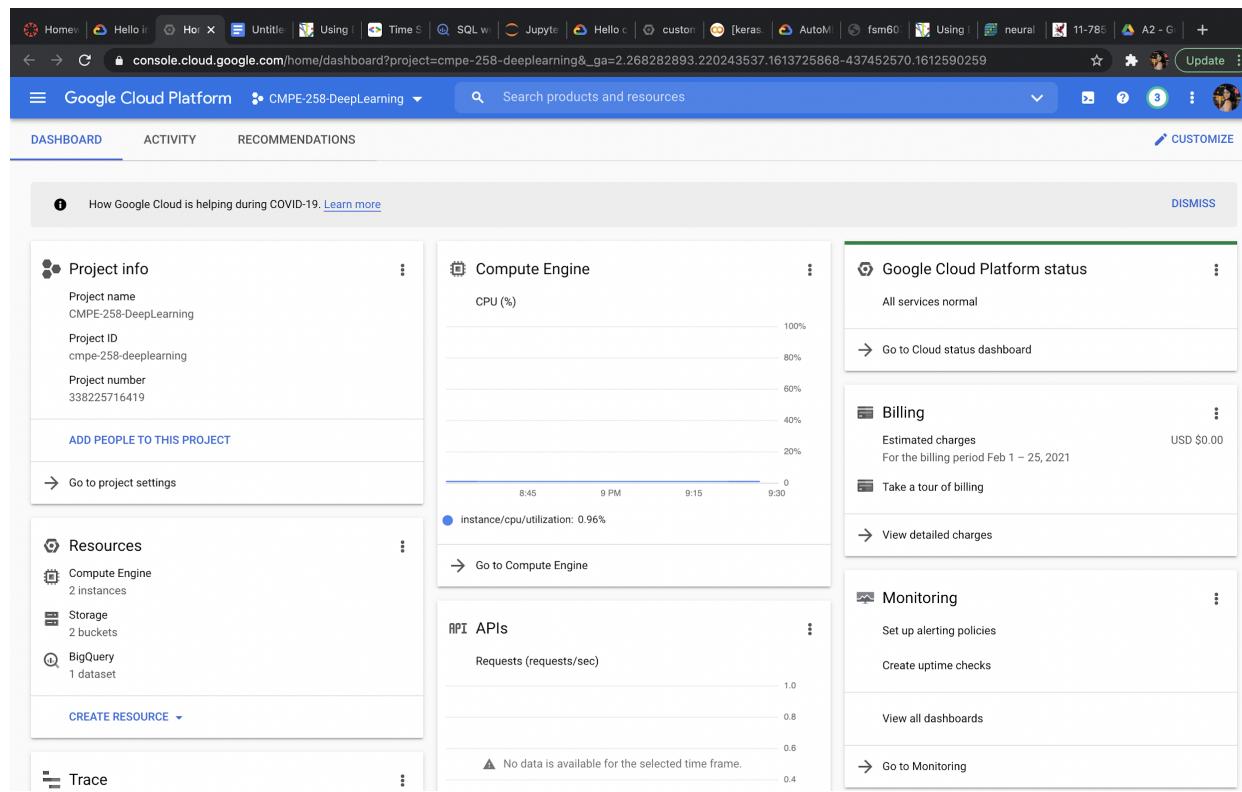


Assignment 2

PART 1 - Hello AI Platform (Unified)

- Hello image data - Using flower dataset

- Setting up project
 - Created Project
 - Set up Billing Account
 - Enabled AI Platform



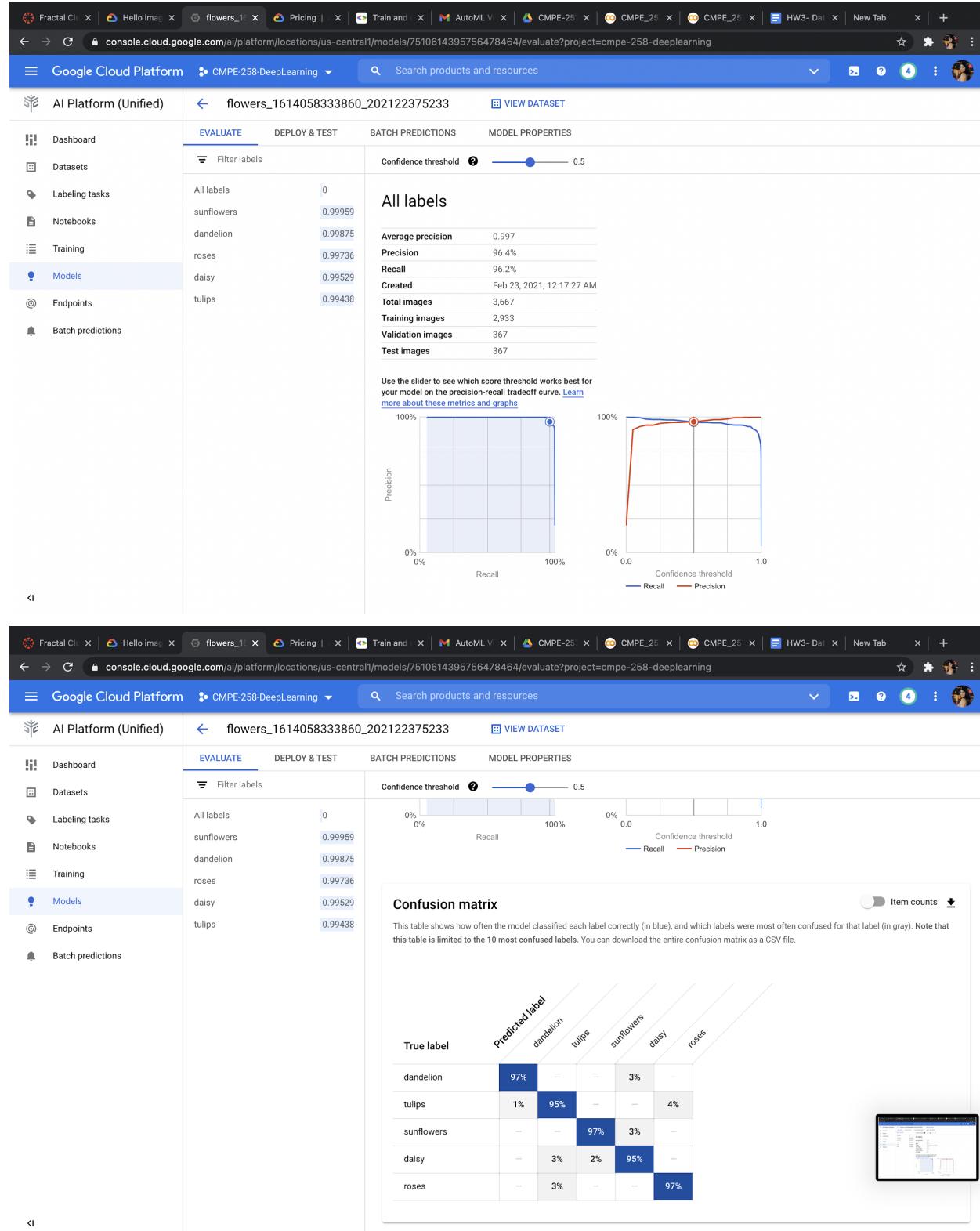
- Dataset

Screenshot of the Google Cloud Platform AI Platform (Unified) Datasets page. The URL is <https://console.cloud.google.com/ai/platform/datasets?project=cmpe-258-deeplearning>.

The page shows a dataset named "flowers_1614058333860" located in the "us-central1 (Iowa)" region. The dataset contains 3,667 items, is an image type, and has no labels. It was last updated on February 22, 2021, and is in a "Finished importing data" status.

Below this, the "BROWSE" tab is selected in the "flowers_1614058333860" view. The page displays a grid of 10 flower images with their respective labels: roses, daisy, tulips, daisy, sunflowers, daisy, roses, sunflowers, roses, and daisy. There are also links to "ADD NEW LABEL" and "ANALYZE".

○ Train Model



○ Deploy Model

Screenshot of the Google Cloud Platform AI Platform (Unified) interface showing the deployment process for a machine learning model.

Deploy to endpoint

1 Define your endpoint
 Create new endpoint Add to existing endpoint
Endpoint name *: flowers_image_classification

2 Endpoint details

DEPLOY CANCEL

Model settings

flowers_161405833860_202122375233
Traffic split: 100%

CONTINUE

Test your model PREVIEW

- In order to test your model, you will need to create an endpoint.
- Your model must be successfully deployed to an endpoint before you can test it.

Deploy your model

Endpoints are machine learning models made available for online prediction requests. Endpoints are useful for timely predictions from many users (for example, in response to an application request). You can also request batch predictions if you don't need immediate results.

DEPLOY TO ENDPOINT

Endpoint	ID	Models	Region	Last updated	API	Notification	Metadata	Encryption
flower_image_classification	384881846279733248	1	us-central1	Feb 23, 2021, 12:20:53 AM	Sample request			Google-managed key

Test your model PREVIEW

- Your model must be successfully deployed to an endpoint before you can test it.

UPLOAD IMAGE

Creating endpoint "flower_image_classification"...

○ Endpoints

[flower_image_classification](#) [EDIT SETTINGS](#) [SAMPLE REQUEST](#)

Region	Logs
us-central1	View Logs

Model	Traffic split	Compute nodes	Type	Created
flowers_161405833860_202122375233	100%	Auto (1 minimum, 1 maximum)	Image classification	Feb 23, 2021, 1:16:28 AM

[DEPLOY ANOTHER MODEL](#)

○ Test

- Hello text data - Using IMDB Movie Review for positive and negative classification
 - Setting up project
 - Dataset

Screenshot of the Google Cloud Platform AI Platform (Unified) interface showing the IMDB Movie Review Classification dataset.

