CMPE-258 HW2 Part 1 Auto AI/ML Abhishek Bais
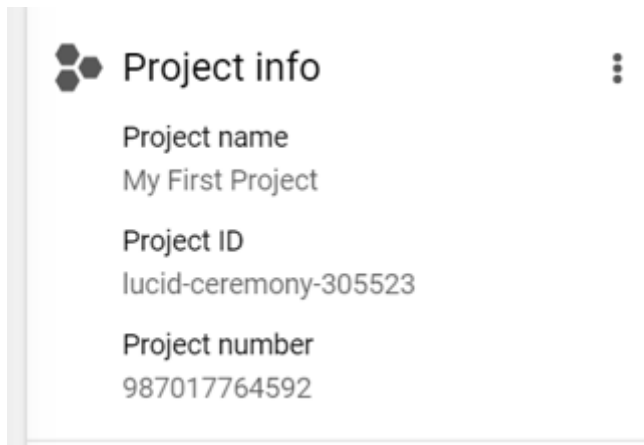
AI Platform training on google cloud

Setup Project

a) Create Project

Project info

Project name
My First Project

Project ID
lucid-ceremony-305523

Project number
987017764592

b) Enable API

Register your application for Cloud AI Platform API in Google Cloud Platform

Google Cloud Platform allows you to manage your application and monitor API usage.

Select a project where your application will be registered
You can use one project to manage all of your applications, or you can create a different project for each application.

My First Project

Continue

c) Create a JSON service account key

Service account

abais

Key type
Downloads a file that contains the private key. Store the file securely because this key can't be recovered if lost.

- ● JSON
  Recommended
- ○ P12
  For backward compatibility with code using the P12 format

Create   Cancel

1. Hello Image Classification Model

a) Activate cloud shell, create cloud storage bucket, copy sample images to your bucket

```
 2  ls
 3  export PROJECT_ID=lucid-ceremony-305523
 4  gsutil mb -p ${PROJECT_ID} -l us-central1 gs://${PROJECT_ID}/
 5  export BUCKET=${PROJECT_ID}
 6  gsutil -m cp -R gs://cloud-ml-data/img/flower_photos/ gs://${BUCKET}/img/
 7  gsutil cat gs://${BUCKET}/img/flower_photos/all_data.csv | sed "s:cloud-ml-data:${BUCKET}:" > all_data.csv
 8  gsutil cp all_data.csv gs://${BUCKET}/csv/
 9  gs://${BUCKET}/img/flower_photos/all_data.csv:
10  gs://${BUCKET}/img/flower_photos/all_data.csv
```

```
Your Cloud Platform project in this session is set to lucid-ceremony-305523.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
abhishek_bais@cloudshell:~ (lucid-ceremony-305523)$ ls
all_data.csv  README-cloudshell.txt
```

	Name ↑	Location	Default storage class ❓	Updated ❓
☐	cloud-ai-platform-acb62e23-66da-410e-b124-7ea4f31488...	us-central1 (lo...	Regional	Feb 20, 2021, 4:11:52 PM
☐	lucid-ceremony-305523	us-central1 (lo...	Standard	Feb 20, 2021, 4:50:40 PM

Filter — Filter buckets

💡 Bucket sorting and filtering are available in the Storage browser. Now you can filter your buckets by any value and sort by any column.

b) Import Dataset from google cloud bucket

		Name	ID	Region	Type	Items	Labels	Last updated ↓	Status
☐	▶ ✅	untitled_1613869019938	6571402767217197056	us-central1	🖼️ Image	3,667	-	February 20, 2021	Finished importing data

c) Browse Dataset

← untitled_1613869019938   untitled_1613869019938_... ▼   ❓

IMPORT	BROWSE	ANALYZE

All	3,667
Labeled	3,667
Unlabeled	0

Filter labels +

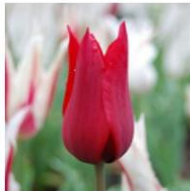| daisy | 633 |
dandelion	898
roses	641
sunflowers	697
tulips	798

ADD NEW LABEL

Filter items

❗ Unable to import data due to errors.

☐ Select all

roses   daisy   tulips

d) Analyze the dataset

You're ready to train

Your dataset meets the recommendation of 100 images assigned to each label. Learn more ⧉

Labels ↑	Images
daisy	633
dandelion	898
roses	641
sunflowers	697
tulips	798

e) Train Model

Training **PREVIEW**   ➕ CREATE   ↻ RI

TRAINING PIPELINE   CUSTOM JOB   HYPERPARAMETER TUNING

Training pipelines are the primary model training workflow in AI Platform (Unified). You can use training pipelines to create an AutoML-trained model or a custom-trained model. For custom-trained models, training pipelines orchestrate custom training jobs and hyperparameter tuning with additional steps like adding a dataset or uploading the model to AI Platform for prediction serving. Learn More

