

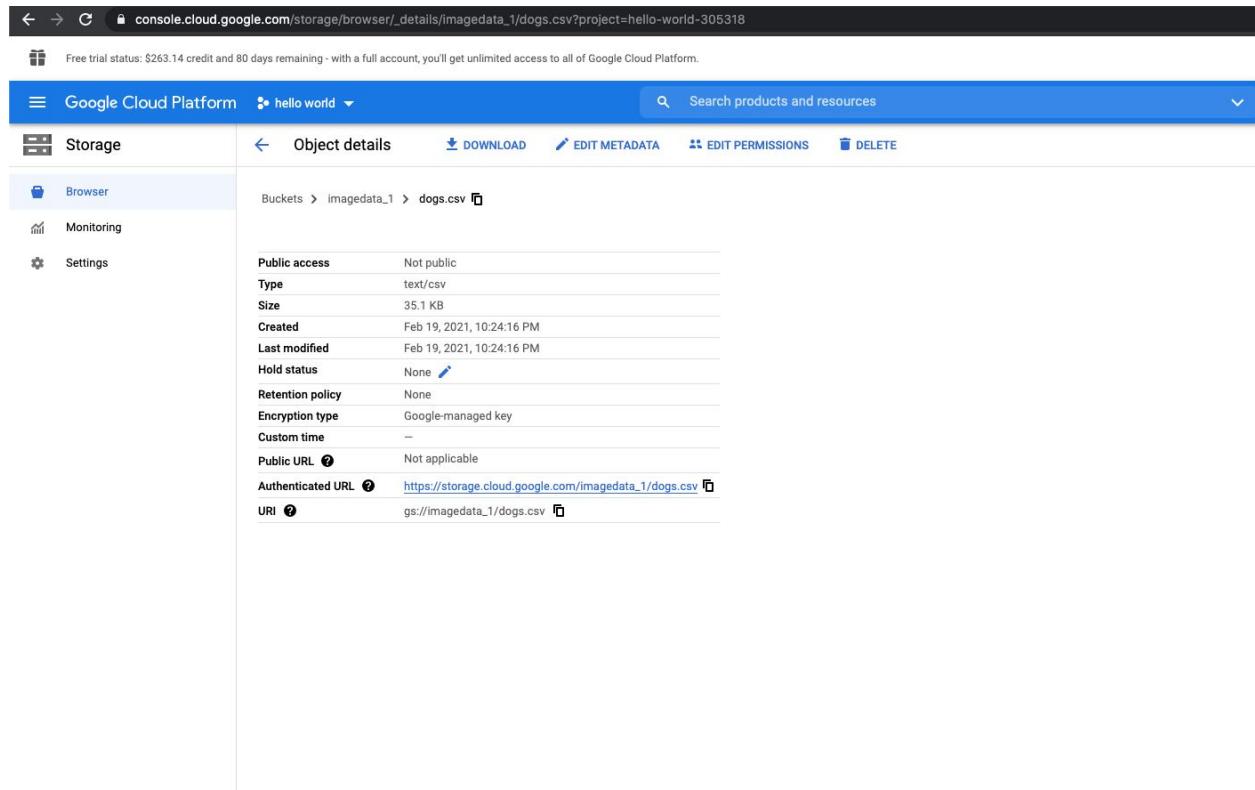
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CMPE-258

Hello AI Platform (Unified)

- Hello image data

Use an image dataset to train an AutoML model.

In this section, I tried to classify dogs based on different breeds. The dataset i chose includes images of different breeds of dog and objective was to classify the dog based on breed.



The screenshot shows the Google Cloud Platform Storage browser interface. The left sidebar is titled 'Storage' and has three options: 'Browser' (selected), 'Monitoring', and 'Settings'. The main area shows 'Object details' for a file named 'dogs.csv' located in the 'imagedata_1' bucket under 'Buckets > imagedata_1 >'. The object details table includes the following information:

Public access	Not public
Type	text/csv
Size	35.1 KB
Created	Feb 19, 2021, 10:24:16 PM
Last modified	Feb 19, 2021, 10:24:16 PM
Hold status	None
Retention policy	None
Encryption type	Google-managed key
Custom time	—
Public URL	Not applicable
Authenticated URL	https://storage.cloud.google.com/imagedata_1/dogs.csv
URI	gs://imagedata_1/dogs.csv

Fig1: creating project “hello world” and bucket “imagedata_1” that includes dogs.csv

Free trial status: \$251.14 credit and 80 days remaining - with a full account, you'll get unlimited access to all of Google Cloud Platform.

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Google Cloud Platform > hello world > Bucket details

imagedata_1

Storage Browser Monitoring Settings

OBJECTS CONFIGURATION PERMISSIONS RETENTION LIFECYCLE

Buckets: > imagedata_1

UPLOAD FILES UPLOAD FOLDER CREATE FOLDER MANAGE HOLDS DOWNLOAD DELETE

Filter by name prefix only Filter objects and folders

Name

- dogs.csv
- labeled_dogs.csv
- n02088364-beagle/
- n02099601-golden_retriever/
- n02107142-doberman/
- n02112018-Pomeranian/

Release Notes

Figure 2: Uploaded dogs.csv and label_dogs.csv

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Google Cloud Platform > hello world > dogimage_dataset

AI Platform (Unified)

Dashboard Datasets Labeling tasks Notebooks Training Models Endpoints Batch predictions

IMPORT BROWSE ANALYZE

Add images to your dataset

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

Select an import method

- Upload images: Recommended if you don't have labels yet
- Import files: Recommended if you already have labels. An import file is a list of Cloud Storage URIs to your images and optional data, like labels. [Learn how to create an import file](#)
- Upload images from your computer
- Upload import files from your computer
- Select import files from Cloud Storage

Select import files from Cloud Storage

Images referenced in the import files will be preprocessed and stored in a new Cloud Storage bucket ([charges apply](#))

Import file path * gs://imagedata_1/labeled_dogs.csv BROWSE Data split Automatic

ADD ANOTHER FILE

What happens next?

You'll be emailed after the images are imported and your dataset is ready

CONTINUE

Figure 3: adding images to your dataset

Name	ID	Data	Endpoints	Region	Type	Created	Notifications	Metadata
dogimage_dataset_20212207336	4313621610276847616	dogimage_dataset_icn	0	us-central1	Image classification	Feb 19, 2021, 11:34:01 PM		
Image_data_model	3277793695981533536	untitled_1613765726552_icn	0	us-central1	Image classification	Feb 19, 2021, 12:34:14 PM		

