#)

Region

us-central1 (Iowa)

Filter

Enter a property name

Name	Status	Model	Objective	Last updated
iowa_daily	Running	iowa_daily_2021121002247	Tabular	December 9, 2021

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← iowa_daily

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Marketplace

ID

5769903870545231872

Model

[iowa_daily_2021121002247](#)

Objective

Tabular

Import location

[gs://automl-demo-240614-1cm/iowa_liquor/iowa_daily_automl_predict.csv](#)

Created

Dec 09, 2021 at 05:47PM

Updated

Dec 09, 2021 at 05:52PM

Elapsed time

5 min 13 sec

Status

Finished

Export location

[bq://cmpe260-334300.export_evaluated_data_items_iowa_daily_2021121002247_2021_12_09T16_29_57_96Z](#)

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FEATURES & INFO

SHORTCUT

DISABLE EDITOR TABS

Explorer

+ ADD DATA

Type to search

Viewing pinned projects.

cmpe260-334300

dataset_57160442934586...

export_evaluated_data_ite...

errors_2021_12_09T17...

evaluated_data_items

predictions_2021_12_0...

bigquery-public-data

EDITOR

EXPORT...

PREDICT...

COMPOSE NEW QUERY

predictions_2021_12_09T17_47_33_624Z

QUERY

SHARE

COPY

SNAPSHOT

DELETE

EXPORT

SCHEMA

DETAILS

PREVIEW

Row	ds	holiday	id	y	predicted_y value
1	2020-05-23 00:00:00 UTC	0	0	null	4.7916741371154785
2	2020-05-24 00:00:00 UTC	0	0	null	9.0024642944335938
3	2020-05-26 00:00:00 UTC	0	0	null	1544561.75
4	2020-05-27 00:00:00 UTC	0	0	null	1652441.875
5	2020-05-28 00:00:00 UTC	0	0	null	1459899.25
6	2020-05-29 00:00:00 UTC	0	0	null	1481845.625
7	2020-05-25 00:00:00 UTC	1	0	null	142.09532165527344

PERSONAL HISTORY

PROJECT HISTORY

SAVED QUERIES