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Hello Image

1. Create a dataset, select Image classification (single-label)

Dataset name *

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](#)

IMAGE TABULAR TEXT VIDEO

Upload dataset of cat/dog images

Google Cloud Platform My First Project Search products and resources

AI Platform (Unified) Datasets PREVIEW + CREATE REFRESH

Dashboard

Datasets

Labeling tasks

Notebooks

Training

Models

Endpoints

Batch predictions

Region us-central1 (Iowa)

Filter datasets

ID	Name	Type	Items	Labels	Last updated	Status	Metadata
5363030692198350848	untitled_1614486281927	Text	5	-	February 27, 2021	Finished importing data	⋮
8889349200429449216	untitled_1614474317695	Image	176	-	February 27, 2021	Finished importing data	⋮

Google Cloud Platform > My First Project > AI Platform (Unified)

Datasets

- All: 176
- Labeled: 138
- Unlabeled: 38
- Filter labels: cat, dog
- Add New Label

BROWSE

Filter items: Select all

cat	cat	cat
cat	cat	cat

Items per page: 10 | 1 - 10 of many

Training jobs and models

cat_dog_1614474317695_202122812617

Model type: Image classification

Labeling tasks

If your data still needs to be labeled, create a labeling task to have others label it for you

CREATE LABELING TASK

2. Train a new model

Train new model

1 Choose training method

2 Define your model

3 Compute and pricing

START TRAINING

CANCEL

Dataset: untitled_1614474317695

Annotation set: untitled_1614474317695_icn

Objective: Image classification (Single-label)

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

AutoML

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

AutoML Edge

Train a model that can be exported for on-prem/on-device use. Typically has lower accuracy. [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

Train new model

Choose training method
 Define your model
3 Compute and pricing

START TRAINING CANCEL

Enter the **maximum** number of node hours you want to spend training your model.

You can train for as little as 8 node hours. You may also be eligible to train with free node hours. [Pricing guide](#)

Budget *
 Maximum node hours

Estimated completion date: Mar 7, 2021 1 PM GMT-8

Enable early stopping
 Ends model training when no more improvements can be made and refunds leftover training budget. If early stopping is disabled, training continues until the budget is exhausted.

Google Cloud Platform • My First Project ▾

Search products and resources

AI Platform (Unified) [untitled_1614474317695](#) [untitled_1614474317695...](#) [?](#)

Dashboard IMPORT BROWSE ANALYZE

Consider assigning more labels
 For best results, it's recommended that at least **100 images** are assigned to each label.
 Consider assigning more images to labels with less than the recommended number.
[Learn more](#)

Here's what you can do:
 • Assign labels: Assign more labels on the Browse tab or create a labeling task to do it automatically
 • Add images: Upload more images on the Import tab
 • Remove labels: Go to the Browse tab and remove labels that don't have enough images

Labels ↑	Images
cat	
dog	

Custom data split

Training jobs and models

cat_dog_1614474317695_202122812617
 Model type: Image classification
[Resume Training](#)

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

Google Cloud Platform • My First Project ▾

Search products and resources

AI Platform (Unified) [cat_dog_1614474317695_202122812617](#) [VIEW DATASET](#)

EVALUATE DEPLOY & TEST BATCH PREDICTIONS MODEL PROPERTIES

Filter labels		Confidence threshold
All labels	0	<input type="range" value="0.5"/>
cat	1	
dog	1	

Recall 100%
Created Feb 27, 2021, 5:47:48 PM
Total images 138
Training images 110
Validation images 14
Test images 14

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](#)

Precision

0% 100%

0.0 1.0

3. Deploy to end point

The screenshot shows the Google Cloud Platform AI Platform (Unified) interface. On the left, there is a sidebar with the following navigation items:

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

The main content area has the following sections:

- EVALUATE** (disabled)
- DEPLOY & TEST** (selected)
- 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
hello_automl_image	4698626601858891776	1	us-central1	Feb 27, 2021, 6:29:55 PM	Sample request			Google-managed key

Test your model [PREVIEW]

UPLOAD IMAGE

hello_automl_image

EDIT SETTINGS **SAMPLE REQUEST**

Region us-central1 **Logs** View Logs

Model

Model	Traffic split	Compute nodes	Type	Created
cat_dog_1614474317695_202122812617	100%	Auto (1 minimum, 1 maximum)	Image classification	Feb 27, 2021, 6:21:43 PM