Region
us-central1 (Iowa)   ❓

Filter training pipelines...   ❓

Name	ID	Job type	Model type	Status	Created	Elapsed time
✓ untitled_1613869019938_202122111837	8163741894841466880	Training pipeline	🖼 Image classification (Single-label)	Succeeded	Feb 20, 2021, 5:20:12 PM	24 min 1 sec

f) Evaluate the Model

←   untitled_1613869019938_202122111837   ▦ VIEW DATASET

EVALUATE   DEPLOY & TEST   BATCH PREDICTIONS   MODEL PROPERTIES
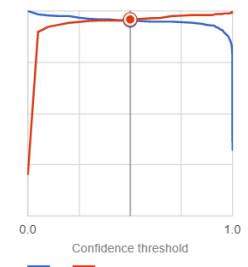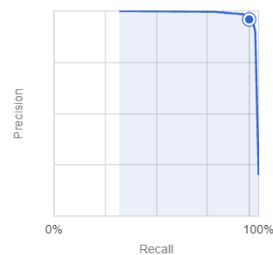
Filter labels   Confidence threshold ❓ ———●——— 0.5

All labels	0
sunflowers	0.99870
dandelion	0.99568
daisy	0.99287
tulips	0.98138
roses	0.93601

All labels

Average precision	0.99
Precision	95.9%
Recall	95.4%
Created	Feb 20, 2021, 5:45:53 PM
Total images	3,667
Training images	2,933
Validation images	367
Test images	367

Use the slider to see which score threshold works best for your model on the precision-recall tradeoff curve. Learn more about these metrics and graphs

g) Deploy Model

		Model	Traffic split	Compute nodes	Type	Created ↑
☑	●					
☑	✓	untitled_1613869019938_202122111837	100%	Auto (1 minimum, 1 maximum)	Image classification	Feb 20, 2021, 8:51:07 PM