Figure 4: Bucket holding image dataset and now ready to train the model

Label	Count
All	639
Labeled	639
Unlabeled	0

Figure 5: Importing dataset

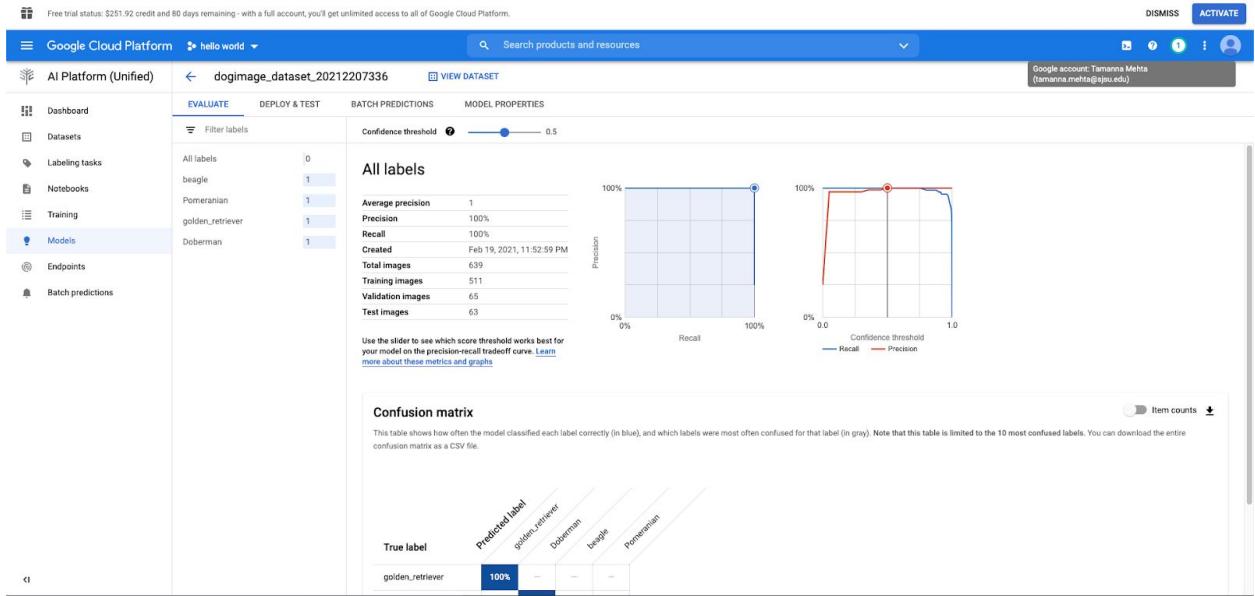


Figure 6: Evaluation metrics after training the model

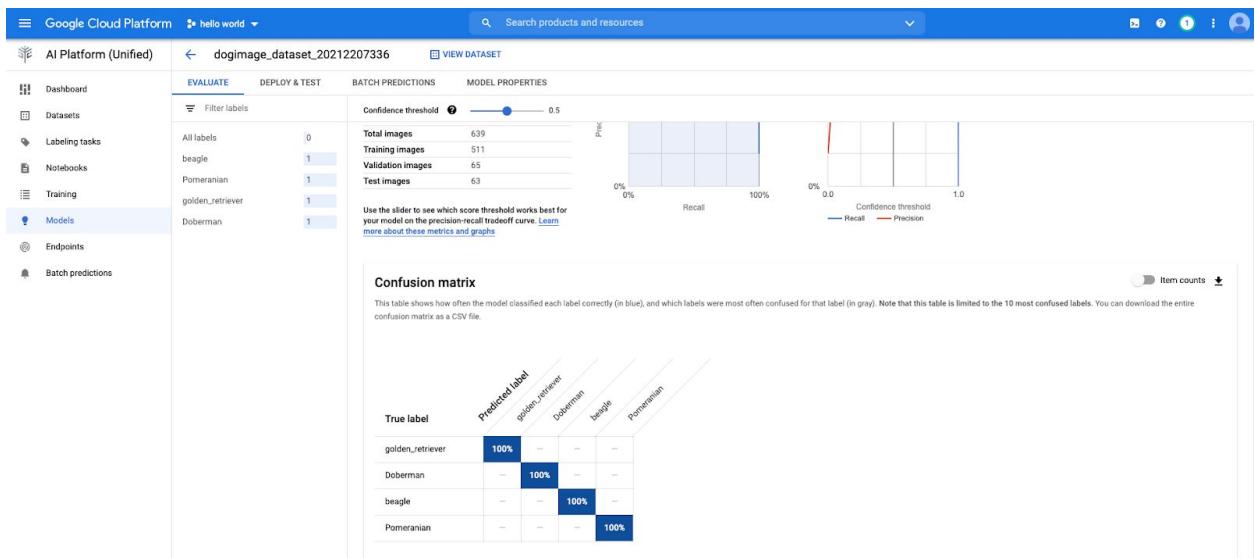


Figure 7: Confusion matrix for image classification model

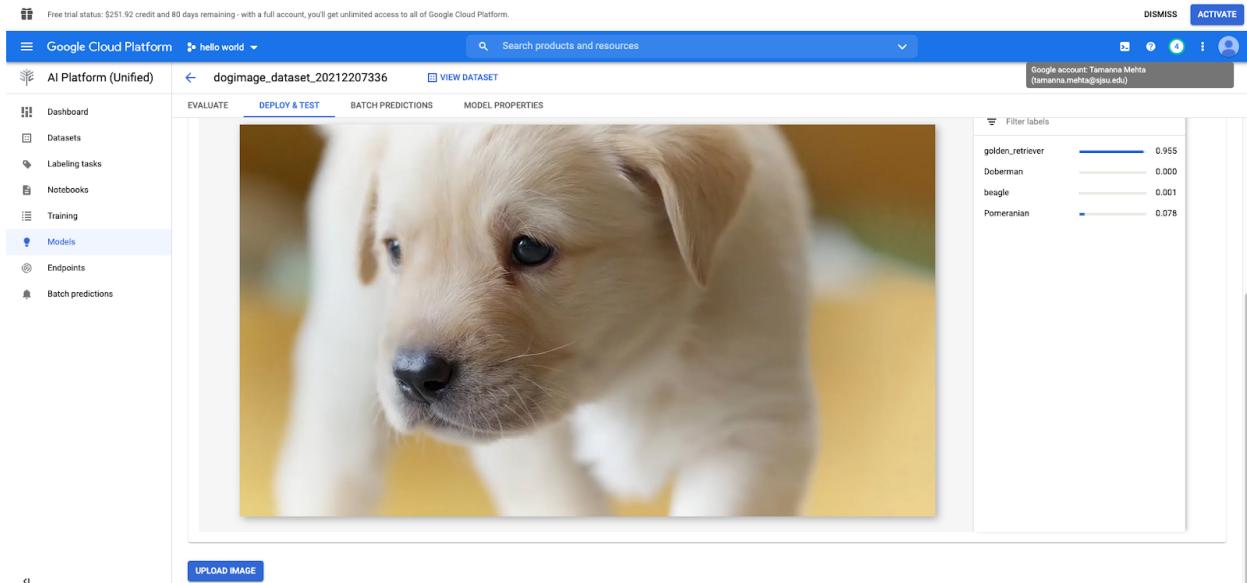


Figure 8: testing the model by passing random picture for the dog which it classified as “Golden Retriever on upper right with 95.5 percent accuracy

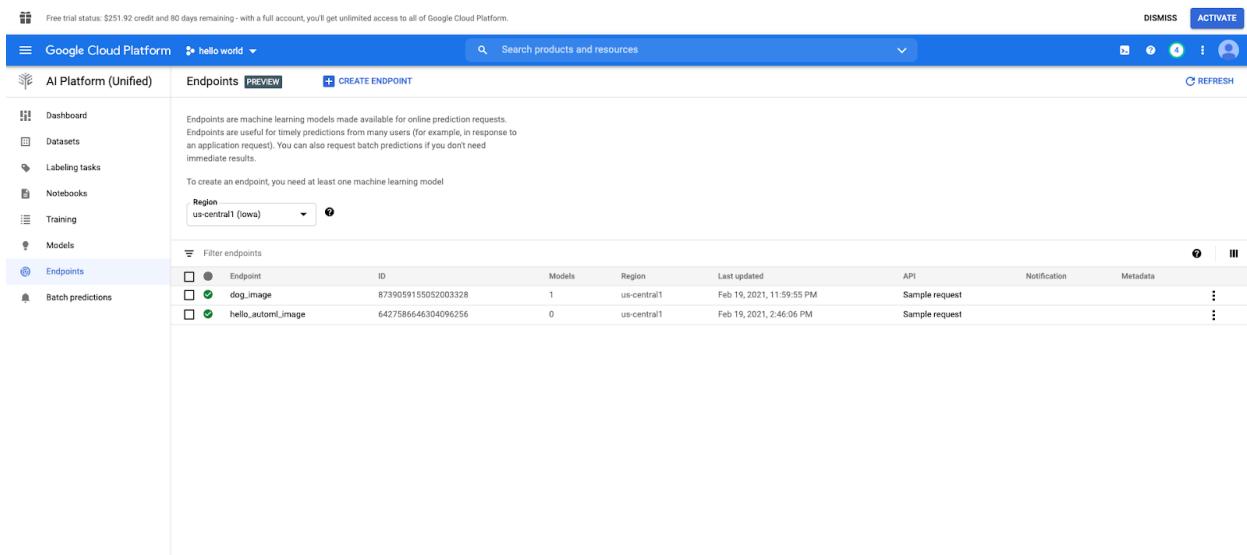


Figure 9: Creating endpoints

Hello video data

Use a video dataset to train an AutoML model.