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

0.04/s
0.03/s
0.02/s
0.01/s

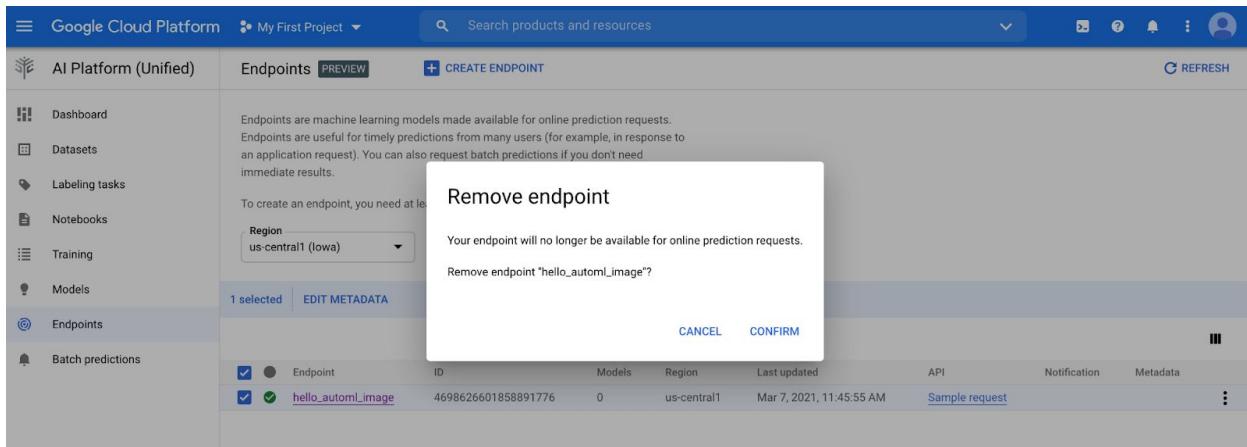
4. Test model

The screenshot shows the Google Cloud Platform AI Platform (Unified) interface. On the left, a sidebar menu includes options like Dashboard, Datasets, Labeling tasks, Notebooks, Training, Models (which is selected), Endpoints, and Batch predictions. The main area is titled "Test your model" and "PREVIEW". It displays a image of a black and white cat. To the right of the image is a table titled "Item 1 of many" with a "Filter labels" section. The table shows two rows: "cat" with a probability of "1.000" and "dog" with a probability of "0.000".

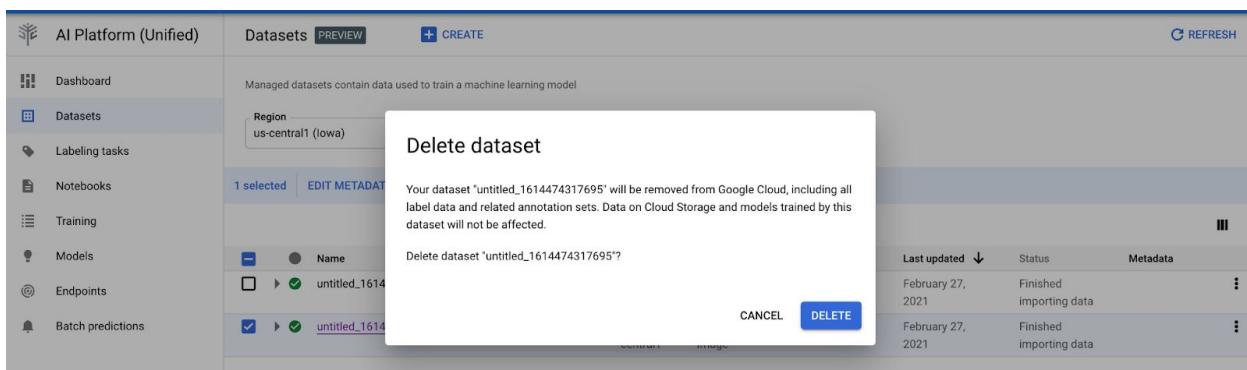
5. Cleanup

Undeploy model and remove endpoint

The screenshot shows the Google Cloud Platform AI Platform (Unified) interface for a specific model named "cat_dog_1614474317695_202122812617". The "DEPLOY & TEST" tab is selected. A modal dialog box is open, titled "Undeploy model". The dialog contains the text: "This will not delete the endpoint." and "Undeploy model 'cat_dog_1614474317695_202122812617' from endpoint 'hello_automl_image'?" At the bottom of the dialog are "CANCEL" and "CONFIRM" buttons. The background shows the model's properties and deployment status.