Region
us-central1

Logs
View Logs ⧉

hello_automl_image   ✎ EDIT SETTINGS   <> SAMPLE REQUEST

h) Test Model

untitled_1613869019938_202122111837   ⊞ VIEW DATASET

EVALUATE   DEPLOY & TEST   BATCH PREDICTIONS   MODEL PROPERTIES

Test your model PREVIEW

Test your model

Item 1 of many

≡ Filter labels

sunflowers		1.000
dandelion		0.000
tulips		0.000
roses		0.000
daisy		0.000

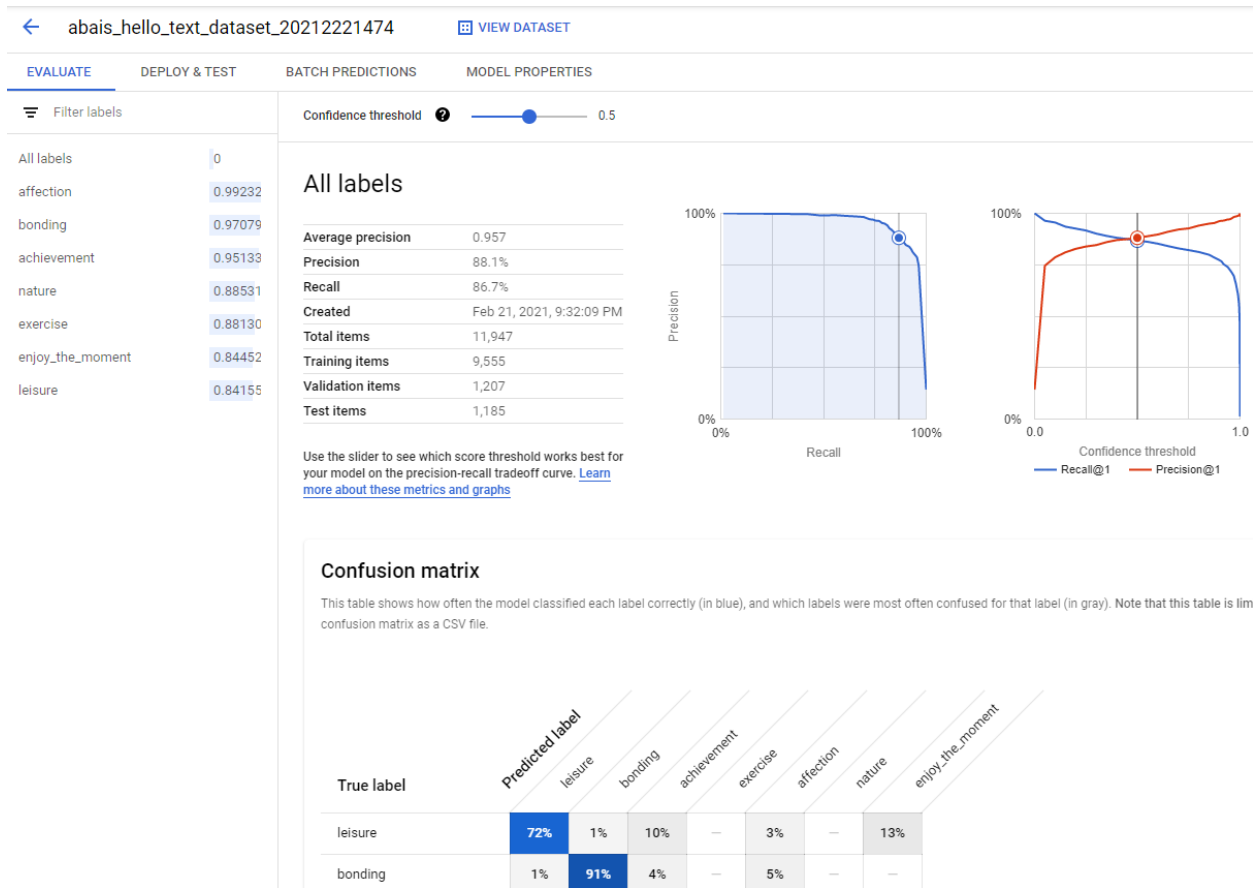## 2. Hello Text Classification Model

a) Activate cloud shell, create cloud storage bucket, copy sample text dataset to your bucket

```
 16   export PROJECT_ID=lucid-ceremony-305523
 17   export BUCKET=${PROJECT_ID}-lcm
 18   gsutil mb -p ${PROJECT_ID} -l us-central1 gs://${BUCKET}/
 19   gsutil -m cp -R gs://cloud-ml-data/NL-classification/happiness.csv gs://${BUCKET}/text/
 20   history
abhishek_bais@cloudshell:~ (lucid-ceremony-305523)$ ▯
```

b) Import Dataset from google cloud bucket

		Name	ID	Region	Type	Items	Labels	Last updated ↓	Status
☐	●								
☐	▶ ✓	abais_hello_text_dataset	314214034939314176	us-central1	📄 Text	11,947	-	February 21, 2021	Finished importing data
☐	▶ ✓	untitled_1613869019938	6571402767217197056	us-central1	🖼 Image	3,667	-	February 20, 2021	Finished importing data

c) Browse dataset

IMPORT   **BROWSE**   ANALYZE

All	11,947
Labeled	11,947
Unlabeled	0

Filter labels +

achievement	3,791
affection	4,232
bonding	1,303
enjoy_the_moment	1,343
exercise	172
leisure	832
nature	274

ADD NEW LABEL

Filter items

❗ Unable to import data due to errors.   DETAILS   DISMISS

☐		Text	Labels
☐	⌄	My eldest son who is 27 just got word he has a new job after finishing his bache...	achievement
☐	⌄	I visited my best friend at her school on St. Patrick's day.	bonding
☐	⌄	My mom cooked some delicious rice for me with curd.	affection
☐	⌄	Today I make Eye contact with my crush. She Also look into my Eyes For a Seco...	affection
☐	⌄	I was dropping off my son for a sleepover. He was really excited to go. I droppe...	affection
☐	⌄	Dinner tonight was really good.	leisure
☐	⌄	I WENT TO MEENAKSHI AMMAN TEMPLE WITH MY FAMILY MEMBERS.	affection
☐	⌄	I got the test results back from my father's echo and neck arteries taken at the ...	affection
☐	⌄	I was selected as the winner for a random lottery drawing from an mturk hit. It ...	achievement
☐	⌄	My brother told me he got into med school!	affection

Items per page: 10 ▾   1 – 10 of many   ‹ ›

d) Analyze the dataset

← abais_hello_text_dataset   abais_hello_text_dataset_... ▾   ?

IMPORT   BROWSE   **ANALYZE**

You're ready to train

Your dataset meets the recommendation of 100 text items assigned to each label. Learn more ↗

Labels ↑	Text items
achievement	3791
affection	4232
bonding	1303

e) Train Model

Filter training pipelines...

Name	ID	Job type	Model type	Status	Created	Elapsed time
✓ Structured_AutoML_Tutorial_202122243140	6261534002230853632	Training pipeline	⊞ Tabular classification	Succeeded	Feb 21, 2021, 8:32:56 PM	1 hr 6 min
✓ abais_hello_video_dataset_202122233610	2522983361559920640	Training pipeline	🖵 Video classification	Succeeded	Feb 21, 2021, 7:36:33 PM	1 hr 59 min
✓ abais_hello_text_dataset_20212221474	6491780533180170240	Training pipeline	📄 Text classification (Single-label)	Succeeded	Feb 21, 2021, 5:48:01 PM	3 hr 44 min
✓ hello_custom	1526561944004198400	Training pipeline	⚙ Custom	Succeeded	Feb 21, 2021, 8:13:52 PM	15 min 7 sec
✓ untitled_1613869019938_202122111837	8163741894841466880	Training pipeline	🖼 Image classification (Single-label)	Succeeded	Feb 20, 2021, 5:20:12 PM	24 min 1 sec

f) Evaluate the Model

abais_hello_text_dataset_20212221474   ▦ VIEW DATASET

EVALUATE | DEPLOY & TEST | BATCH PREDICTIONS | MODEL PROPERTIES

≡ Filter labels

All labels	0
affection	0.99232
bonding	0.97079
achievement	0.95133
nature	0.88531
exercise	0.88130
enjoy_the_moment	0.84452
leisure	0.84155

Confidence threshold ❓ ———●——— 0.5

All labels

Average precision	0.957
Precision	88.1%
Recall	86.7%
Created	Feb 21, 2021, 9:32:09 PM
Total items	11,947
Training items	9,555
Validation items	1,207
Test items	1,185

Use the slider to see which score threshold works best for your model on the precision-recall tradeoff curve. Learn more about these metrics and graphs

Recall@1   Precision@1

Confusion matrix

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 limi[...] confusion matrix as a CSV file.