In this section, I tried to label object in video.

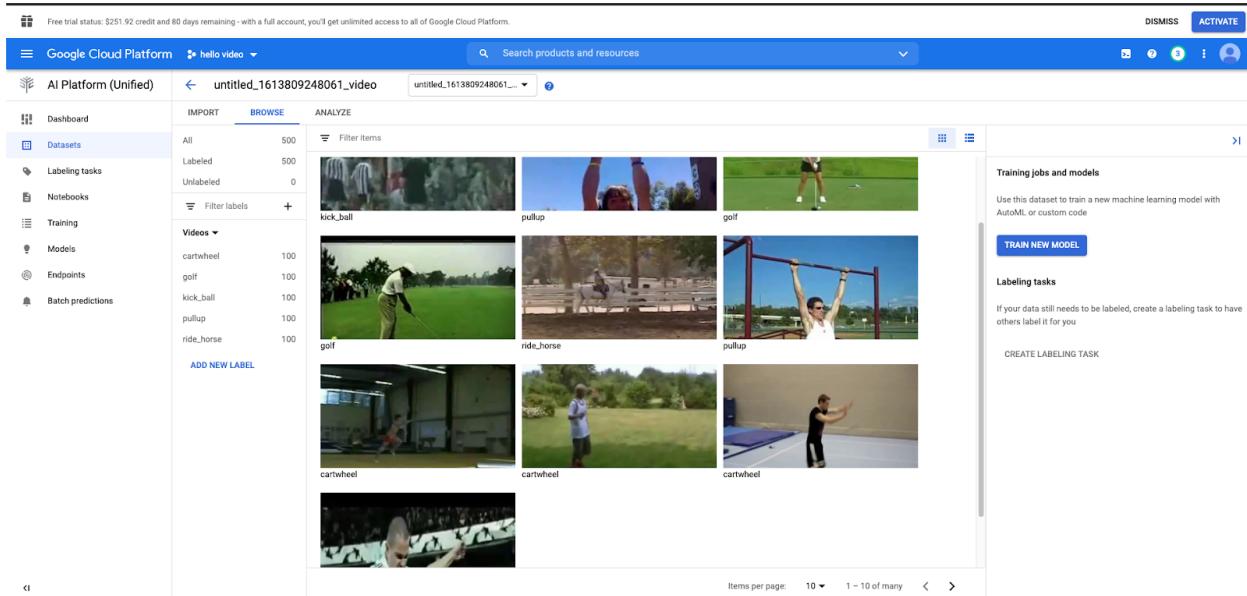


Figure 10: Video dataset imported with labels depicting type of game

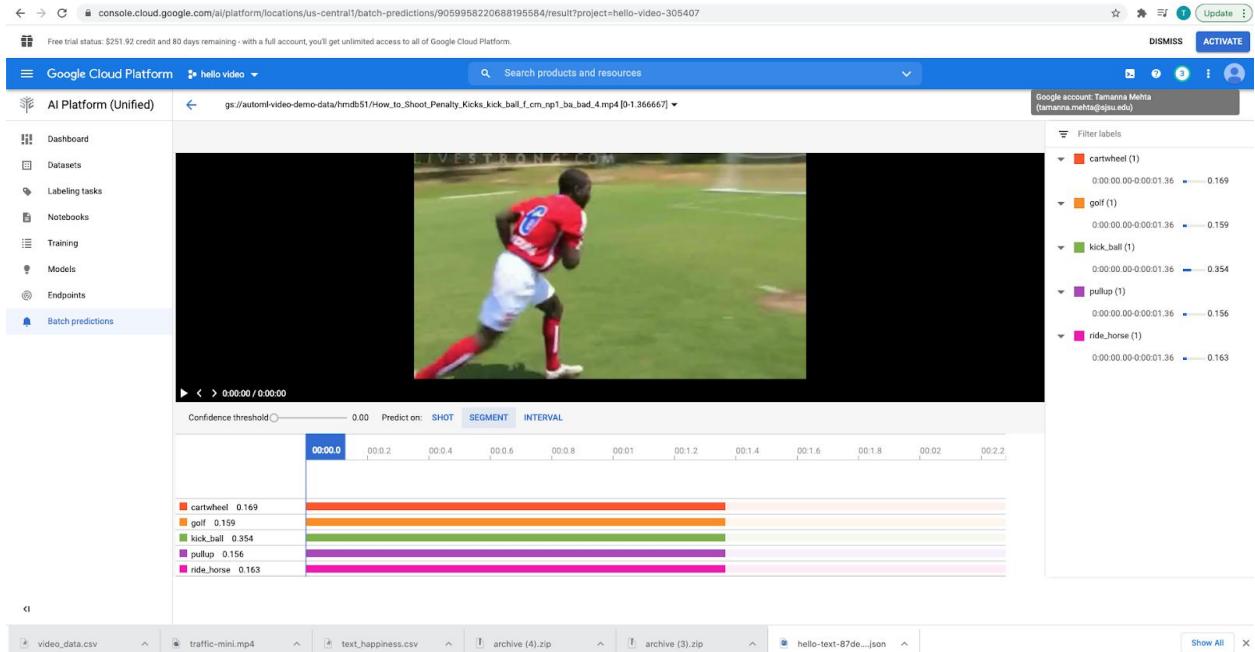


Figure 10: With trained model , we tried testing with random video sample and it detected the type of game (batch prediction)