Delete model and delete dataset



Hello Text

1. Create a dataset

Create a dataset by selecting Text Classification (Single Label)

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

Text classification (Single-label)
Predict the one correct label that you want assigned to a document.

Text classification (Multi-label)
Predict all the correct labels that you want assigned to a document.

Text entity extraction
Identify entities within your text items.

Using the dataset in tutorial

Datasets **PREVIEW** **CREATE** **REFRESH**

Managed datasets contain data used to train a machine learning model

Region: us-central1 (Iowa) **?**

Filter datasets **?** **II**

<input type="checkbox"/>	Name	ID	Region	Type	Items	Labels	Last updated	Status	Metadata	⋮
<input type="checkbox"/>	text_classification_tutorial	7780760004654530560	us-central1	Text	11,947	-	March 7, 2021	Finished Importing data		⋮

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

2. Train new model

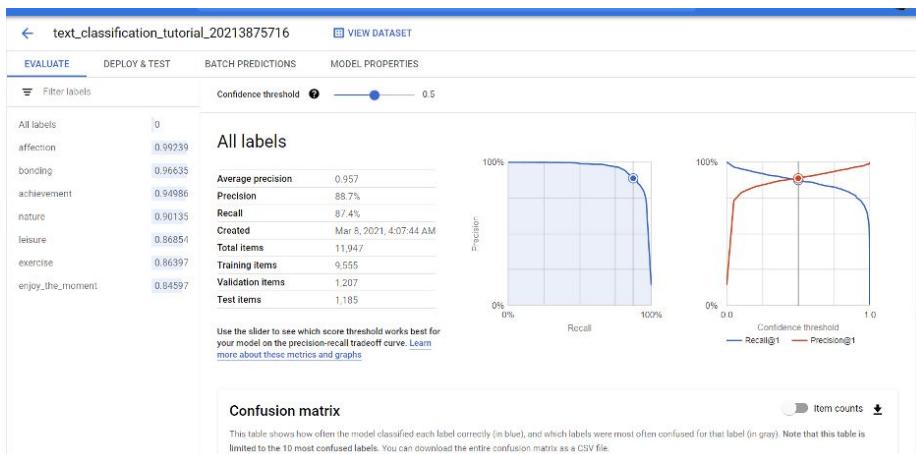
Filter models...

Name	ID	Data	Endpoints	Region	Type	Created	Notifications	Metadata
text_classification_tutorial_20213875716	4836179904540180480	text_classificationTutorial_tcn	0	us-central1	Text classification	Mar 7, 2021, 11:58:36 PM		

EVALUATE DEPLOY & TEST BATCH PREDICTIONS MODEL PROPERTIES

Info This model finished training on Mar 8, 2021, 4:07:52 AM.

Status	Succeeded
Model ID	4836179904540180480
Training pipeline ID	5360136777594044416
Created	Mar 7, 2021, 11:58:36 PM
Training time	4 hr 9 min
Region	us-central1
Encryption type	Google-managed key
Dataset	text_classificationTutorial
Dataset ID	7780760004654530560
Annotation set	text_classificationTutorial_tcn
Data split	Randomly assigned (80/10/10)
Total items	11,947
Training items	9,555 (80.0%)
Validation items	1,207 (10.1%)
Test items	1,185 (9.9%)
Algorithm	AutoML
Objective	Text classification (Single-label)



3. Deploy to end point

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	⋮
hello_automl_text	4092048027047428096	1	us-central1	Mar 8, 2021, 12:06:03 PM	Sample request			Google-managed key	⋮

Test your model **PREVIEW**

4. Test model

Test your model **PREVIEW**

Hello, it's a nice day. Here is some text.

PREDICT

Filter labels

affection	0.073
achievement	0.008
enjoy_the_moment	0.868
bonding	0.001
leisure	0.046
nature	0.005
exercise	0.000

5. Cleanup

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...