True label	leisure	bonding	achievement	exercise	affection	nature	enjoy_the_moment
leisure	72%	1%	10%	—	3%	—	13%
bonding	1%	91%	4%	—	5%	—	—

g) Deploy Model

DEPLOY TO ENDPOINT

	Endpoint	ID	Models	Region	Last updated	API	Notification	Metadata	Encryption
✓	hello_automl_text	7045705695160696832	1	us-central1	Feb 21, 2021, 10:47:17 PM	Sample request			Google-managed key

h) Send a prediction, Test Model

Test your model PREVIEW

Hi, My name is Abhishek Bais and I find my class of CMPE-258 deep learning very interesting. I am learning new things here and look forward to coming out on top.

PREDICT

≡ Filter labels

affection	0.007
achievement	0.992
enjoy_the_moment	0.001
bonding	0.000
leisure	0.000
nature	0.000
exercise	0.000

3) Hello Video Classification Model
a) Get the dataset from the location below

`[gs://]automl-video-demo-data/hmdb_split1_5classes_all.csv`

b) Import Dataset from google cloud bucket

		Name	ID	Region	Type	Items	Labels	Last updated ↓	Status
☐	▶ ✅	abais_hello_video_dataset	5869404175300820992	us-central1	🖥 Video	500	-	February 21, 2021	Finished importing data
☐	▶ ✅	abais_hello_text_dataset	314214034939314176	us-central1	📄 Text	11,947	-	February 21, 2021	Finished importing data
☐	▶ ✅	untitled_1613869019938	6571402767217197056	us-central1	🖼 Image	3,667	-	February 20, 2021	Finished importing data

c) Browse dataset

d) Analyze the dataset

e) Train Model

Name	ID	Job type	Model type	Status	Created	Elapsed time
✓ Structured_AutoML_Tutorial_202122243140	6261534002230853632	Training pipeline	⊞ Tabular classification	Succeeded	Feb 21, 2021, 8:32:56 PM	1 hr 6 min
✓ abais_hello_video_dataset_202122233610	2522983361559920640	Training pipeline	▭ Video classification	Succeeded	Feb 21, 2021, 7:36:33 PM	1 hr 59 min
✓ abais_hello_text_dataset_20212221474	6491780533180170240	Training pipeline	▤ Text classification (Single-label)	Succeeded	Feb 21, 2021, 5:48:01 PM	3 hr 44 min
✓ hello_custom	1526561944004198400	Training pipeline	⊛ Custom	Succeeded	Feb 21, 2021, 8:13:52 PM	15 min 7 sec
✓ untitled_1613869019938_202122111837	8163741894841466880	Training pipeline	▦ Image classification (Single-label)	Succeeded	Feb 20, 2021, 5:20:12 PM	24 min 1 sec

f) Evaluate the Model

← abais_hello_video_dataset_202122233610   ⊞ VIEW DATASET

EVALUATE   TEST   BATCH PREDICTIONS   MODEL PROPERTIES

Filter labels

Confidence threshold ❓ ——●—— 0.5

All labels	0
golf	1
kick_ball	1
cartwheel	1
ride_horse	1
pullup	1

All labels

Average precision	1
Precision	100%
Recall	96%
Created	Feb 21, 2021, 9:35:35 PM
Training videos	400
Test videos	100

Use the slider to see which confidence threshold works best for your model on the precision-recall tradeoff curve. Learn more about these metrics and graphs

Confusion matrix

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 l confusion matrix as a CSV file.

True label	pullup	kick_ball	cartwheel	golf	ride_horse
pullup	100%	—	—	—	—
kick_ball	—	100%	—	—	—
cartwheel	—	—	100%	—	—

g) Batch predictions

← abais_hello_video_batch_prediction

Model	abais_hello_video_dataset_202122233610
Objective	Video classification
Import location	gs://automl-video-demo-data/hmdb_split1_predict.jsonl
Total items	5
Predicted items	5
Created	Feb 21, 2021 at 10:14PM
Updated	Feb 21, 2021 at 10:18PM
Elapsed time	3 min 38 sec
Status	Completed without errors
Export location	gs://abais_hello_custom_lucid-ceremony-305523/predict_results/prediction-abais_hello_video_dataset_202122233610-2021-02-22T06:14:30.072884Z

VIEW RESULTS

abais_hello_custom_lucid-ceremony-305523

OBJECTS   CONFIGURATION   PERMISSIONS   RETENTION   LIFECYCLE

Buckets > abais_hello_custom_lucid-ceremony-305523 > predict_results > prediction-abais_hello_video_dataset_202122233610-2021-02-22T06:14:30.072884Z