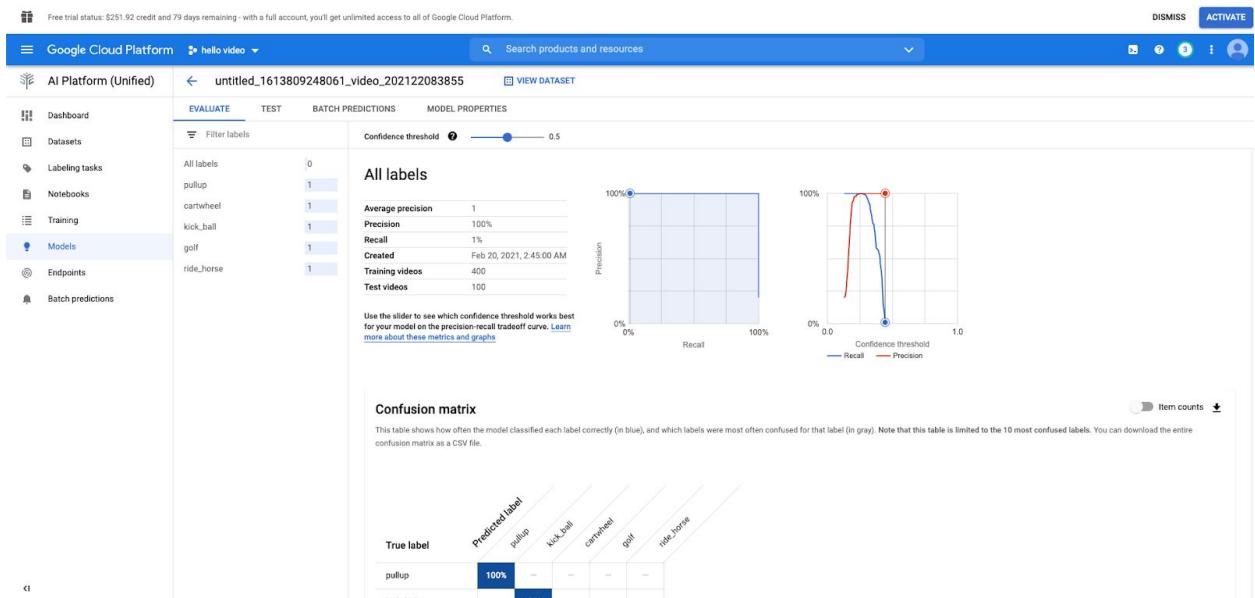


Figure 11: Evaluation metrics after training the model-accuracy,precision,recall

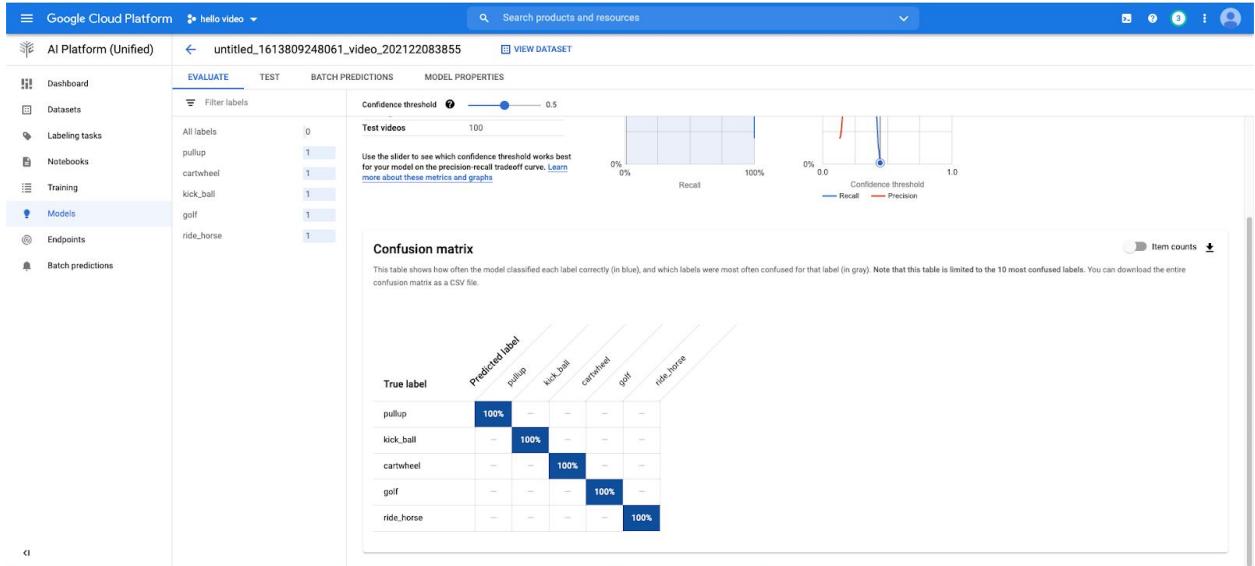


Figure 11: Evaluation metrics after training the model-Confusion Mterics

Hello custom training

Learn how to bring your own code to AI Platform, by using a sample app to train an image recognition model

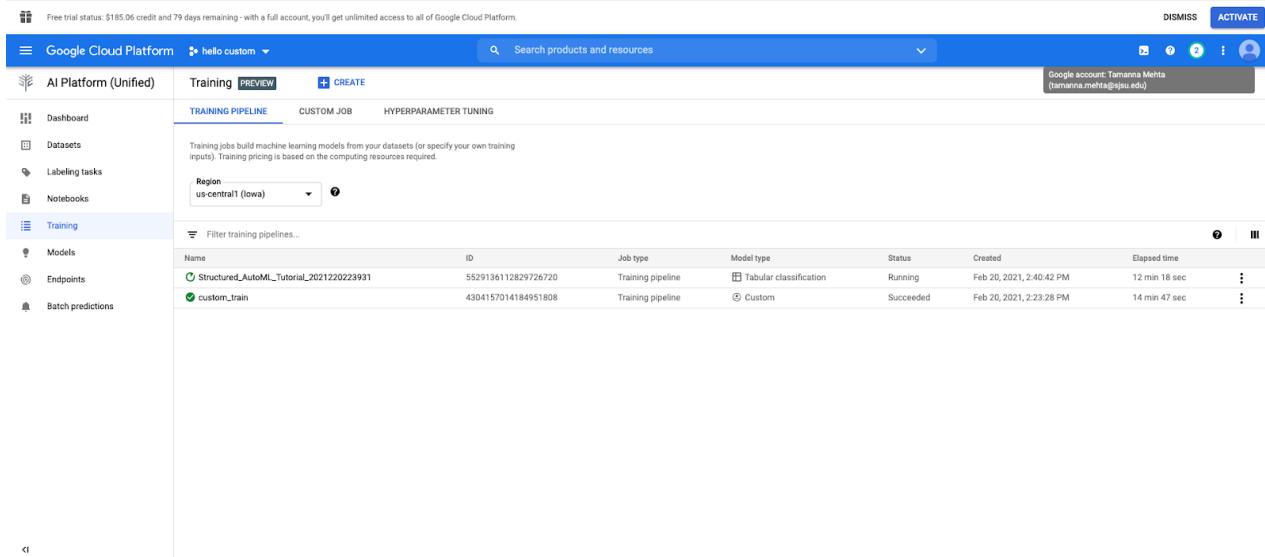


figure 12: custom train the image classification model

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Google Cloud Platform hello custom

AI Platform (Unified)

Models PREVIEW + CREATE IMPORT

Google account: Tamanna Mehta (tamanna.mehta@sjtu.edu)

Dashboard Datasets Labeling tasks Notebooks Training Models Endpoints Batch predictions

Region: us-central1 (owa)

Filter models...

Name	ID	Data	Endpoints	Region	Type	Created	Notifications	Metadata
custom_train	3894223894977970176	-	0	us-central1	Custom trained	Feb 20, 2021, 2:23:28 PM		

Figure 13: Trained the model

Hello custom training

Click on any of the following images to request a prediction from your image classification model.

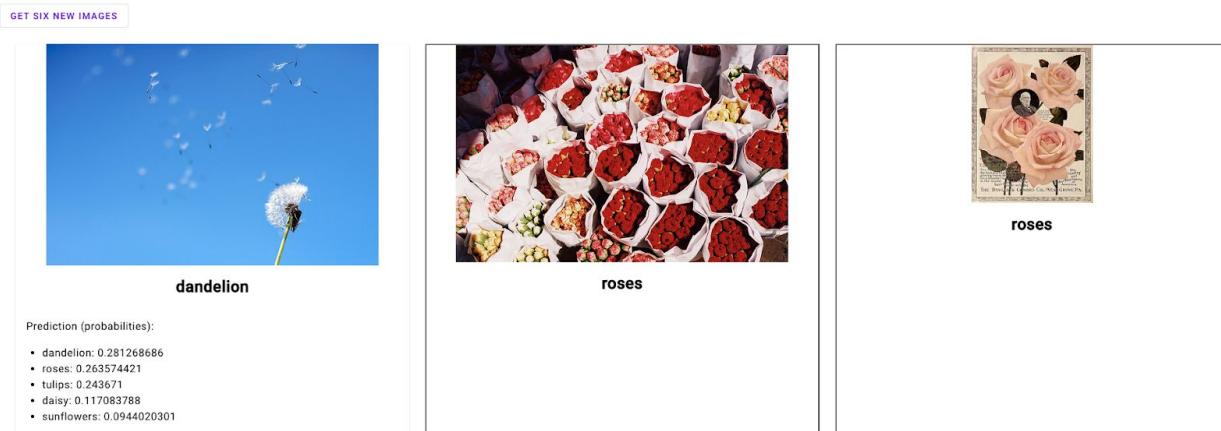


Figure 13: testing the Custom Trained model and predicting the type of flowers using custom training image classification

Hello structured data

Use a structured dataset to train an AutoML model.