Top Navigation: console.cloud.google.com /ai/platform/locations/us-central1/datasets/787091995813216256;annotationSetId=3602967662826618880/import?project=cmpe-258-deeplearning

Left Sidebar:

- AI Platform (Unified)
- Dashboard
- Datasets** (selected)
- Labeling tasks
- Notebooks
- Training
- Models
- Endpoints
- Batch predictions

Main Content Area:

Import in progress
This can take several minutes or more. You will be emailed once processing completes.

BROWSE Tab:

	All	49,583	Filter items
Labeled	49,583	<input type="checkbox"/> Text	
Unlabeled	0	<input type="checkbox"/> Subject matter: Worthwhile Acting: Fair (some of it) Plot: Ridiculous 	
Filter labels	+	<input type="checkbox"/> Not having seen the film in the original theater release, I was happily surprised	
negative	24,698	<input type="checkbox"/> Most people will consider that Yul Brynner's greatest performance was as the	
positive	24,884	<input type="checkbox"/> Well, I'll start by admitting I'm not a John Ford fan. (I watched "The Informer" c	
sentiment	1	<input type="checkbox"/> I'm a huge fan of legendary director Elia Kazan . His movies often deal with pe	
ADD NEW LABEL		<input type="checkbox"/> From 1936-1939, Peter Lorre made a string of highly successful Mr. Moto film	
		<input type="checkbox"/> I really wanted to like this film as I have admiration for Italian rip-off cinema (e	
		<input type="checkbox"/> <i>Algeris</i> is not a classic; it is a perversion of the wonderful original <i>Pepe le Mok</i>	
		<input type="checkbox"/> This was painfull Recently given away as a free DVD with a British newspaper,	
		<input type="checkbox"/> The major flaw in this Spanish slasher/shocker is within it's script. For the fir	

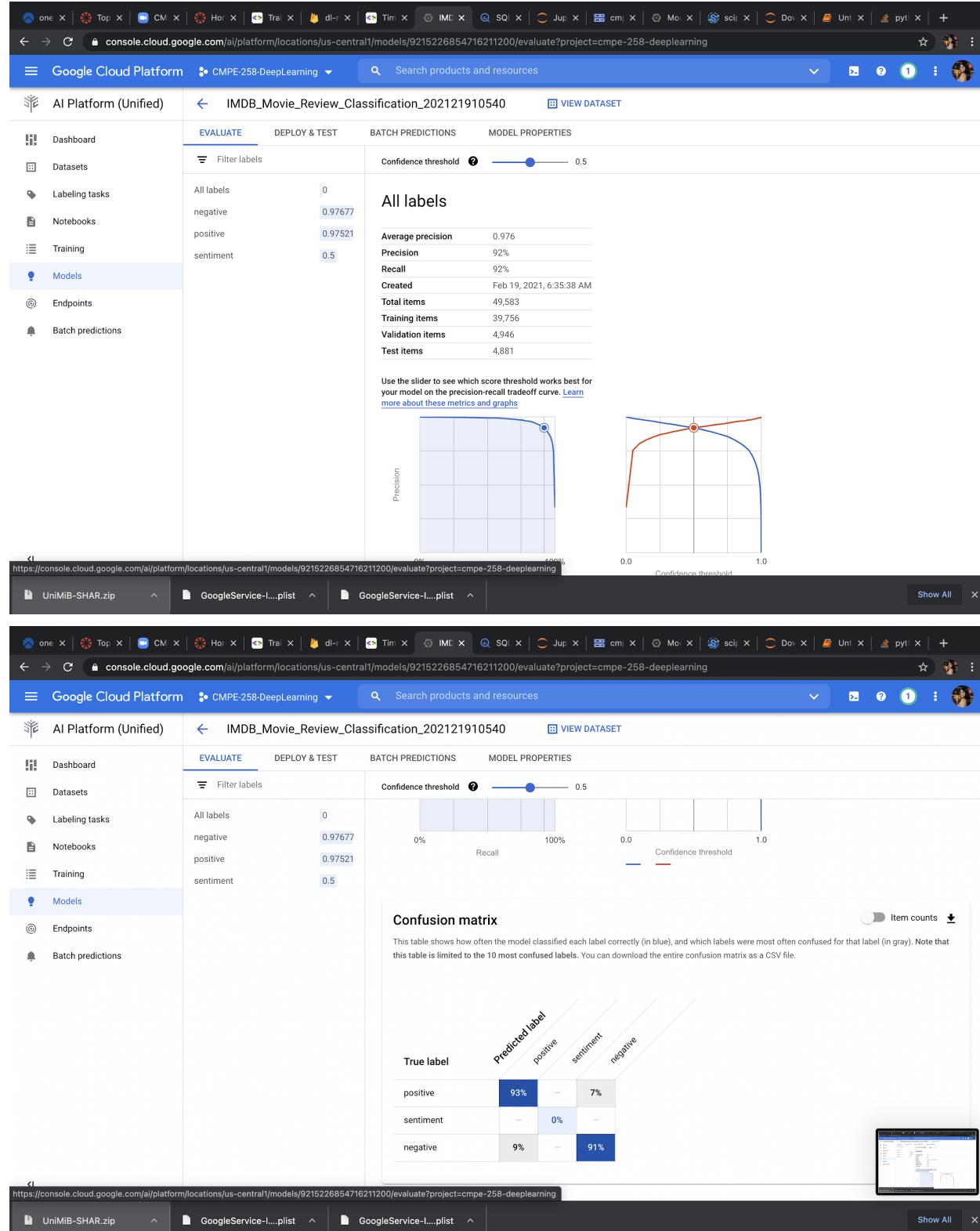
Items per page: 10 ▾ 1 – 10 of many < >

Right Sidebar:

- Training jobs and models**: Use this dataset to train a new machine learning model with AutoML or custom code.
- TRAIN NEW MODEL**
- Labeling tasks**: If your data still needs to be labeled, create a labeling task to have others label it for you.
- CREATE LABELING TASK**

Show All

○ Model



○ Deploy

Google Cloud Platform CMPE-258-DeepLearning Search products and resources

AI Platform (Unified) IMDB_Movie_Review_Classification_202121910540 VIEW DATASET

EVALUATE DEPLOY & TEST BATCH PREDICTIONS MODEL PROPERTIES

Deploy your model

Endpoints are machine learning models made available for online prediction requests. Endpoints are useful for timely predictions from many users (for example, in response to an application request). You can also request batch predictions if you don't need immediate results.

DEPLOY TO ENDPOINT

Endpoint	ID	Models	Region	Last updated	API	Notification	Metadata	Encryption
imdb-txt-cls	7654817544762556416	1	us-central1	Feb 19, 2021, 10:20:18 AM	Sample request		Google-managed key	...

Test your model PREVIEW

pathetic

PREDICT

positive 0.947
negative 0.048
sentiment 0.005

○ Endpoint

Google Cloud Platform CMPE-258-DeepLearning Search products and resources

AI Platform (Unified) imdb-txt-cls EDIT SETTINGS SAMPLE REQUEST

Region us-central1 Logs View Logs

Model IMDB_Movie_Review_Classification_202121910540 Traffic split 100% Compute nodes Auto Type Text classification Created Feb 19, 2021, 10:14:08 AM

DEPLOY ANOTHER MODEL

Chart interval: 1 hour 6 hours 12 hours 1 day 2 days 4 days 7 days 14 days 30 days

Predictions/second

IMDB_Movie_Review_Classification_202121910540: 0.033/s

○ Test

Google Cloud Platform CMPE-258-DeepLearning Search products and resources

AI Platform (Unified) IMDB_Movie_Review_Classification_202121910540 VIEW DATASET

EVALUATE DEPLOY & TEST BATCH PREDICTIONS MODEL PROPERTIES

Deploy your model

Endpoints are machine learning models made available for online prediction requests. Endpoints are useful for timely predictions from many users (for example, in response to an application request). You can also request batch predictions if you don't need immediate results.

DEPLOY TO ENDPOINT

Endpoint	ID	Models	Region	Last updated	API	Notification	Metadata	Encryption
imdb-txt-cls	7654817544762556416	1	us-central1	Feb 19, 2021, 10:20:18 AM	Sample request			Google-managed key

Test your model PREVIEW

awesome

PREDICT

positive 0.947
negative 0.048
sentiment 0.005

UniMiB-SHAR.zip GoogleService-l...plist GoogleService-l...plist

Google Cloud Platform CMPE-258-DeepLearning Search products and resources

AI Platform (Unified) IMDB_Movie_Review_Classification_202121910540 VIEW DATASET

EVALUATE DEPLOY & TEST BATCH PREDICTIONS MODEL PROPERTIES

Deploy your model

Endpoints are machine learning models made available for online prediction requests. Endpoints are useful for timely predictions from many users (for example, in response to an application request). You can also request batch predictions if you don't need immediate results.