UPLOAD FILES   UPLOAD FOLDER   CREATE FOLDER   MANAGE HOLDS   DOWNLOAD   DELETE

Filter by name prefix only ▾   ▼ Filter   Filter objects and folders

	Name	Size	Type	Created time ❓	Storage class	Last modified	Public access ❓	Encryption ❓	Retention expiration date ❓
☐	📄 errors.jsonl	0 B	application/octet-stream	Feb 21, 2021, 1...	Standard	Feb 21, 20...	Not public	Google-managed key	—
☐	📄 predictions_00001.j	3.4 KB	application/octet-stream	Feb 21, 2021, 1...	Standard	Feb 21, 20...	Not public	Google-managed key	—
☐	📄 predictions_00002.j	2.6 KB	application/octet-stream	Feb 21, 2021, 1...	Standard	Feb 21, 20...	Not public	Google-managed key	—
☐	📄 predictions_00003.j	2.6 KB	application/octet-stream	Feb 21, 2021, 1...	Standard	Feb 21, 20...	Not public	Google-managed key	—
☐	📄 predictions_00004.j	3.4 KB	application/octet-stream	Feb 21, 2021, 1...	Standard	Feb 21, 20...	Not public	Google-managed key	—
☐	📄 predictions_00005.j	3.4 KB	application/octet-stream	Feb 21, 2021, 1...	Standard	Feb 21, 20...	Not public	Google-managed key	—

h) Demo model predictions – batch predictions, view results
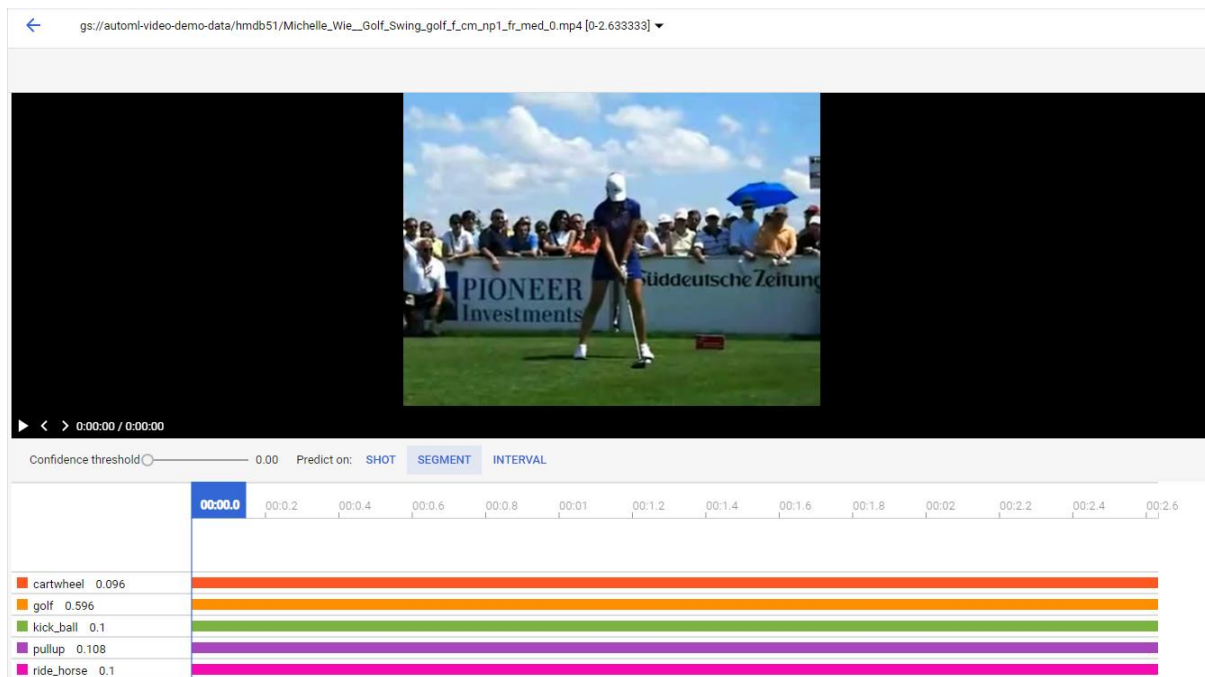
4. Hello Custom Image Classification Model