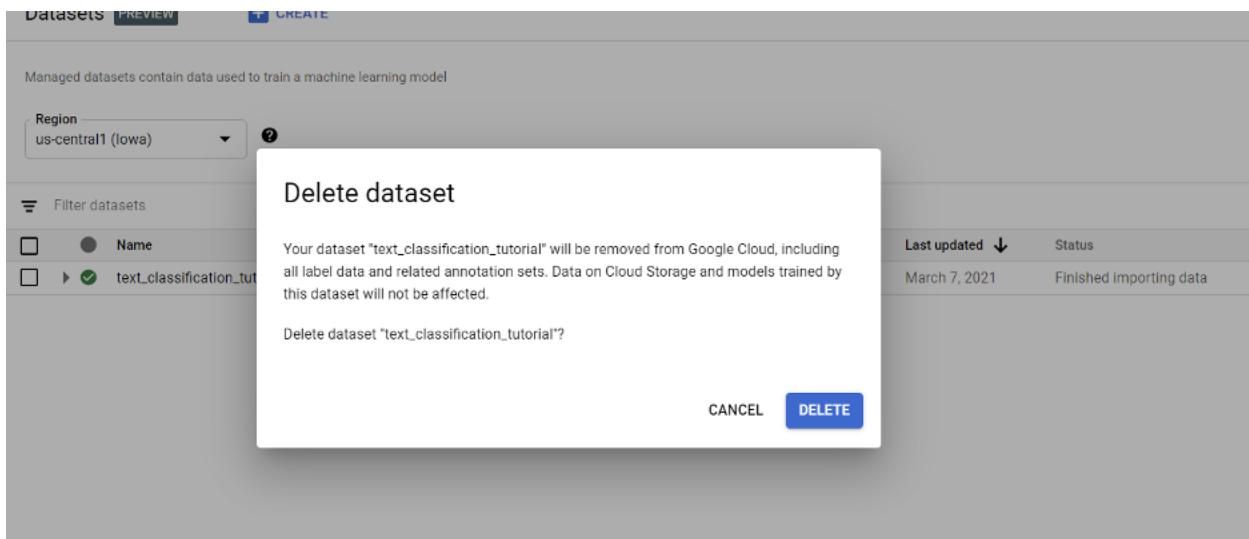
Name: text_classificationTutorial_2021030716

Delete model

Your model and its evaluations will be removed from your Google Cloud project. This may affect any active endpoints using this model. Delete model "text_classificationTutorial_2021030716"?

CANCEL DELETE

Region	Type	Created	Notifications	Metadata
us-central1	Text classification	Mar 7, 2021, 11:58:36 PM		⋮



Hello Custom Training

1. Bucket and code setup

Create a Cloud Storage bucket, then Download sample code

```
Updated property [core/project].
yuxing_wang01@cloudshell:~ (serene-art-307423)$
yuxing_wang01@cloudshell:~ (serene-art-307423)$ gsutil mb -p serene-art-307423 -l us-central1 gs://my_first_project
Creating gs://my_first_project...
ServiceException: 409 A Cloud Storage bucket named 'my first project' already exists. Try another name. Bucket names must be globally unique across all Google Cloud projects, including those outside of your organization.
yuxing_wang01@cloudshell:~ (serene-art-307423)$ gsutil mb -p serene-art-307423 -l us-central1 gs://serene-art-307423
Creating gs://serene-art-307423/...
yuxing_wang01@cloudshell:~ (serene-art-307423)$ gsutil cp gs://cloud-samples-data/ai-platform/hello-custom/hello-custom-sample-v1beta1.tar.gz
| tar -xvz
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
yuxing_wang01@cloudshell:~ (serene-art-307423)$ cd hello-custom-sample
```

Examine the code

```
yuxing_wang01@cloudshell:~/hello-custom-sample (serene-art-307423)$ ls -lpR
.:
total 16
drwxr-xr-x 2 yuxing_wang01 yuxing_wang01 4096 Mar 12 05:20 function/
-rw-r--r-- 1 yuxing_wang01 yuxing_wang01 310 Oct  8 19:11 setup.py
drwxr-xr-x 2 yuxing_wang01 yuxing_wang01 4096 Oct  8 22:28 trainer/
drwxr-xr-x 2 yuxing_wang01 yuxing_wang01 4096 Mar 12 05:20 webapp/

./function:
total 8
-rw-r--r-- 1 yuxing_wang01 yuxing_wang01 3171 Oct  8 19:10 main.py
-rw-r--r-- 1 yuxing_wang01 yuxing_wang01 167 Oct  8 19:09 requirements.txt

./trainer:
total 4
-rw-r--r-- 1 yuxing_wang01 yuxing_wang01     0 May 14 2020 __init__.py
-rw-r--r-- 1 yuxing_wang01 yuxing_wang01 2746 Oct  8 19:04 task.py

./webapp:
total 144
-rw-r--r-- 1 yuxing_wang01 yuxing_wang01    164 Oct  8 22:24 function-url.js
-rw-r--r-- 1 yuxing_wang01 yuxing_wang01 130482 May 14 2020 image-list.txt
-rw-r--r-- 1 yuxing_wang01 yuxing_wang01    439 May 14 2020 index.css
-rw-r--r-- 1 yuxing_wang01 yuxing_wang01   1710 Jun 16 2020 index.html
-rw-r--r-- 1 yuxing_wang01 yuxing_wang01   3634 Jun 17 2020 main.js
```