DEPLOY TO ENDPOINT

Endpoint	ID	Models	Region	Last updated	API	Notification	Metadata	Encryption
imdb-txt-cls	7654817544762556416	1	us-central1	Feb 19, 2021, 10:20:18 AM	Sample request			Google-managed key

Test your model PREVIEW

pathetic

PREDICT

positive 0.947
negative 0.048
sentiment 0.005

UniMiB-SHAR.zip GoogleService-l...plist GoogleService-l...plist

● Hello video data

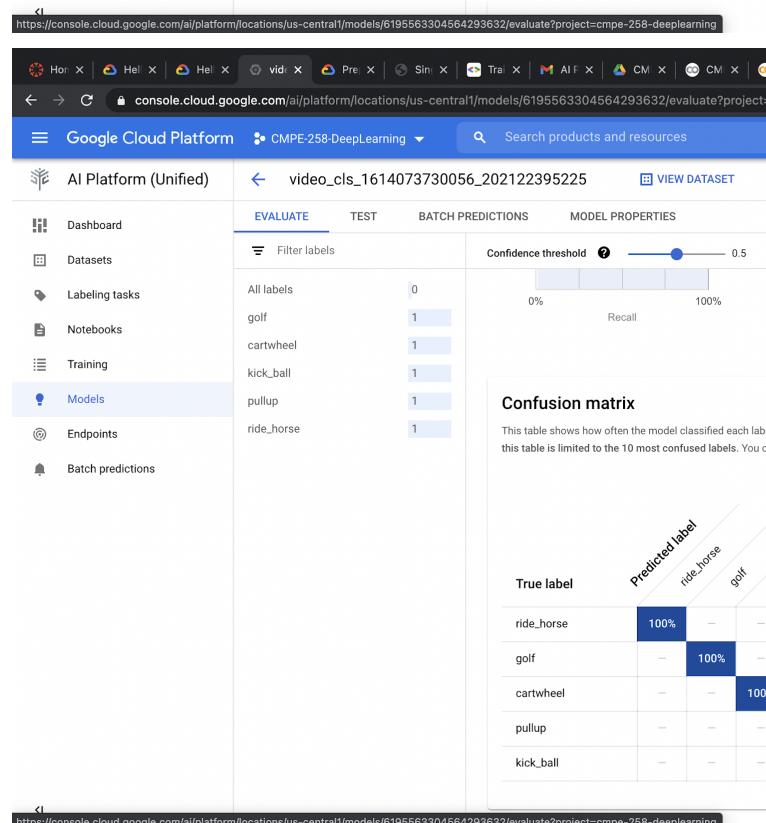
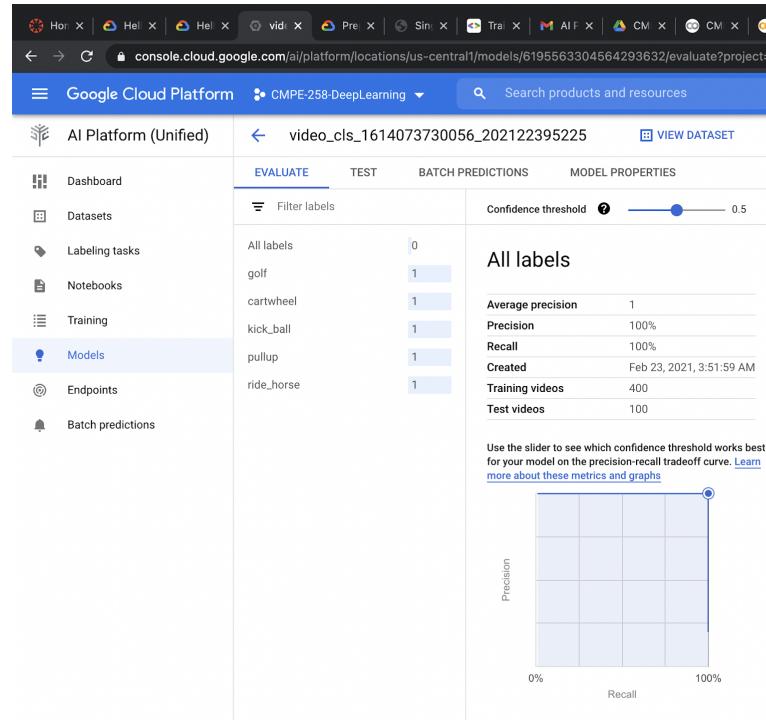
- Setting up project
- Dataset

The screenshot shows the Google Cloud Platform AI Platform (Unified) interface. On the left, there's a sidebar with options like Dashboard, Datasets (which is selected), Labeling tasks, Notebooks, Training, Models, Endpoints, and Batch predictions. The main area is titled 'Datasets PREVIEW'. It shows a table with one row of data:

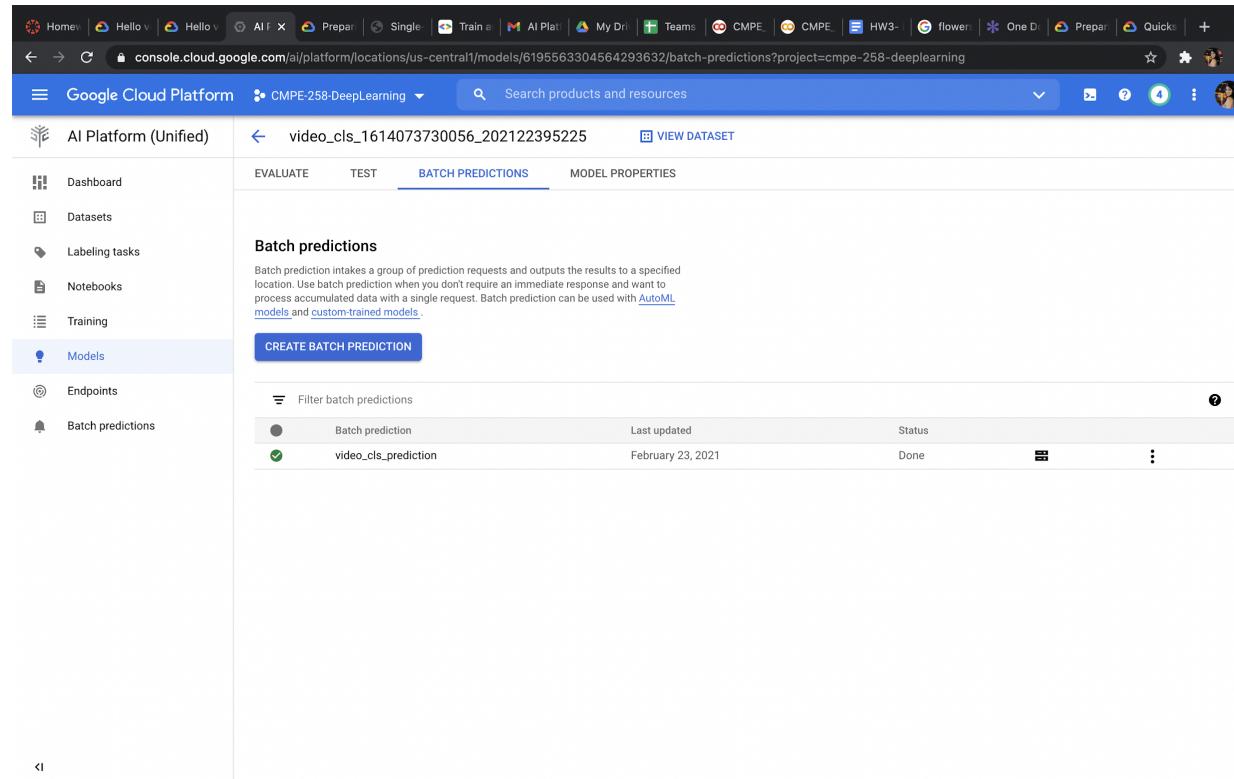
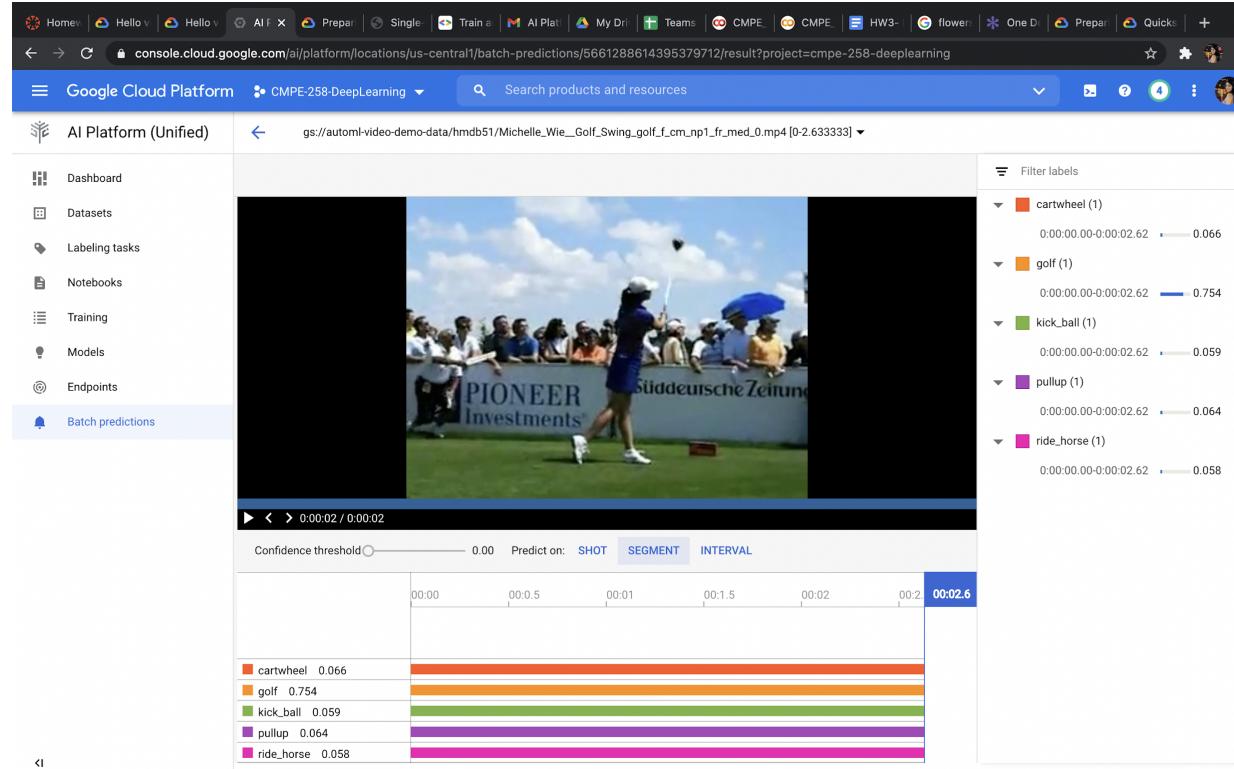
Name	ID	Region	Type	Items	Labels	Last updated	Status	Metadata
video_cls_1614073730056	1435047392201146368	us-central1	Video	500	-	February 23, 2021	Finished importing data	...