In this section, I tried predicting whether person is likely to suffer from heart disease or not based on heart_Disease dataset provided.

The screenshot shows the Google Cloud Platform AI Platform (Unified) interface. On the left, there's a sidebar with options like Dashboard, Datasets, Labeling tasks, Notebooks, Training, Models, Endpoints, and Batch predictions. The main area is titled 'heart_disease' and has tabs for 'SOURCE' and 'ANALYZE'. Under 'ANALYZE', there's a 'Dataset Info' section with details: Created: Feb 20, 2021 2:47 PM, Dataset format: CSV, Dataset location: gs://heart_disease/heart.csv. Below this is a table titled 'Filter table' with columns: Field Name, Missing % (count), and Distinct values. The 'chol' row is highlighted with a blue border. To the right, there's a 'Summary' section with a bar chart showing the number of instances for 'ca' values 1, 2, and 3, and a pie chart showing the distribution of 'ca' values. A 'TRAIN NEW MODEL' button is also visible.

Figure 14: Choosing the target variable from tabular dataset

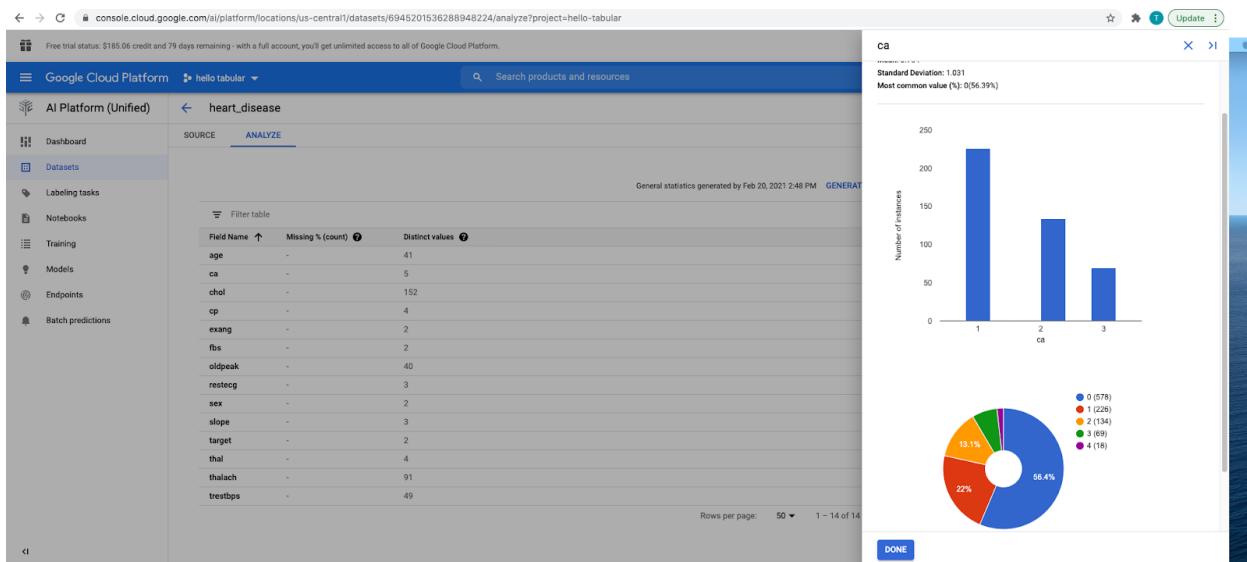


Figure 15: Showing statistics (visual representation) of selected dataset feature “ca”

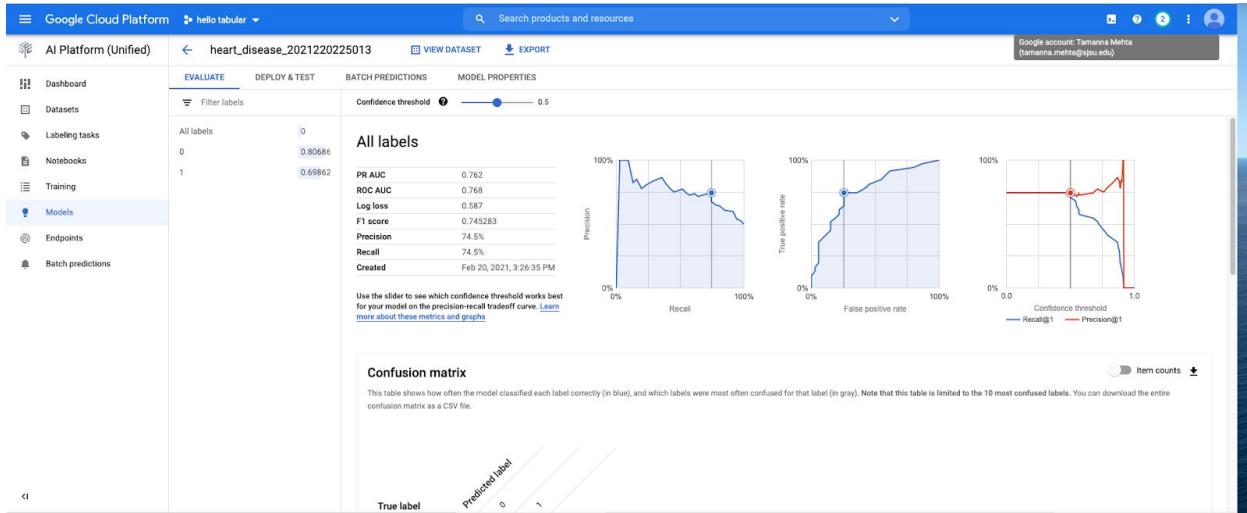


Figure 17: Evaluation metrics for heart_disease dataset

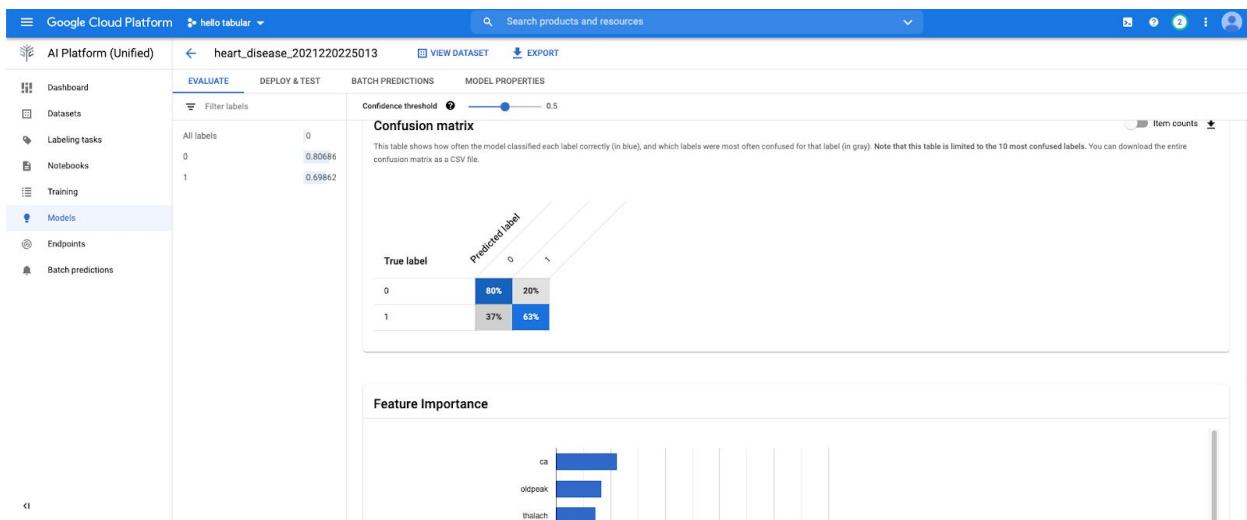


Figure 18: “confusion matrix” for heart_disease dataset

Figure 19: Predicting whether a person would have heart disease or not. It gave a confidence score of 77 percent