The hello-custom-sample directory has four items:

- trainer/: A directory of TensorFlow Keras code for training the flower classification model.
- setup.py: A configuration file for packaging the trainer/ directory into a Python source distribution that AI Platform can use.
- function/: A directory of Python code for a [Cloud Function](#) that can receive and preprocess prediction requests from a web browser, send them to AI Platform, process the prediction responses, and send them back to the browser.
- webapp/: A directory with code and markup for a web app that gets flower classification predictions from AI Platform.

2. Training a custom model

Create a source distribution in the gzipped tarball format

```
yuxing_wang01@cloudshell:~/hello-custom-sample (serene-art-307423)$ python3 setup.py sdist --formats=gztar
running sdist
running egg_info
creating hello_custom_training.egg-info
writing hello_custom_training.egg-info/PKG-INFO
writing dependency_links to hello_custom_training.egg-info/dependency_links.txt
writing requirements to hello_custom_training.egg-info/requirements.txt
writing top-level names to hello_custom_training.egg-info/top_level.txt
writing manifest file 'hello_custom_training.egg-info/SOURCES.txt'
reading manifest file 'hello_custom_training.egg-info/SOURCES.txt'
writing manifest file 'hello_custom_training.egg-info/SOURCES.txt'
warning: sdist: standard file not found: should have one of README, README.rst, README.txt, README.md

running check
warning: check: missing required meta-data: url

warning: check: missing meta-data: either (author and author_email) or (maintainer and maintainer_email) must be supplied

creating hello-custom-training-2.0
creating hello-custom-training-2.0/hello_custom_training.egg-info
creating hello-custom-training-2.0/trainer
copying files to hello-custom-training-2.0...
copying setup.py -> hello-custom-training-2.0
copying hello_custom_training.egg-info/PKG-INFO -> hello-custom-training-2.0/hello_custom_training.egg-info
copying hello_custom_training.egg-info/SOURCES.txt -> hello-custom-training-2.0/hello_custom_training.egg-info
copying hello_custom_training.egg-info/dependency_links.txt -> hello-custom-training-2.0/hello_custom_training.egg-info
copying hello_custom_training.egg-info/requirements.txt -> hello-custom-training-2.0/hello_custom_training.egg-info
copying hello_custom_training.egg-info/top_level.txt -> hello-custom-training-2.0/hello_custom_training.egg-info
```

Upload dist/hello-custom-training-2.0.tar.gz to the Cloud Storage bucket:

```
yuxing_wang01@cloudshell:~/hello-custom-sample (serene-art-307423)$ gsutil cp dist/hello-custom-training-2.0.tar.gz gs://serene-art-307423/t
aining/
Copying file://dist/hello-custom-training-2.0.tar.gz [Content-Type=application/x-tar]...
/ [1 files][ 1.9 KiB/ 1.9 KiB]
Operation completed over 1 objects/1.9 KiB.
yuxing_wang01@cloudshell:~/hello-custom-sample (serene-art-307423)$
```

In Training page, create a model

The screenshot shows the Google Cloud Platform AI Platform (Unified) interface. The left sidebar has links for AI Platform (Unified), Dashboard, Datasets, Labeling tasks, Notebooks, Training, and Models. The main area has tabs for TRAINING PIPELINE, CUSTOM JOB, and HYPERPARAMETER TUNING. The TRAINING PIPELINE tab is selected. It contains a brief description of training pipelines and a 'Region' dropdown set to 'us-central1 (Iowa)'. There is also a 'Filter' button.