This screenshot shows the same interface but with the 'BROWSE' tab selected for the dataset 'video_cls_1614073730056'. The left sidebar remains the same. The main area has tabs for IMPORT, BROWSE (which is active), and ANALYZE. Under the BROWSE tab, it shows statistics: All 500, Labeled 500, Unlabeled 0, and a section for Videos with items: cartwheel (100), golf (100), kick_ball (100), pullup (100), and ride_horse (100). Below this is a 'ADD NEW LABEL' button. To the right, there are video thumbnails for 'kick_ball', 'pullup', and 'ride_horse'. A 'Training jobs and models' section shows a job named 'video_cls_1614073730056_202122395225' with the note 'Model type: Video classification' and a 'TRAIN NEW MODEL' button. A 'Labeling tasks' section with the note 'If your data still needs to be labeled, create a labeling task to have others label it for you' and a 'CREATE LABELING TASK' button.

○ Model

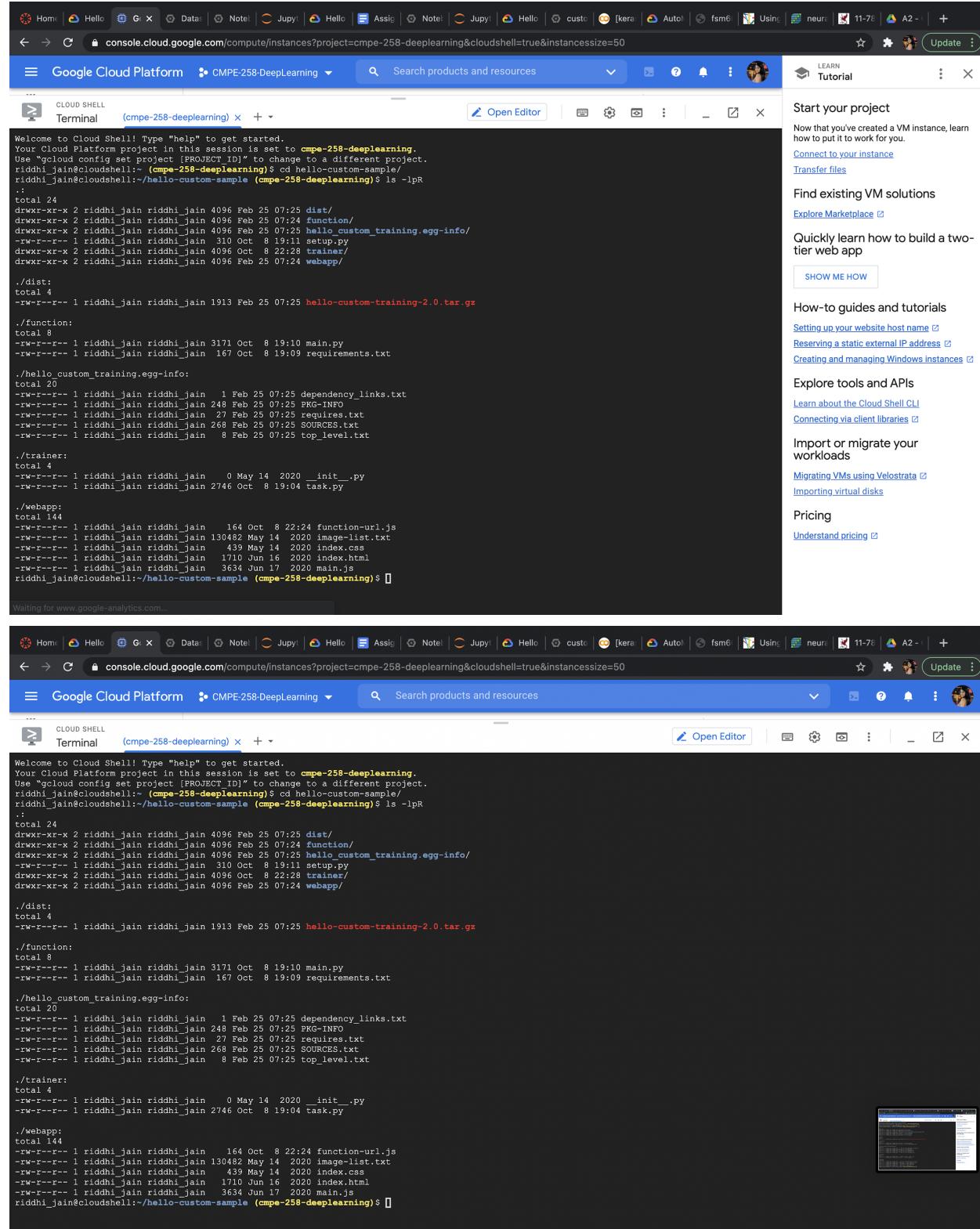


○ Test



● Hello custom training

○ Model



```
Welcome to Cloud Shell! Type "help" to get started.  
Your Cloud Platform project in this session is set to cmpe-258-deeplearning.  
Use "gcloud config set project [PROJECT_ID]" to change to a different project.  
riddhi_jain@cloudshell:~ (cmpe-258-deeplearning)$ cd hello-custom-sample/  
riddhi_jain@cloudshell:~/hello-custom-sample (cmpe-258-deeplearning)$ ls -lprR .:  
total 24  
drwxr-xr-x 2 riddhi_jain riddhi_jain 4096 Feb 25 07:25 dist/  
drwxr-xr-x 2 riddhi_jain riddhi_jain 4096 Feb 25 07:24 function/  
drwxr-xr-x 2 riddhi_jain riddhi_jain 4096 Feb 25 07:25 hello_custom_training.egg-info/  
-rw-r--r-- 1 riddhi_jain riddhi_jain 310 Oct 8 19:11 setup.py  
drwxr-xr-x 2 riddhi_jain riddhi_jain 4096 Oct 8 22:28 trainer/  
drwxr-xr-x 2 riddhi_jain riddhi_jain 4096 Feb 25 07:24 webapp/  
  
.dist:  
total 4  
-rw-r--r-- 1 riddhi_jain riddhi_jain 1913 Feb 25 07:25 hello-custom-training-2.0.tar.gz  
.function:  
total 8  
-rw-r--r-- 1 riddhi_jain riddhi_jain 3171 Oct 8 19:10 main.py  
-rw-r--r-- 1 riddhi_jain riddhi_jain 167 Oct 8 19:09 requirements.txt  
  
.hello_custom_training.egg-info:  
total 20  
-rw-r--r-- 1 riddhi_jain riddhi_jain 1 Feb 25 07:25 dependency_links.txt  
-rw-r--r-- 1 riddhi_jain riddhi_jain 248 Feb 25 07:25 PKG-INFO  
-rw-r--r-- 1 riddhi_jain riddhi_jain 27 Feb 25 07:25 requires.txt  
-rw-r--r-- 1 riddhi_jain riddhi_jain 268 Feb 25 07:25 SOURCES.txt  
-rw-r--r-- 1 riddhi_jain riddhi_jain 8 Feb 25 07:25 top_level.txt  
  
.trainer:  
total 4  
-rw-r--r-- 1 riddhi_jain riddhi_jain 0 May 14 2020 __init__.py  
-rw-r--r-- 1 riddhi_jain riddhi_jain 2746 Oct 8 19:04 task.py  
  
.webapp:  
total 144  
-rw-r--r-- 1 riddhi_jain riddhi_jain 164 Oct 8 22:24 function-url.js  
-rw-r--r-- 1 riddhi_jain riddhi_jain 130482 May 14 2020 image-list.txt  
-rw-r--r-- 1 riddhi_jain riddhi_jain 439 May 14 2020 index.css  
-rw-r--r-- 1 riddhi_jain riddhi_jain 1710 Jun 16 2020 index.html  
-rw-r--r-- 1 riddhi_jain riddhi_jain 3634 Jun 17 2020 main.js  
riddhi_jain@cloudshell:~/hello-custom-sample (cmpe-258-deeplearning)$ [  
  
Waiting for www.google-analytics.com...  
  
Welcome to Cloud Shell! Type "help" to get started.  
Your Cloud Platform project in this session is set to cmpe-258-deeplearning.  
Use "gcloud config set project [PROJECT_ID]" to change to a different project.  
riddhi_jain@cloudshell:~ (cmpe-258-deeplearning)$ cd hello-custom-sample/  
riddhi_jain@cloudshell:~/hello-custom-sample (cmpe-258-deeplearning)$ ls -lprR .:  
total 24  
drwxr-xr-x 2 riddhi_jain riddhi_jain 4096 Feb 25 07:25 dist/  
drwxr-xr-x 2 riddhi_jain riddhi_jain 4096 Feb 25 07:24 function/  
drwxr-xr-x 2 riddhi_jain riddhi_jain 4096 Feb 25 07:25 hello_custom_training.egg-info/  
-rw-r--r-- 1 riddhi_jain riddhi_jain 310 Oct 8 19:11 setup.py  
drwxr-xr-x 2 riddhi_jain riddhi_jain 4096 Oct 8 22:28 trainer/  
drwxr-xr-x 2 riddhi_jain riddhi_jain 4096 Feb 25 07:24 webapp/  
  
.dist:  
total 4  
-rw-r--r-- 1 riddhi_jain riddhi_jain 1913 Feb 25 07:25 hello-custom-training-2.0.tar.gz  
.function:  
total 8  
-rw-r--r-- 1 riddhi_jain riddhi_jain 3171 Oct 8 19:10 main.py  
-rw-r--r-- 1 riddhi_jain riddhi_jain 167 Oct 8 19:09 requirements.txt  
  
.hello_custom_training.egg-info:  
total 20  
-rw-r--r-- 1 riddhi_jain riddhi_jain 1 Feb 25 07:25 dependency_links.txt  
-rw-r--r-- 1 riddhi_jain riddhi_jain 248 Feb 25 07:25 PKG-INFO  
-rw-r--r-- 1 riddhi_jain riddhi_jain 27 Feb 25 07:25 requires.txt  
-rw-r--r-- 1 riddhi_jain riddhi_jain 268 Feb 25 07:25 SOURCES.txt  
-rw-r--r-- 1 riddhi_jain riddhi_jain 8 Feb 25 07:25 top_level.txt  
  
.trainer:  
total 4  
-rw-r--r-- 1 riddhi_jain riddhi_jain 0 May 14 2020 __init__.py  
-rw-r--r-- 1 riddhi_jain riddhi_jain 2746 Oct 8 19:04 task.py  
  
.webapp:  
total 144  
-rw-r--r-- 1 riddhi_jain riddhi_jain 164 Oct 8 22:24 function-url.js  
-rw-r--r-- 1 riddhi_jain riddhi_jain 130482 May 14 2020 image-list.txt  
-rw-r--r-- 1 riddhi_jain riddhi_jain 439 May 14 2020 index.css  
-rw-r--r-- 1 riddhi_jain riddhi_jain 1710 Jun 16 2020 index.html  
-rw-r--r-- 1 riddhi_jain riddhi_jain 3634 Jun 17 2020 main.js  
riddhi_jain@cloudshell:~/hello-custom-sample (cmpe-258-deeplearning)$ [
```

```
[1]+ Stopped less trainer/task.py
riiddhi_jain@cloudshell:~/hello-custom-sample (cmpe-258-deeplearning)$ gsutil cp dist/hello-custom-training-2.0.tar.gz \
> gs://cmpe-256-deeplearning/training/
```