a) Copy sample custom dataset to your bucket

```
36  gcloud config set project lucid-ceremony-305523
37  gsutil mb -p lucid-ceremony-305523 -l us-central1 gs://abais_hello_custom_lucid-ceremony-305523
38  gsutil cp gs://cloud-samples-data/ai-platform/hello-custom/hello-custom-sample-v1beta1.tar.gz - | tar -xzv
```

```
Creating gs://abais_hello_custom_lucid-ceremony-305523/...
abhishek_bais@cloudshell:~ (lucid-ceremony-305523)$ gsutil cp gs://cloud-samples-data/ai-platform/hello-custom/hello-custom-sample-v1beta1.tar.gz - | tar -xzv
hello-custom-sample/
hello-custom-sample/webapp/
hello-custom-sample/function/
hello-custom-sample/setup.py
hello-custom-sample/trainer/
hello-custom-sample/trainer/task.py
hello-custom-sample/trainer/__init__.py
hello-custom-sample/function/requirements.txt
hello-custom-sample/function/main.py
hello-custom-sample/webapp/._index.html
hello-custom-sample/webapp/index.html
hello-custom-sample/webapp/image-list.txt
hello-custom-sample/webapp/index.css
hello-custom-sample/webapp/main.js
hello-custom-sample/webapp/function-url.js
```

b) Run a custom training pipeline

Training PREVIEW   + CREATE

| TRAINING PIPELINE | CUSTOM JOB | HYPERPARAMETER TUNING |

Custom jobs specify how AI Platform (Unified) runs your custom training code, including worker pools, machine types, and settings related to your Python training application and custom container. Custom jobs are only used by custom-trained models and not AutoML models. Learn More

Region
us-central1 (Iowa)

Filter training pipelines...

Name	ID	Job type	Model type	Status	Created	Elapsed time
✅ hello_custom-custom-job	7956576311982424064	Custom job	-	Succeeded	Feb 21, 2021, 8:14:02 PM	6 min 14 sec

c) Monitor training

← hello_custom-custom-job

🛈   Custom job was completed on Feb 21, 2021, 8:26:38 PM.

Status	Succeeded
Custom job ID	7956576311982424064
Created	Feb 21, 2021, 8:14:02 PM
Start time	Feb 21, 2021, 8:20:24 PM
Elapsed time	6 min 14 sec
Region	us-central1
Encryption type	Google-managed key

Machine type (Worker pool 0)	n1-standard-4
Machine count (Worker pool 0)	1
Container Location (Worker pool 0)	us-docker.pkg.dev/cloud-aiplatform/training/tf-cpu.2-1:latest

Algorithm	Custom training
Objective	Custom
Container (Training)	Prebuilt; TensorFlow 2.1; Python 3.7
Package locations	gs://abais_hello_custom_lucid-ceremony-305523/training/hello-custom-training-2.0.tar.gz
Logs	View logs

d) View custom trained model

←   hello_custom   ⬇ EXPORT

DEPLOY & TEST   BATCH PREDICTIONS   **MODEL PROPERTIES**

ⓘ   This model finished training on Feb 21, 2021, 8:29:09 PM.

Status	Succeeded
Model ID	7569161190912294912
Training pipeline ID	1526561944004198400
Created	Feb 21, 2021, 8:13:52 PM
Training time	15 min 7 sec
Region	us-central1
Encryption type	Google-managed key
Machine type (Worker pool 0)	n1-standard-4
Machine count (Worker pool 0)	1
Container Location (Worker pool 0)	us-docker.pkg.dev/cloud-aiplatform/training/tf-cpu.2-1:latest
Dataset	No managed dataset
Algorithm	Custom training
Objective	Custom
Container (Training)	Prebuilt; TensorFlow 2.1; Python 3.7
Package locations	gs://abais_hello_custom_lucid-ceremony-305523/training/hello-custom-training-2.0.tar.gz
Container (inference)	Prebuilt; TensorFlow 2.1; Python 3.7
Container Location (inference)	us-docker.pkg.dev/cloud-aiplatform/prediction/tf2-cpu.2-1:latest

Models PREVIEW   ➕ CREATE   ⬇ IMPORT

Models are built from your datasets or unmanaged data sources. There are many different types of machine learning models available on AI Platform, depending on your use case and level of experience with machine learning. Learn more

Region
us-central1 (Iowa) ▼   ❓

☰ Filter models...

● Name	ID	Data	Endpoints	Region	Type	Created
✅ automl_abaisflowers_20210222012303 (1)	8531805611262738432	—	0	us-central1	🖼 Image classification	Feb 22, 2021, 9:43:30 AM
✅ automl_abaisflowers_20210222012303	2713154892700057600	—	0	us-central1	🖼 Image classification	Feb 22, 2021, 9:42:39 AM
✅ abais_hello_custom_2	6555851274753933312	—	1	us-central1	⊗ Custom trained	Feb 22, 2021, 9:08:03 AM
✅ Structured_AutoML_Tutorial_202122243140	6889680597132771328	Structured_AutoML_Tutorial	1	us-central1	⊞ Tabular	Feb 21, 2021, 8:32:56 PM
✅ abais_hello_video_dataset_202122233610	1995956652041306112	abais_hello_video_dataset_vcn	0	us-central1	🖵 Video classification	Feb 21, 2021, 7:36:33 PM
✅ abais_hello_text_dataset_20212221474	5668642148161945600	abais_hello_text_dataset_tcn	1	us-central1	▤ Text classification	Feb 21, 2021, 5:48:01 PM
✅ hello_custom	7569161190912294912	—	6	us-central1	⊗ Custom trained	Feb 21, 2021, 8:13:52 PM
✅ untitled_1613869019938_202122111837	4513468843741413376	untitled_1613869019938_icn	1	us-central1	🖼 Image classification	Feb 20, 2021, 5:20:12 PM

e) Deploy to endpoint

		Endpoint	ID	Models	Region	Last updated	API
☐	✔	abais_hello_custom_endpoint	1428591059922845696	1	us-central1	Feb 21, 2021, 11:14:55 PM	Sample request
☐	✔	hello_automl_text	7045705695160696832	1	us-central1	Feb 21, 2021, 10:47:17 PM	Sample request