Hello text data

Use a text dataset to train an AutoML model.

tried predicting whether the given text is a spam or not

Part b)- end2end deployment of a vision model using automl to mobile device

The screenshot shows the Google Cloud Platform Vision interface. The top navigation bar includes the Google Cloud Platform logo, 'My First Project' dropdown, and a search bar. The left sidebar has 'Vision' selected, with options for 'Dashboard', 'Datasets' (which is highlighted), and 'Models'. The main content area is titled 'flowers_dataset' and shows tabs for 'IMPORT', 'IMAGES', 'TRAIN' (which is selected), 'EVALUATE', and 'TEST & USE'. Below this, a 'Models' section displays a card for 'flowers_dataset_20210223111518'. The card highlights an 'Average precision' of 0.999. It also shows 'Precision*' at 98% and 'Recall*' at 98%. A note states: '* Using a score threshold of 0.5'. Below the card, detailed model metadata is listed:

Model ID	ICN6747546729010167808
Created	23 Feb 2021, 23:16:20
Base model	None
Data	1,000 images
Model type	Cloud
Train cost	16 node hours
Deployment state	Not deployed

At the bottom of the card are two buttons: 'SEE FULL EVALUATION' and 'RESUME TRAINING'.

Figure 20: Trained flower_dataset model for deployment to android mobile

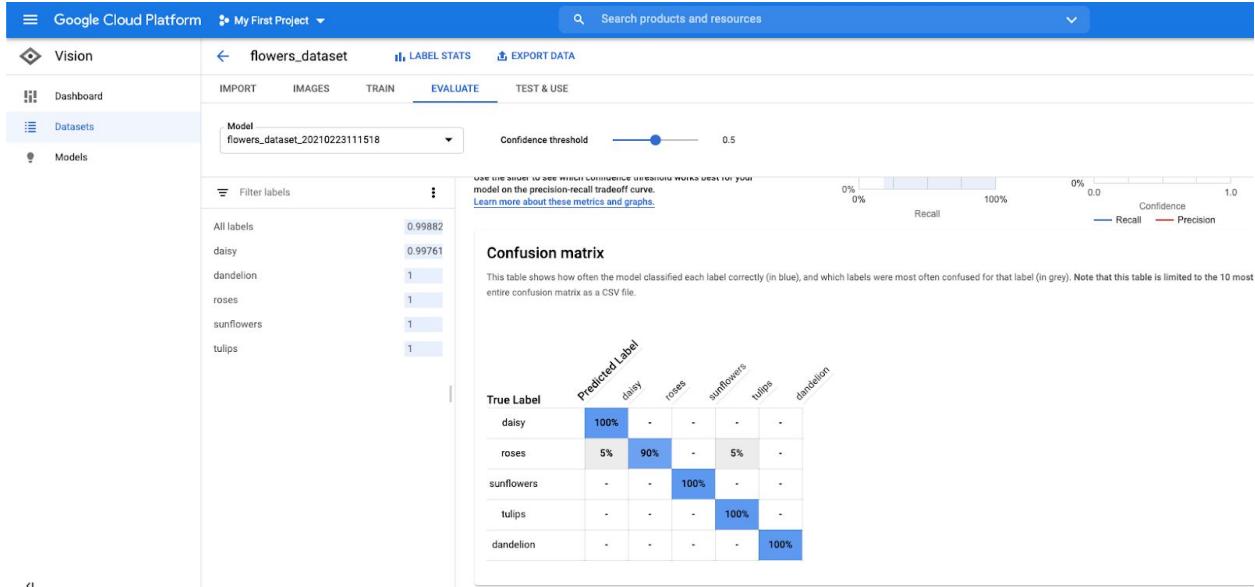


Figure 21: Trained flower_dataset mode evaluation in terms of confusion matrix

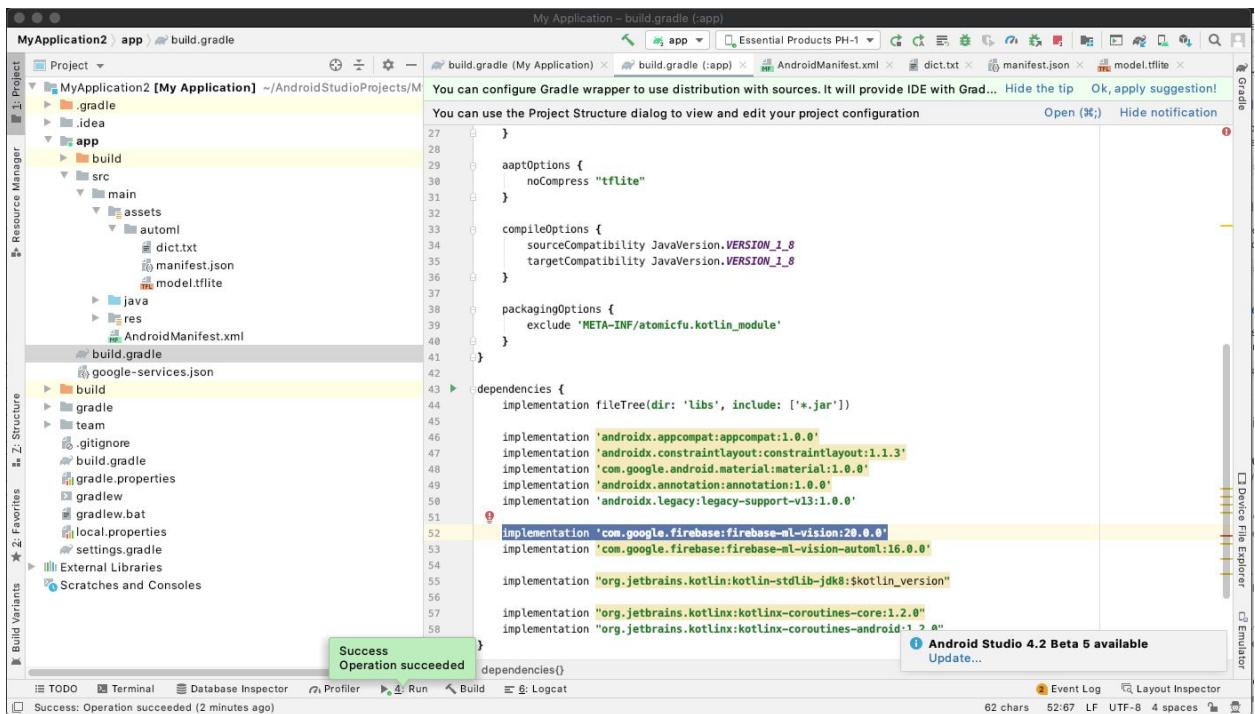


Figure 22:: Using android studio and setting up the environment variables

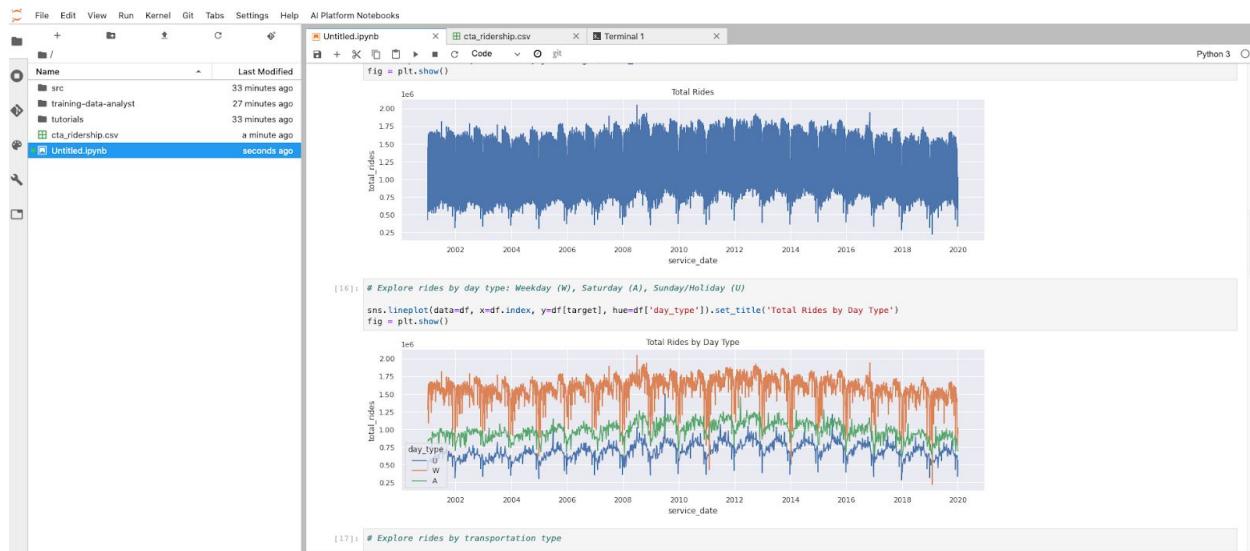
The screenshot shows the Google Cloud Platform Storage interface. At the top, there's a banner with a free trial status: '\$297.84 credit and 89 days remaining'. Below the banner, the navigation bar includes 'Google Cloud Platform' and 'Auto-ML'. A search bar says 'Search products and resources'. On the left, a sidebar has 'Storage' selected, with options for 'Browser', 'Monitoring', and 'Settings'. The main content area shows 'Bucket details' for 'new_bucket2'. The 'OBJECTS' tab is active, displaying a list of objects. The list includes:

Name	Size	Type	Created time	Storage class	Last modified	Public access	Encryption	Retention expiry date	Holds
flower_photos-2021-0...	61.3 MB	application/zip	24 Feb 2021, 1...	Standard	24 Feb 202...	Not public	Google-managed key	—	None
model-export/	—	Folder	—	—	—	—	—	—	—
packages/	—	Folder	—	—	—	—	—	—	—
trainer/	—	Folder	—	—	—	—	—	—	—

On the right side, there are several recommended sections: 'Control access to data', 'Make data public', 'Manage object lifecycles', 'You might also like', 'API and references', 'Access control', and 'Resources'. Each section has a brief description and a 'View' link.

Figure : model exported to new_bucket

Part-a: Execute automl vision and time series forecasting models



The figure shows a Jupyter Notebook interface with three tabs: Untitled.ipynb, cta_ridership.csv, and Terminal 1. The cta_ridership.csv tab displays a preview of the data with columns 'service_date' and 'total_rides'. The data starts on January 1, 2001, and ends on January 20, 2001. The total number of rows shown is 20.

	service_date	total_rides
1	2001-01-01	423647
2	2001-01-02	1282779
3	2001-01-03	1361355
4	2001-01-04	1420032
5	2001-01-05	1448343
6	2001-01-06	832757
7	2001-01-07	545656
8	2001-01-08	1575927
9	2001-01-09	1578282
10	2001-01-10	1586936
11	2001-01-11	1603064
12	2001-01-12	1624237
13	2001-01-13	861847
14	2001-01-14	547933
15	2001-01-15	1087994
16	2001-01-16	1646530
17	2001-01-17	1639033
18	2001-01-18	1625828
19	2001-01-19	1493815
20	2001-01-20	846163
21	2001-01-21	550488
22	2001-01-22	1604713
23	2001-01-23	1630335
24	2001-01-24	1598496
25	2001-01-25	1614134
26	2001-01-26	1562363
27	2001-01-27	858914
28	2001-01-28	543253
29	2001-01-29	1540584
30	2001-01-30	1580004

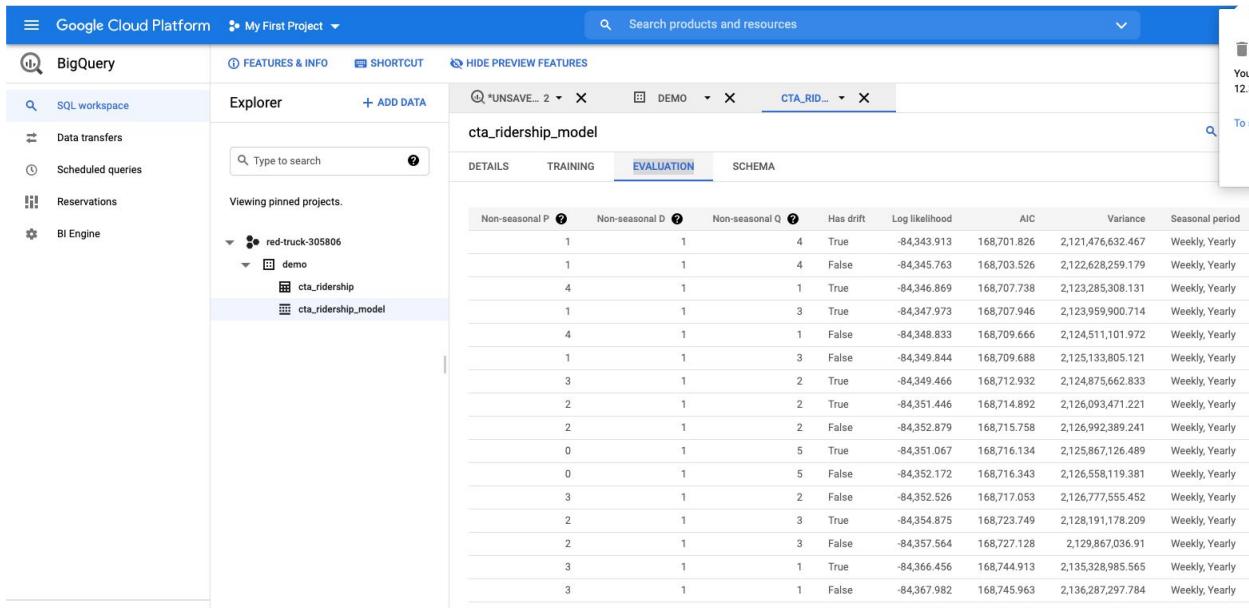
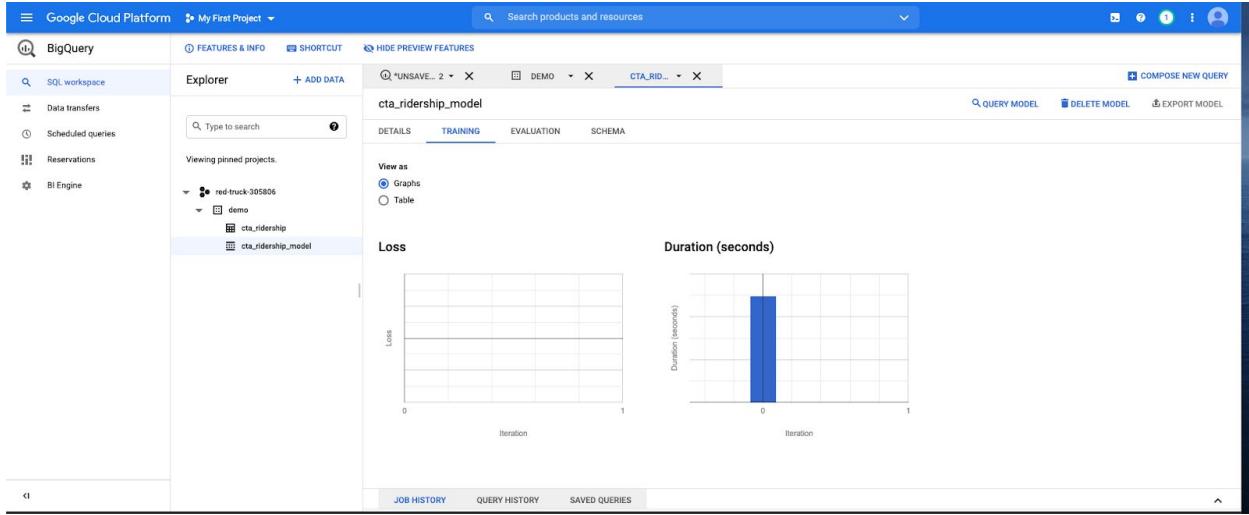