Google Cloud Platform CMPE-258-DeepLearning Search products and resources

Storage

Bucket details

cmpe-258-deeplearning

OBJECTS CONFIGURATION PERMISSIONS RETENTION LIFECYCLE

Buckets > cmpe-258-deeplearning

UPLOAD FILES UPLOAD FOLDER CREATE FOLDER MANAGE HOLDS DOWNLOAD DELETE

Filter by name prefix only Filter objects and folders

Name	Type	Created time	Storage class	Last modified	Public access	Encryption	Retention expiration date	Holds
Auto-ML-Mode	Folder	—	—	—	—	—	—	...
Custom_Output	Folder	—	—	—	—	—	—	...
Image Classifi	Folder	—	—	—	—	—	—	...
Tabular Classif	Folder	—	—	—	—	—	—	...
Text Classifica	Folder	—	—	—	—	—	—	...
happyDB/	Folder	—	—	—	—	—	—	...
img_classifica	Folder	—	—	—	—	—	—	...
packages/	Folder	—	—	—	—	—	—	...
prediction/	Folder	—	—	—	—	—	—	...
trainer/	Folder	—	—	—	—	—	—	...
training/	Folder	—	—	—	—	—	—	...

Rows per page: 50 1

https://console.cloud.google.com/storage/browser/cmpe-258-deeplearning/train...

Google Cloud Platform CMPE-258-DeepLearning Search products and resources

AI Platform (Unified)

Models PREVIEW + CREATE IMPORT

Region us-central1 (Iowa)

Filter models...

Name	ID	Data	Endpoints	Region	Type	Created	Notifications	Metadata
custom_model	141599505471504384	—	2	us-central1	Custom trained	Feb 24, 2021, 11:33:53 PM		

○ Deploy

Deploy to endpoint

Define your endpoint Add to existing endpoint
Endpoint name * custom_deploy

Model settings

custom_model
Traffic split * 100

Compute resources

Choose how compute resources will serve prediction traffic to your model

- Autoscaling: If you set a minimum and maximum, compute nodes will scale to meet traffic demand within those boundaries
- No scaling: If you only set a minimum, then number of compute nodes will always run regardless of traffic demand (the maximum will be set to minimum)

Once scaling settings are set, they can't be changed unless you redeploy the model. [Pricing guide](#)

Minimum number of compute nodes * 1
Default is 1. If set to 1 or more, then compute resources will continuously run even without traffic demand. This can increase cost but avoid dropped requests due to node initialization.

Maximum number of compute nodes (optional)
Enter a number equal to or greater than the minimum nodes. Can reduce costs but may cause reliability issues for high traffic.

Machine type * n1-standard-2, 2 vCPUs, 7.5 GiB memory

Machine type * n1-standard-2, 2 vCPUs, 7.5 GiB memory

Accelerator type NVIDIA_TESLA_K80

Accelerator count 1

Service account

A service account determines what Google Cloud resources your service code can access. By default, a Google-managed service account is used with permissions appropriate for most models. You can also use a user-managed service account to customize permissions. [Learn more](#).

Logging

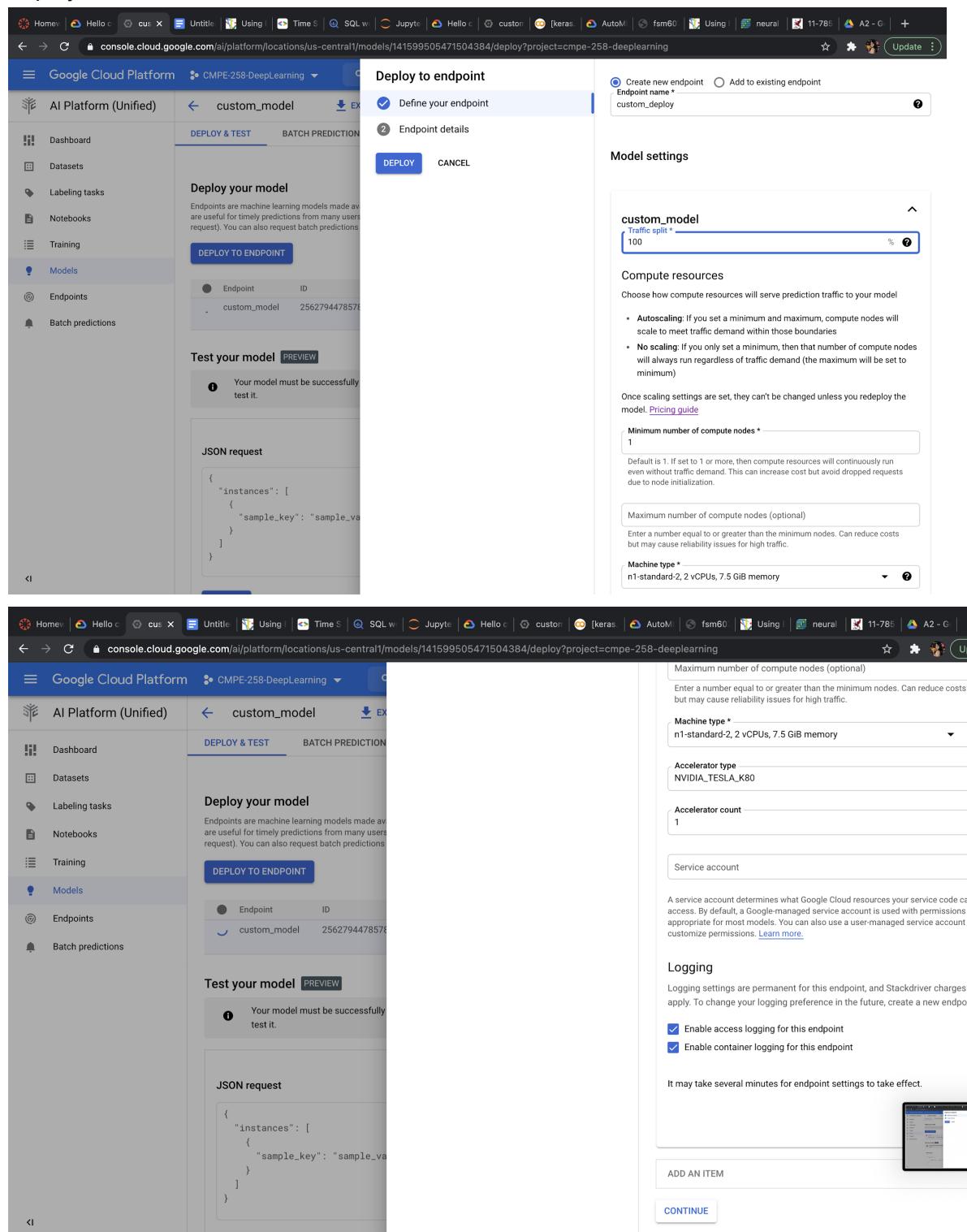
Logging settings are permanent for this endpoint, and Stackdriver charges will apply. To change your logging preference in the future, create a new endpoint.