Train new model

- 1 Choose training method**
- 2 Define your model
- 3 Training container
- 4 Hyperparameter tuning (Optional)
- 5 Compute and pricing
- 6 Prediction container (Optional)

START TRAINING

CANCEL

Dataset *
No managed dataset

Annotation set
-

Objective
Custom

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

ⓘ AutoML options are only available when you train with a managed dataset.

AutoML

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

AutoML Edge

Train a model that can be exported for on-prem/on-device use. Typically has lower accuracy. [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

Train new model

- 1 Choose training method**
- 2 Define your model**
- 3 Training container
- 4 Hyperparameter tuning (Optional)

Model name *
hello_custom

ADVANCED OPTIONS

CONTINUE

Choose training method

Define your model

3 Training container

4 Hyperparameter tuning
(Optional)

5 Compute and pricing

6 Prediction container
(Optional)

START TRAINING

CANCEL

non-ML dependencies, libraries and binaries) that are not otherwise supported. [Learn more](#)

Pre-built container

View the list of [supported runtimes](#) including TensorFlow and scikit-learn versions

Custom container

Build a custom Docker container. Must be stored in [Container Registry](#)

Pre-built container settings

Before you begin, you need to package and upload your application code and dependencies to a Cloud Storage bucket. [Learn more](#)

In order to run in a pre-built container, your code needs to be in Python 3.7

Model framework *

TensorFlow

Model framework version *

2.1

Package location (Cloud Storage path) *

gs:// serene-art-307423/training/hello-custom-training-2.0.ta [BROWSE](#)



Learn how to [package and upload](#) your application code and dependencies

[+ ADD PACKAGE](#)

Python module *

trainer.task

Model output directory

gs:// serene-art-307423/output/ [BROWSE](#)

Train new model

- Choose training method
- Define your model
- Training container
- Hyperparameter tuning (Optional)
- 5 Compute and pricing**
- 6 Prediction container (Optional)**

START TRAINING

CANCEL

Model training pricing is based on the length of time spent training, machine types, and any accelerators used. [Learn more](#)

Region *

us-central1 (Iowa)

Where your model should be trained. For efficiency, your selected region should match the same region as your dataset.

Compute settings

Select the type of virtual machine to use for your worker pool. You can add up to 4 worker pools. To learn about compute costs and how to map your ML framework's roles to specific worker pools, consult the [documentation](#)

Worker pool 0

Machine type *

n1-standard-4, 4 vCPUs, 15 GiB memory

Accelerator type

Accelerators can speed up model training that involves intensive compute tasks. [Learn more](#)

Worker count

1

Disk type

SSD

Disk size (GB)

100

183002662.-1205907129.1615144309

Then start training

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 Filter training pipelines...

Name	ID	Job type	Model type	Status	Created
hello_custom	3959376555993464832	Training pipeline	Custom	Pending	Mar 11, 2021, 10:01:36 PM

Monitoring training from custom jobs

Training [PREVIEW](#) [CREATE](#) [REF](#)

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 Filter training pipelines... [?](#)

Name	ID	Job type	Model type	Status	Created	Elapsed time
hello_custom-custom-job	5632463817561604096	Custom job	-	Pending	Mar 11, 2021, 10:04:18 PM	1 min 37 sec

View logs of the training jobs

Logs Explorer [OPTIONS ▾](#) [SHARE LINK](#) [QUERY SPECIFIED RANGE](#) [PAGE LAYOUT](#)

Query preview
`resource.labels.job_id="5632463817561604096" timestamp>="2021-0..."` [Save](#) [Stream logs](#) [Run query](#) [▼](#)

Log fields [X](#)

Search fields and values

- RESOURCE TYPE
 - Cloud ML Job 1
- SEVERITY
- Info 1

Histogram

Mar 11, 10:04:18 PM 10:06 PM Mar 11, 10:06:54 PM

Query results [Jump to now](#) [Actions ▾](#) [Configure ▾](#)

SEVERITY	TIMESTAMP	PST	SUMMARY
Info	2021-03-11 22:04:19.085 PST		Showing logs for time specified in query. To view more results update your query.
>			service Waiting for job to...

Till model is trained successfully

Filter Filter training pipelines... [?](#) [☰](#)

Name	ID	Job type	Model type	Status	Created	Elapsed time
hello_custom	3959376555993464832	Training pipeline	Custom	Succeeded	Mar 11, 2021, 10:01:36 PM	15 min 38 sec

3. Prediction from custom image classification model

Create an end-point

Deploy to endpoint

1 Define your endpoint

2 Endpoint details

DEPLOY CANCEL

Model settings

hello_custom
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 that 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.