Figure 28:

Free trial status: \$300.00 credit and 90 days remaining. With a full account, you'll get unlimited access to all of Google Cloud Platform.

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Google Cloud Platform My First Project Search products and resources

BigQuery

FEATURES & INFO SHORTCUT HIDE PREVIEW FEATURES

Explorer + ADD DATA UNSAVE... DEMO CTA_RID... CTA_RID... COMPOSE NEW QUERY

Type to search

Viewing pinned projects.

red-truck-305806 demo cta_ridership cta_ridership_model

1 SELECT
2 *
3 FROM
4 ML.EVALUATE(MODEL `demo.cta_ridership_model`)

This query will process 0 B when run.

Query results SAVE RESULTS EXPLORE DATA

Query complete (0.4 sec elapsed, 0 B processed)

Job information Results JSON Execution details

Row	non_seasonal_p	non_seasonal_d	non_seasonal_q	has_drift	log_likelihood	AIC	variance	seasonal_periods
1	1	1	4	true	-84343.91298029698	168701.82596059397	2.1214766324672794E9	WEEKLY
2	1	1	4	false	-84345.76278035615	168703.5255607123	2.122628591786644E9	WEEKLY
								YEARLY

Figure:29

Free trial status: \$300.00 credit and 90 days remaining. With a full account, you'll get unlimited access to all of Google Cloud Platform.

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Google Cloud Platform My First Project Search products and resources

BigQuery

FEATURES & INFO SHORTCUT HIDE PREVIEW FEATURES

Explorer + ADD DATA UNSAVE... DEMO CTA_RID... CTA_RID... COMPOSE NEW QUERY

Type to search

Viewing pinned projects.

red-truck-305806 demo cta_ridership cta_ridership_model

1 SELECT
2 *
3 FROM
4 ML.EVALUATE(MODEL `demo.cta_ridership_model`)

This query will process 0 B when run.

Query results SAVE RESULTS EXPLORE DATA

Query complete (0.4 sec elapsed, 0 B processed)

Job information Results JSON Execution details

Row	non_seasonal_p	non_seasonal_d	non_seasonal_q	has_drift	log_likelihood	AIC	variance	seasonal_periods
1	1	1	4	true	-84343.91298029698	168701.82596059397	2.1214766324672794E9	WEEKLY
2	1	1	4	false	-84345.76278035615	168703.5255607123	2.122628591786644E9	WEEKLY
								YEARLY

Figure:30

Free trial status: \$300.00 credit and 90 days remaining. With a full account, you'll get unlimited access to all of Google Cloud Platform.

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Google Cloud Platform My First Project Search products and resources

BigQuery

FEATURES & INFO SHORTCUT HIDE PREVIEW FEATURES

Explorer + ADD DATA UNSAVE... DEMO CTA_RID... CTA_RID... COMPOSE NEW QUERY

Type to search

Viewing pinned projects.

red-truck-305806 demo cta_ridership cta_ridership_model

1 SELECT
2 *
3 FROM
4 ML.FORECAST(MODEL `demo.cta_ridership_model`,
5 STRUCT(? AS horizon))

This query will process 23.4 kB when run.

Query results SAVE RESULTS EXPLORE DATA

Query complete (0.3 sec elapsed, 23.4 kB processed)

Job information Results JSON Execution details

Row	forecast_timestamp	forecast_value	standard_error	confidence_level	prediction_interval_lower_bound	prediction_interval_upper_bound	confidence_interval_lower_bound	confidence_interval_upper_bound
1	2020-01-01 00:00:00 UTC	662436.4424369269	46059.49014554253	0.95	572322.980240453	752549.9046334007	572322.980240453	752549.9046334007
2	2020-01-02 00:00:00 UTC	1029641.4669424891	46576.328347693256	0.95	939103.76989082	1120179.1639941582	939103.76989082	1120179.1639941582
3	2020-01-03 00:00:00 UTC	120160.2034356925	47233.43871922012	0.95	1109249.9600529654	1294070.4468184195	1109249.9600529654	1294070.4468184195
4	2020-01-04 00:00:00 UTC	651095.9776391207	48157.99332862347	0.95	556676.8819095747	745315.0733686666	556676.8819095747	745315.0733686666
5	2020-01-05 00:00:00 UTC	467394.91846646497	48621.50963880497	0.95	372268.67250121285	562520.8644317171	372268.67250121285	562520.8644317171

Figure:31

The screenshot shows the Google Colab interface for AI Platform Notebooks. On the left, there's a sidebar with a file tree showing notebooks like '01-explore.ipynb', '02-model.ipynb', '03-cloud-training.ipynb' (which is currently selected), and 'cta_ridership.csv'. The main area has several tabs open: 'Untitled.ipynb', 'Terminal 1', '03-cloud-training.ipynb', '01-explore.ipynb', and '02-model.ipynb'. The '03-cloud-training.ipynb' tab contains Python code for model deployment. The code includes error handling, prediction logic using a trained model (PROJECT MODEL_NAME), and cleanup commands for deleting resources.

```

if 'error' in response:
    raise RuntimeError(response['error'])

return response['predictions']

# Predict with the 1st element from the test set
prediction_json = {input_layer_name: X_test[0].tolist()}

pred_val = predict_json[PROJECT_MODEL_NAME, prediction_json]
pred_val

[[445]: [{'dense': [0.7314867973327637,
0.6400444507598077,
0.678550017962646,
0.7441668530437012,
-1.7441668530437012,
0.5619034717104431,
0.71538639086668352]}]

[[446]: # Print prediction and compare to actual value
print('Predicted riders:', int(round(inverse_scale(np.array([pred_val[0]['dense'][0]]).reshape(1,1)))[0][0]))
print('Actual riders:', int(round(inverse_scale(np.array(y_test[0])))[0][0]))
Predicted riders: 1674300
Actual riders: 1647321

Cleanup

[[448]: # Delete model version resource
!echo gcloud ai-platform versions delete <version> --model <MODEL_NAME> --quiet
# Delete model resource
!echo gcloud ai-platform models delete <MODEL_NAME> --quiet
gcloud ai-platform versions delete version_1614242270 --model cta_ridership --quiet
gcloud ai-platform models delete cta_ridership --quiet

```

Figure:32