Enable access logging for this endpoint
 Enable container logging for this endpoint

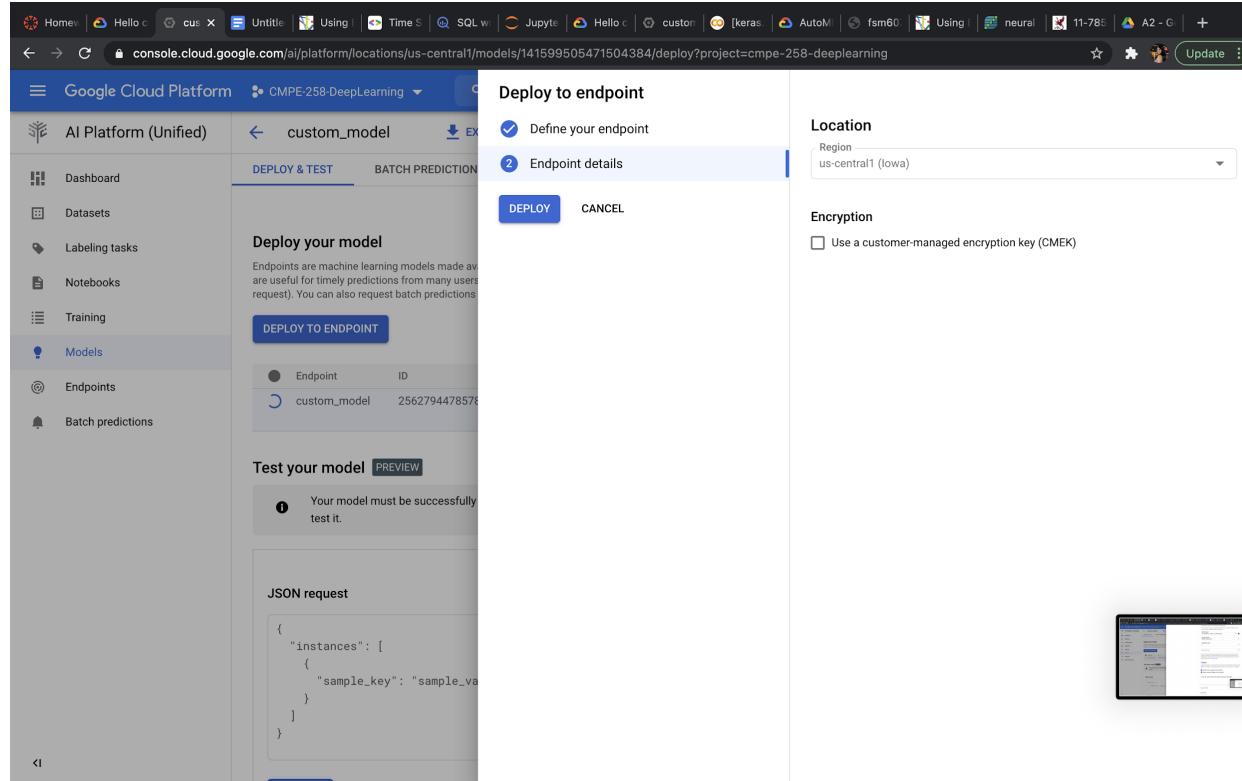
It may take several minutes for endpoint settings to take effect.

ADD AN ITEM

CONTINUE



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 (which is selected), Endpoints, and Batch predictions. The main area has tabs for 'DEPLOY & TEST' and 'BATCH PREDICTION'. Under 'DEPLOY & TEST', there's a 'Deploy your model' section with a note about endpoints being machine learning models for timely predictions. Below it is a 'Test your model' section with a 'PREVIEW' button. A 'JSON request' box contains a sample JSON object. To the right, the 'Deploy to endpoint' dialog is open, showing 'Define your endpoint' is checked and 'Endpoint name' is set to 'custom_deploy'. It also includes sections for 'Model settings' (with a preview of 'custom_model' and traffic split at 100%), 'Compute resources' (with autoscaling options), and 'Logging' (with checkboxes for access and container logging). At the bottom, there are 'ADD AN ITEM' and 'CONTINUE' buttons.



- Endpoint and Test

Sample Request

REST **PYTHON**

You can now execute queries using the command line interface (CLI).

1. Make sure you have the [Google Cloud SDK](#) installed.
2. Run the following command to authenticate with your Google account.

```
$ gcloud auth application-default login
```

3. Create a JSON object to hold your data.

```
{ "instances": [ { "sample_key": "sample_value" } ] }
```

4. Create environment variables to hold your endpoint and project IDs, as well as your JSON object.

```
$ ENDPOINT_ID="4355930817713668096"
$ PROJECT_ID="hellocustom"
$ INPUT_DATA_FILE="INPUT.JSON"
```

5. Execute the request.

```
$ curl \
-X POST \
-H "Authorization: Bearer $(gcloud auth print-access-token)" \
-H "Content-Type: application/json" \
https://us-central1-prediction.googleapis.com/v1/predictions/hellocustom \
-d '$(cat $INPUT_DATA_FILE)'
```

- Hello structured data

- Dataset

Big Mart Sales Prediction

SOURCE ANALYZE

Created: Feb 19, 2021 10:58 AM Total columns: 12
Dataset format: CSV Total rows: 8,523
Dataset location: gs://cmpe-258...taset/train (1).csv

General statistics generated by Feb 19, 2021 11:05 AM [GENERATE STATISTICS](#)

Field Name ↑	Missing % (count)	Distinct values
Item_Fat_Content	-	5
Item_Identifier	-	1559
Item_MRP	-	5938
Item_Outlet_Sales	-	3493
Item_Type	-	16
Item_Visibility	-	7880
Item_Weight	17.17% (1463)	415
Outlet_Establishment_Year	-	9
Outlet_Identifier	-	10
Outlet_Location_Type	-	3
Outlet_Size	28.28% (2410)	3
Outlet_Type	-	4

Rows per page: 50 ▾ 1 – 12 of 12 < >

Training jobs and models

Big Mart Sales Prediction_202121919121
Model type: Tabular

TRAIN NEW MODEL

○ Model

Train new model

Choose training method (selected)

Define your model

Choose training options

Compute and pricing

Dataset *: Big Mart Sales Prediction

Objective *: Regression

Please refer to the pricing guide for more details (and available deployment options) for each method.

AutoML (selected): Train high-quality models with minimal effort and machine learning expertise. Just specify how long you want to train. [Learn more](#)

Custom training (advanced): Run your TensorFlow, scikit-learn, and XGBoost training applications in the cloud. Train with one of Google Cloud's pre-built containers or use your own. [Learn more](#)

CONTINUE

Google Cloud Platform

Train new model

Model name: Big Mart Sales Prediction_202121919121

Target column: Item_Outlet_Sales

Export test dataset to BigQuery

ADVANCED OPTIONS

CONTINUE

START TRAINING CANCEL

train (1).csv UniMiB-SHAR.zip GoogleService-L...plist GoogleService-L...plist

Google Cloud Platform

Train new model

TRANSFORMATION INCLUSIVITY

Filter table

Field Name	Transformation	Missing % (count)	Distinct values
Item_Fat_Content	Auto	-	-
Item_Identifier	Auto	-	-
Item_MRP	Auto	-	-
Item_Type	Auto	-	-
Item_Visibility	Auto	-	-
Item_Weight	Auto	-	-
Outlet_Establishment_Year	Auto	-	-
Outlet_Identifier	Auto	-	-
Outlet_Location_Type	Auto	-	-
Outlet_Size	Auto	-	-
Outlet_Type	Auto	-	-

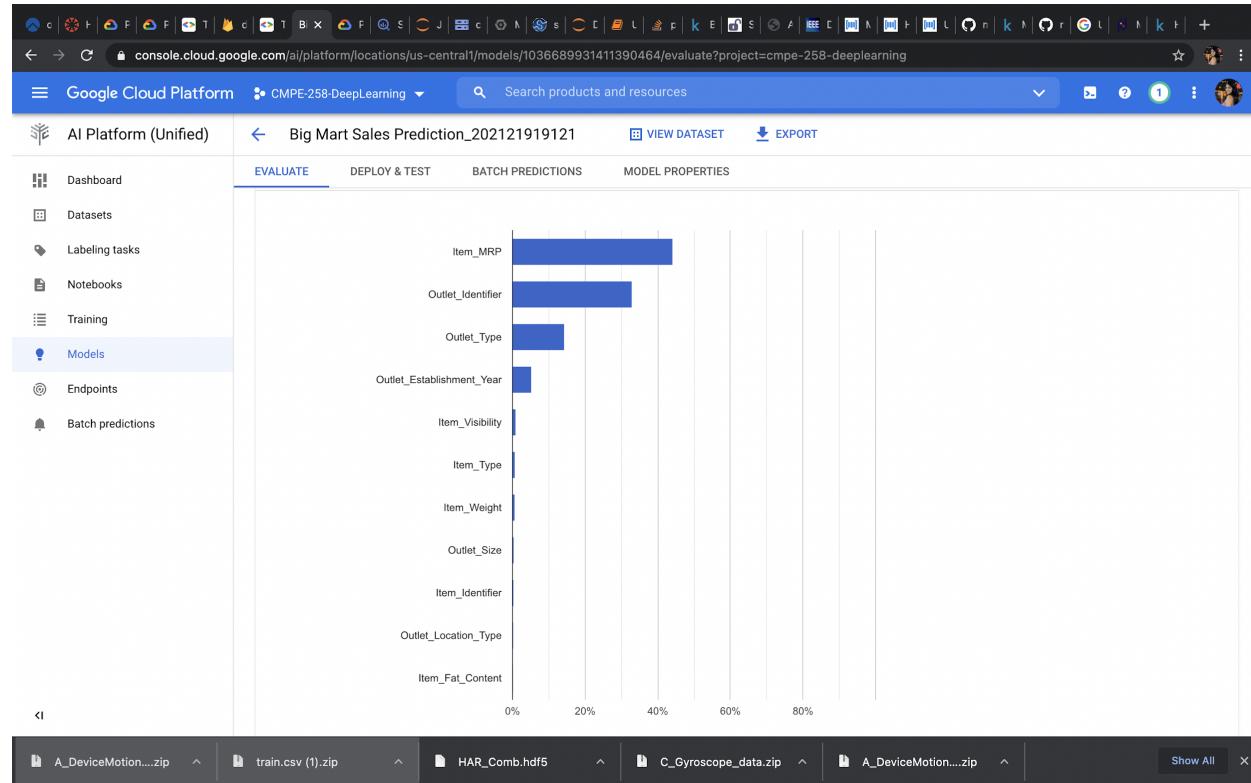
Rows per page: 50 1 – 11 of 11

ADVANCED OPTIONS

CONTINUE

START TRAINING CANCEL

train (1).csv UniMiB-SHAR.zip GoogleService-L...plist GoogleService-L...plist



- Deploy & Endpoint & Test

The figure shows the 'Deploy & Test' tab of the Google Cloud Platform AI Platform (Unified) interface. It displays a form where feature values can be input to predict a label. The predicted label is 'Low Fat'. The input fields and their values are:

Feature	Type	Value	Count
Item_Fat_Content	Text	Required	Low Fat
Item_Identifier	Text	Required	FDG33
Item_MRP	Text	Required	140.049600
Item_Type	Text	Required	Foods
Item_Visibility	Text	Required	0.052150
Item_Weight	Text	Required	12.350000
Outlet_Establishment_Year	Text	Required	1985
Outlet_Identifier	Text	Required	OUT027
Outlet_Location_Type	Text	Required	Tier 3

Other sections visible include 'Predict label' (Low Fat), 'Prediction result' (2947.69677734375), and '95% prediction interval' ([292.8796997070312, 4661.53466796875]).