Deploy to endpoint

- 1 Define your endpoint
- 2 Endpoint details

DEPLOY CANCEL

Create new endpoint Add to existing endpoint

Endpoint name *
hello_custom

Traffic split: 100%

ADD AN ITEM



Open

CONTINUE

Deploy a cloud function using endpoint ID

```
yuxing_wang01@cloudshell:~/hello-custom-sample (serene-art-307423)$ gcloud functions deploy classify_flower --region us-central1 --source=function --runtime=python37 --memo
ry=2048MB --trigger-http --allow-unauthenticated --set-env-vars ENDPOINT_ID=$(ENDPOINT_ID)
Deploying function may take a while - up to 2 minutes)..."  

For Cloud Build Stackdriver Logs, visit: https://console.cloud.google.com/logs/viewer?project=serene-art-307423&advancedFilter=resource.type%3Dbuild%0Aresource.labels.build_id%3D35
bc597-87cd-45b0-907c-99b3afea4697#AlogName=3Dprojects%2Fserene-art-307423%2Flogs%2Fcloudbuild  

Deploying function may take a while - up to 2 minutes)...done.  

availableMemoryMb: 2048  

buildId: 35bcb597-87cd-45b0-907c-99b3afea4697  

entryPoint: classify_flower  

environmentVariables:  

ENDPOINT_ID: '9201381804299255808'  

httpsTrigger:  

  securityLevel: SECURE OPTIONAL  

  url: https://us-central1-serene-art-307423.cloudfunctions.net/classify_flower  

ingressSettings: ALLOW_ALL  

labels:  

  deployment-tool: cli-gcloud  

name: projects/serene-art-307423/locations/us-central1/functions/classify_flower  

runtime: python37  

serviceAccountEmail: serene-art-307423@appspot.gserviceaccount.com  

sourceUploadUrl: https://storage.googleapis.com/gcf-upload-us-central1-c7b8fd5a-8e0d-44fc-828b-19b62c013790/43207624-3ed3-4a7d-a674-ecb27e7e8d31.zip?GoogleAccessId=service-90681390
01486gjg-admin@robot.lam.gserviceaccount.comExpires=1615335849Signature=OsJDqbJmBRees03euEdFaO1qw42Fn2xasqSAf7LCquf1C61Yy225K4TRkQJlhDp1N90%2FghsCBwzhCs4k3ySQ
2enImz2o19xPhq1907dwAhnk7xpwYQ1FPFLRVansgGm3xPu42be1Zee6201lg61rsud8W0BoV98/rkdy7lcejc5dcQH2ZdjwQow19QsZOinzs9Etts0s%2Fu8M1%0C51fbplWCjS6ZiRDznhW32LD5aNeg53PdyjBirVxPtd5
zxy70D0ncvW6nla02hsH6fs8NZElqHu5adrRzExW9Roi77pic4FdFEYNviCMQ259Q%3D%3D  

status: ACTIVE  

timeout: 60s  

updateTime: '2021-03-12T06:53:00.036Z'  

versionId: '4'  

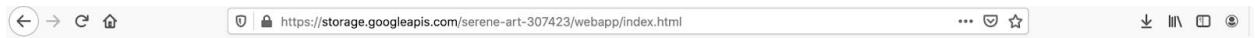
yuxing_wang01@cloudshell:~/hello-custom-sample (serene-art-307423)$
```