▼ Filter endpoints

f) Deploy a cloud function

```
securityLevel: SECURE_OPTIONAL
  url: https://us-central1-automl-custom-305000.cloudfunctions.net/classify_flower
ingressSettings: ALLOW_ALL
labels:
  deployment-tool: cli-gcloud
name: projects/automl-custom-305000/locations/us-central1/functions/classify_flower
runtime: python37
serviceAccountEmail: automl-custom-305000@appspot.gserviceaccount.com
sourceUploadUrl: https://storage.googleapis.com/gcf-upload-us-central1-6e0e311b-9673-4518-8048-673a1202e803/99fb662b-0682-43c4-af64-04b3635c86b0.zip?GoogleAccessId=service-256243604088@gcf-ad
  22aceQgv9U0o5qp8Ee5dO942F43asVIOOs01G1zPg1DroZ5n69FnB1A11k80YNM8aLq41D94BXq7atfqcexu42BknMCkQt3S2TY0dEe7IkyWZxKsqQ3uYaBgW6kz4ZQ0b0x4nZ80bS1Z42Bp80oBwq8NtCxR7anYROUj8d9zcru9Lso5TN0J8Yp1c44eq9Y
  WPxDO42FKChYwGObXwRa2Nb3QKYMPFXtwqoDkSj010bY3G4F8vSPSQ43D43D
status: ACTIVE
timeout: 60s
updateTime: '2021-02-18T00:16:33.003Z'
versionId: '3'
```

g) Use a webapp to make predictions

Hello custom training

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

`GET SIX NEW IMAGES`

tulips

Prediction (probabilities):

- tulips: 0.963485837
- sunflowers: 0.0224831905
- daisy: 0.00806518644
- roses: 0.00452096574
- dandelion: 0.00144479657

tulips

Prediction (probabilities):

- tulips: 0.802598417
- roses: 0.197400212
- daisy: 8.83285054e-7
- dandelion: 2.57974506e-7
- sunflowers: 1.74494517e-7

5. Hello structured data Classification Model
a) Get structured dataset underneath from the cloud storage

`cloud-ml-tables-data/bank-marketing.csv`

b) Import Dataset from google cloud

▼ Filter datasets

		Name	ID	Region	Type	Items	Labels	Last updated ↓	Status
☐	✔	Structured_AutoML_Tutorial	7947252453378883584	us-central1	⊞ Tabular	-	-	February 21, 2021	Created dataset
☐ ▶	✔	abais_hello_video_dataset	5869404175300820992	us-central1	▢ Video	500	-	February 21, 2021	Finished importing data
☐ ▶	✔	abais_hello_text_dataset	314214034939314176	us-central1	▤ Text	11,947	-	February 21, 2021	Finished importing data
☐ ▶	✔	untitled_1613869019938	6571402767217197056	us-central1	▣ Image	3,667	-	February 20, 2021	Finished importing data

c) Analyze the dataset, generate statistics

← Structured_AutoML_Tutorial

SOURCE   **ANALYZE**

Dataset Info

Created: Feb 21, 2021 8:15 PM

Dataset format: CSV

Dataset location: gs://cloud-ml-.../bank-marketing.csv ☒

Summary

Total columns: 17

Total rows: 45,211

General statistics generated by Feb 21, 2021 8:25 PM   **GENERATE STATISTICS**

▼ Enter property name or value   ❓

Field Name ↑	Missing % (count) ❓	Distinct values ❓
Age	-	77
Balance	-	7168
Campaign	-	48
Contact	-	3
Day	-	31

d) Train Model

▼ Filter training pipelines...   ❓

Name	ID	Job type	Model type	Status	Created	Elapsed time
✓ Structured_AutoML_Tutorial_202122243140	6261534002230853632	Training pipeline	▦ Tabular classification	Succeeded	Feb 21, 2021, 8:32:56 PM	1 hr 6 min
✓ abais_hello_video_dataset_202122233610	2522983361559920640	Training pipeline	▢ Video classification	Succeeded	Feb 21, 2021, 7:36:33 PM	1 hr 59 min
✓ abais_hello_text_dataset_20212221474	6491780533180170240	Training pipeline	▤ Text classification (Single-label)	Succeeded	Feb 21, 2021, 5:48:01 PM	3 hr 44 min
✓ hello_custom	1526561944004198400	Training pipeline	⊗ Custom	Succeeded	Feb 21, 2021, 8:13:52 PM	15 min 7 sec
✓ untitled_1613869019938_202122111837	8163741894841466880	Training pipeline	▨ Image classification (Single-label)	Succeeded	Feb 20, 2021, 5:20:12 PM	24 min 1 sec

e) Monitor (Target: Deposit, Objective: Tabular classification)