PART 2

- I - end2end deployment of a vision model using automl to mobile device
 - Firebase Project

The screenshot shows the 'Project settings' page for the project 'CMPE-258-DeepLearning'. The left sidebar includes sections for Authentication, Cloud Firestore, Realtime Database, Storage, Hosting, Functions, Machine Learning, Crashlytics, Performance, Test Lab, App Distribution, Analytics, Extensions, and Blaze. The main content area has tabs for General, Cloud Messaging, Integrations, Service accounts, Data privacy, and Users and permissions. Under 'Your project', the project name is 'CMPE-258-DeepLearning', Project ID is 'cmpe-258-deeplearning', Project number is '338225716419', Default GCP resource location is 'Not yet selected', Parent org/folder in GCP is 'sjsu.edu', and Web API Key is 'No Web API Key for this project'. Under 'Public settings', the Public-facing name is 'project-338225716419' and Support email is 'Not configured'. Under 'Your apps', there is a section for iOS apps with a button to 'Add app'.

o Setup IOS

The screenshot shows the 'Project settings' page for the project 'CMPE-258-DeepLearning'. The left sidebar includes sections for Authentication, Cloud Firestore, Realtime Database, Storage, Hosting, Functions, Machine Learning, Crashlytics, Performance, Test Lab, App Distribution, Analytics, Extensions, and Blaze. The main content area shows an 'iOS apps' section for the app 'auto-ml-img-cls' (com.google.firebaseio.codelab.mlkit.automl). The 'SDK setup and configuration' section contains links to 'See SDK instructions' and 'GoogleService-Info.plist'. Configuration details include: App ID (1:338225716419:ios:58cabe492140111777d676), Encoded App ID (app-1-338225716419-ios-58cabe492140111777d676), App nickname (auto-ml-img-cls), Bundle ID (com.google.firebaseio.codelab.mlkit.automl), App Store ID (1234567), and Team ID (Add a Team ID). A 'Remove this app' button is at the bottom right.

o Dataset

Screenshot of the Google Cloud Platform Vision Datasets page for the CMPE-258-DeepLearning project.

The page shows two datasets:

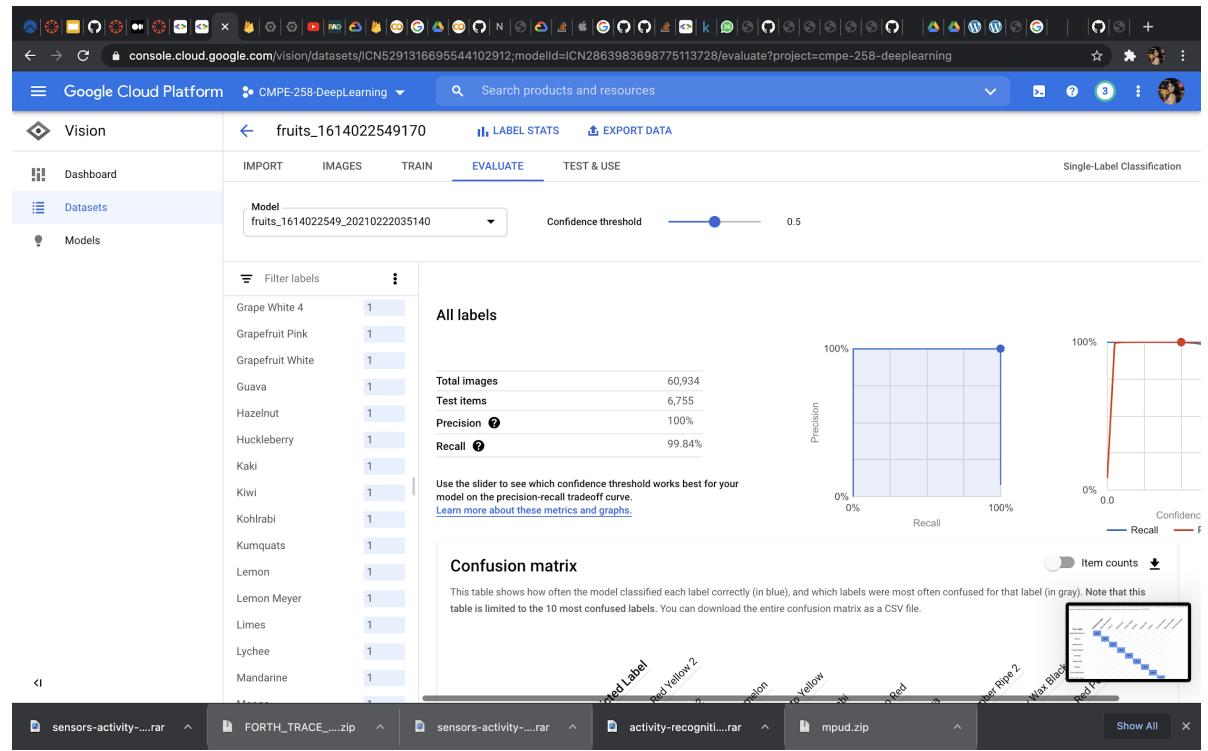
- fruits_1614022549170**: Single-Label Classification, 67,689 total images, 67,689 labeled images, last updated Feb 22, 2021, 12:31:53 PM. Status: Success: Training model.
- flower_img_classification**: Single-Label Classification, 1,000 total images, 1,000 labeled images, last updated Feb 21, 2021, 1:47:15 AM. Status: Success: Training model.

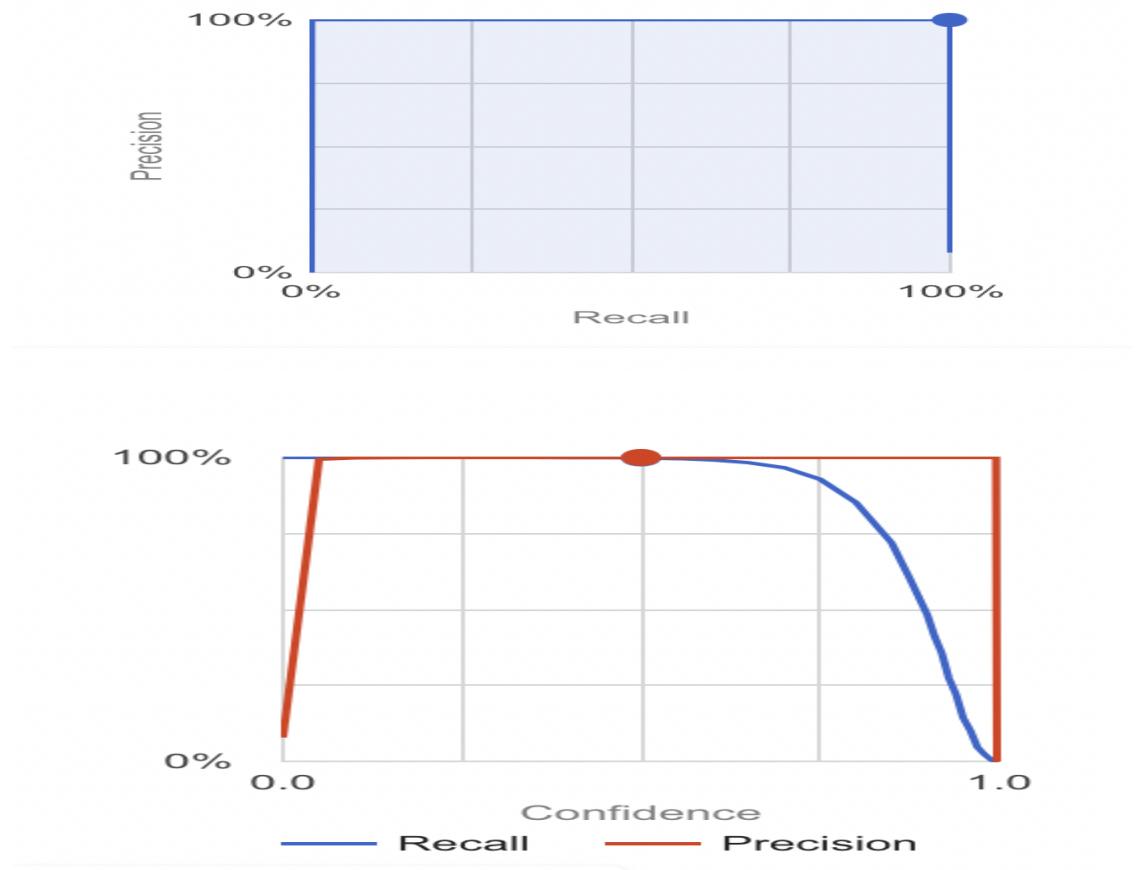
A message indicates that AutoML Vision is now available in the new AI Platform (Unified). A button to "GO TO UNIFIED AI PLATFORM" is present.