← Structured_AutoML_Tutorial_202122243140   ⊞ VIEW DATASET

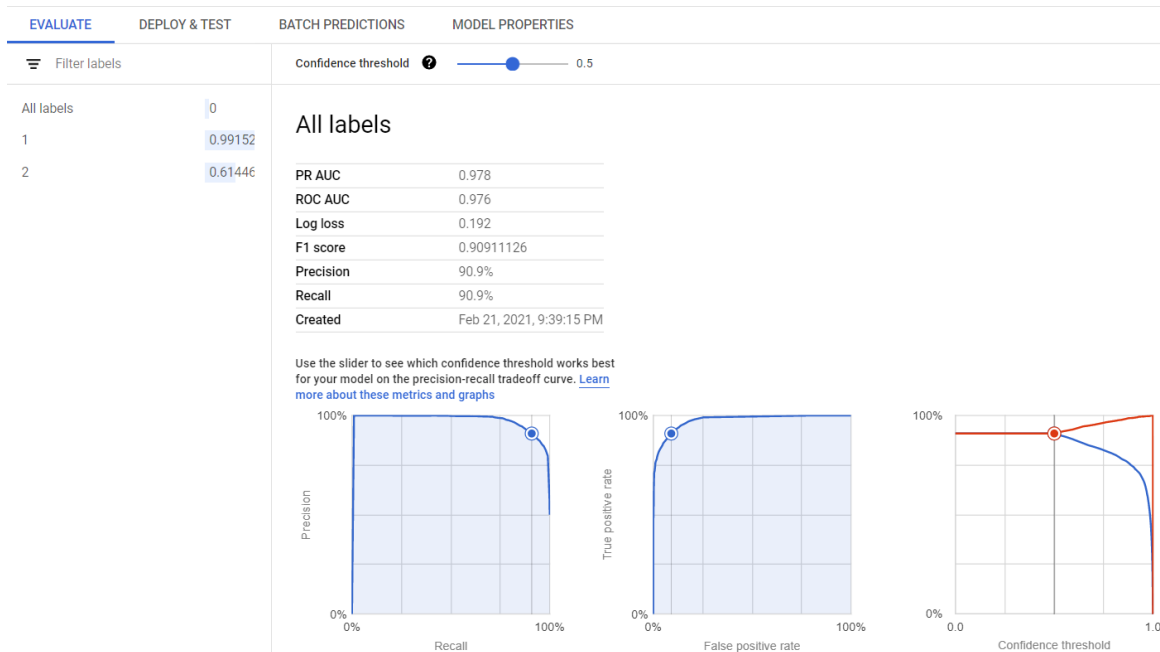EVALUATE   DEPLOY & TEST   BATCH PREDICTIONS   **MODEL PROPERTIES**

ⓘ   This model finished training on Feb 21, 2021, 9:39:36 PM.

Status	Succeeded
Model ID	6889680597132771328
Training pipeline ID	6261534002230853632
Created	Feb 21, 2021, 8:32:56 PM
Budget (original)	1 node hours
Training time	1 hr 6 min
Region	us-central1
Encryption type	Google-managed key

Dataset	Structured_AutoML_Tutorial
Dataset ID	7947252453378883584
Target column	Deposit
Data split	Randomly assigned (80/10/10)
Model hyperparameters	Model Trials
Transformation options	View details

Algorithm	AutoML
Objective	Tabular classification
Optimized for	Log loss

f) Evaluate the Model

EVALUATE	DEPLOY & TEST	BATCH PREDICTIONS	MODEL PROPERTIES

≡ Filter labels

Confidence threshold ❓ ──────●──── 0.5

All labels	0
1	0.99152
2	0.61446

All labels

PR AUC	0.978
ROC AUC	0.976
Log loss	0.192
F1 score	0.90911126
Precision	90.9%
Recall	90.9%
Created	Feb 21, 2021, 9:39:15 PM

Use the slider to see which confidence threshold works best for your model on the precision-recall tradeoff curve. Learn more about these metrics and graphs

g) Deploy Model

DEPLOY TO ENDPOINT

	Endpoint	ID	Models	Region	Last updated	API	Notification	Metadata	Encryption
✓	Structured_AutoML_Tutorial	6262079359998230528	1	us-central1	Feb 21, 2021, 10:12:16 PM	Sample request			Google-managed key

h) Predict

Test your model PREVIEW

Feature column name	Type	Required or optional	Value	Local feature importance
Age	Text	Required	28	-0.00201067328453064
Balance	Text	Required	447	0.0001128613948822021
Campaign	Text	Required	1	-0.001945515473683675
Contact	Text	Required	unknown	0.02199845512708028
Day	Text	Required	5	0.0003501127163569133

Predict label

Prediction result

1

Confidence score: 0.9957932233810425