Below the datasets, the interface switches to the "IMAGES" tab for the fruits dataset. It displays 50 images per page, showing various fruits like Tomato, Apple, Onion, Cherry, Huckleberry, Peach, Tomato Yellow, Granadilla, Huckleberry, and Cherry Wax Red.

The URL in the browser is: <https://console.cloud.google.com/vision/datasets/ICN5291316695544102912;modelId=ICN2863983698775113728/images?project=cmpe-258-deeplearning>

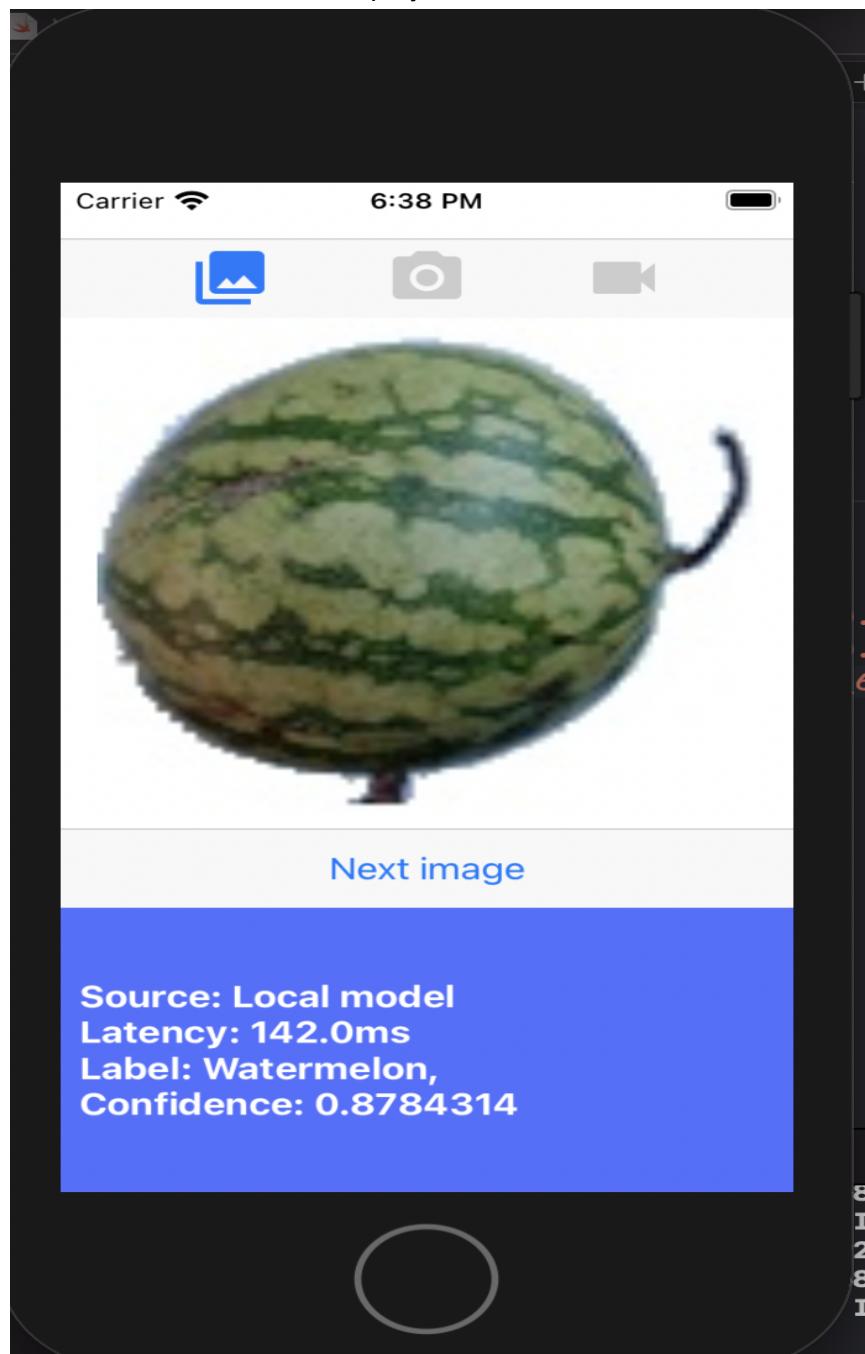
○ Model





This table shows how often the model classified each label correctly (in blue), and which labels were most often confused for that label (in gray). Note that this table is limited to the 10 most confused labels. You can download the entire confusion matrix as a CSV file.

- Downloaded TF Lite and Deployed on IOS Simulator



- II - Execute automl vision and timeseries forecasting models
 - Setup Notebook Environment
 - Enable API

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 (which is selected), Training, Models, Endpoints, and Batch predictions. The main area displays a table of notebook instances:

	Instance name	Zone	Environment	Machine type	GPUs	Permission
<input type="checkbox"/>	dl-a2-part2	us-central1-a	TensorFlow:2.4	4 vCPUs, 15 GB RAM	None	Service account
<input type="checkbox"/>	assignment1-part2	us-west1-b	TensorFlow:2.4	4 vCPUs, 15 GB RAM	None	Service account

■ Create AI Platform Notebook

The screenshot shows the Google Cloud Platform AI Platform (Unified) interface, specifically the "Notebook details" page for a notebook named "dl-a2-part2".

BASIC INFO

Region: us-central1 (Iowa)

Instance properties

Zone	us-central1-a
Environment	TensorFlow 2.4 (with Intel® MKL-DNN/MKL)
Machine type	n1-standard-4 (4 vCPUs, 15 GB RAM)
GPU	None
Boot disk	100 GB disk
Data disk	100 GB disk
Subnetwork	default(10.128.0.0/20)
Service account	338225716419-compute@developer.gserviceaccount.com
Permission mode	Service account
Sudo access	Enabled

Estimated costs

Item	Estimated costs
4 vCPUs, 15 GB RAM	\$138.70/month
Sustained use discount	-\$41.61/month
Total	\$97.09/month

■ Downloaded the lab Material from terminal

```

[ ]: # Copyright 2020 Google LLC
#
# Licensed under the Apache License, Version 2.0 (the "License");
# you may not use this file except in compliance with the License.
# You may obtain a copy of the License at
#
#     https://www.apache.org/licenses/LICENSE-2.0
#
# Unless required by applicable law or agreed to in writing, software
# distributed under the License is distributed on an "AS IS" BASIS,
# WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
# See the License for the specific language governing permissions and
# limitations under the License.

```

Overview

In this notebook, you'll learn how to submit a job to AI Platform Training. In the job you'll train your TensorFlow 2 model and export the saved model to Cloud Storage.

Dataset

CTA - Ridership - Daily Boarding Totals: This dataset shows systemwide boardings for both bus and rail services provided by Chicago Transit Authority, dating back to 2001.

Objective

The goal is to forecast future transit ridership in the City of Chicago, based on previous ridership.

Install packages and dependencies

Import libraries and define constants

```
[ 6]: import datetime
import googleapiclient.discovery
```

○ Model with time series forecasting

```

1 CREATE OR REPLACE MODEL
2   `cmpe-258-deeplearning.dl_a2_part2_time_series.cta_ridership_model` OPTIONS(MODEL_TYPE='ARIMA',
3   TIME_SERIES_TIMESTAMP_COL='service_date',
4   TIME_SERIES_DATA_COL='total_rides',
5   HOLIDAY_REGION='us') AS
6   SELECT
7     service_date, total_rides
8   FROM
9     `cmpe-258-deeplearning.dl_a2_part2_time_series.cta_ridership`

```

Query results

Query complete (40.5 sec elapsed, 4.4 MB (ML) processed)

Job information Results Execution details

This statement will replace the model named cmpe-258-deeplearning.dl_a2_part2_time_series.cta_ridership_model. Depending on the type of model, this may take several hours to complete.

The screenshot shows the Google Cloud Platform BigQuery interface. On the left, the sidebar includes options like Home, Time, Data, Notebooks, Jupyter, Hello, Assignments, SC (selected), Jupyter, Hello, custom, keras, AutoML, fsm6, Using, neural, 11-78, A2 - C, and Update. The main navigation bar shows "Google Cloud Platform" and "CMPE-258-DeepLearning". The search bar says "Search products and resources".

The main area is titled "BigQuery" and "SQL workspace". It features an "Explorer" section with a search bar and a list of pinned projects. One project, "cmpe-258-deeplearning", is expanded, showing datasets "dl_a2_part2_time_series" and "cta_ridership", and a table "cta_ridership_model". Another dataset "bqquery-public-data" is also listed.

A query editor window is open with the following SQL code:

```
1 SELECT
2   *
3   FROM
4   ML.EVALUATE(MODEL `cmpe-258-deeplearning.dl_a2_part2_time_series..cta_ridership_model`)
```

The "RUN" button is highlighted. Below the editor, the "Query results" section shows the output of the query. The results table has columns: Row, non_seasonal_p, non_seasonal_d, non_seasonal_q, has_drift, log_likelihood, AIC, variance, and seasonal. The data is as follows:

Row	non_seasonal_p	non_seasonal_d	non_seasonal_q	has_drift	log_likelihood	AIC	variance	seasonal
1	1	1	4	true	-84343.91298029698	168701.82596059397	2.1214766324672794E9	WEEKLY
2	1	1	4	false	-84345.76278035615	168703.5255607123	2.12262	WEEKLY
3	4	1	1	true	-84346.86918283005	168707.7383656601	2.12328	WEEKLY

Below the table, it says "Rows per page: 100 1 - 42 of 42 First page < > Last page". At the bottom of the results section are tabs for "JOB HISTORY", "QUERY HISTORY", and "SAVED QUERIES".

- **Cleanup**