Setup a webapp to send a prediction request

```
yuxing_wang01@cloudshell:~/hello-custom-sample (serene-art-307423)$ PROJECT_ID=serene-art-307423
yuxing_wang01@cloudshell:~/hello-custom-sample (serene-art-307423)$ BUCKET_NAME=serene-art-307423
yuxing_wang01@cloudshell:~/hello-custom-sample (serene-art-307423)$ ls
dist function hello custom training.egg-info setup.py trainer webapp
yuxing_wang01@cloudshell:~/hello-custom-sample (serene-art-307423)$ echo "export const CLOUD_FUNCTION_URL = 'https://us-central1-$PROJECT_ID.cloudfunctions.net/classify_flower';"
>_> webapp/function-url.js
yuxing_wang01@cloudshell:~/hello-custom-sample (serene-art-307423)$ gsutil -m cp -r webapp gs://$(BUCKET_NAME)/
Copying file://webapp/index.html [Content-Type=text/html]...
Copying file://webapp/index.css [Content-Type=text/css]...
Copying file://webapp/_index.html [Content-Type=text/html]...
Copying file://webapp/function-url.js [Content-Type=application/javascript]...
Copying file://webapp/image-list.txt [Content-Type=text/plain]...
Copying file://webapp/main.js [Content-Type=application/javascript]...
/ [6/6 files] [133.4 KiB/133.4 KiB] 100% Done
Operation completed over 6 objects/133.4 KiB.
yuxing_wang01@cloudshell:~/hello-custom-sample (serene-art-307423)$ gsutil -m acl ch -u AllUsers:R gs://$(BUCKET_NAME)/webapp/*
Updated ACL on gs://serene-art-307423/webapp/_index.html
Updated ACL on gs://serene-art-307423/webapp/function-url.js
Updated ACL on gs://serene-art-307423/webapp/index.css
Updated ACL on gs://serene-art-307423/webapp/image-list.txt
Updated ACL on gs://serene-art-307423/webapp/main.html
Updated ACL on gs://serene-art-307423/webapp/main.js
yuxing_wang01@cloudshell:~/hello-custom-sample (serene-art-307423)$
```

Now, navigate to the web page and get prediction:

<https://storage.googleapis.com/serene-art-307423/webapp/index.html>



Hello custom training

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

GET SIX NEW IMAGES		
 <p>tulips</p>	 <p>dandelion</p>	 <p>sunflowers</p>

GET SIX NEW IMAGES



sunflowers



tulips



tulips

4. Cleanup

Delete training pipeline and delete custom jobs

Reason

Delete training job

This training job will be removed from your Google Cloud project. Once the job is deleted, training details will be lost. Custom job logs will still be available in Stackdriver.

Delete training job "hello_custom"?

CANCEL DELETE

Training

PREVIEW + CREATE

TRAINING PIPELINE CUSTOM JOB HYPERPARAMETER TUNING

Custom jobs specify how AI Platform (Unified) runs your custom training code, including worker

Delete training job

This training job will be removed from your Google Cloud project. Once the job is deleted, training details will be lost. Custom job logs will still be available in Stackdriver.

Delete training job "hello_custom-custom-job"?

CANCEL DELETE

Remove the code of project and remove the storage bucket:

```

hello-custom-sample README-cloudshell.txt
yuxing_wang01@cloudshell:~$ rm -rf hello-custom-sample
yuxing_wang01@cloudshell:~$ gsutil -m rm -rf gs://serene-art-307423
Removing gs://serene-art-307423/output/#1615528558668040...
Removing gs://serene-art-307423/output/model/assets/#1615529891386932...
Removing gs://serene-art-307423/output/model/#1615529884092421...
Removing gs://serene-art-307423/output/model/_saved_model.pb#1615529891840244...
Removing gs://serene-art-307423/output/model/variables/variables.data-00000-of-00001#1615529890375195...
Removing gs://serene-art-307423/output/model/variables/variables.index#1615529890595062...
Removing gs://serene-art-307423/output/model/variables/#1615529884298745...
Removing gs://serene-art-307423/webapp/_index.html#1615532883218012...
Removing gs://serene-art-307423/training/hello-custom-training-2.0.tar.gz#1615528010385101...
Removing gs://serene-art-307423/webapp/function-url.js#1615532883229205...
Removing gs://serene-art-307423/webapp/image-list.txt#1615532883348728...
Removing gs://serene-art-307423/webapp/index.css#1615532883342373...
Removing gs://serene-art-307423/webapp/index.html#1615532883190215...
Removing gs://serene-art-307423/webapp/main.js#1615532883279784...
/ [14/14 objects] 100% Done
Operation completed over 14 objects.
Removing gs://serene-art-307423/...

```

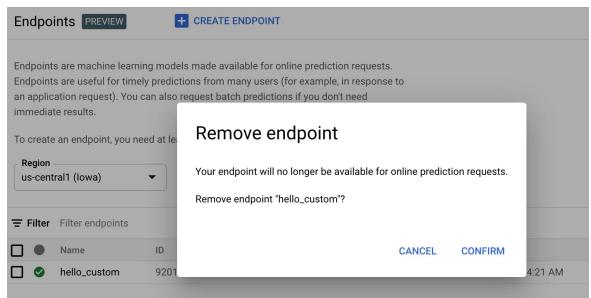
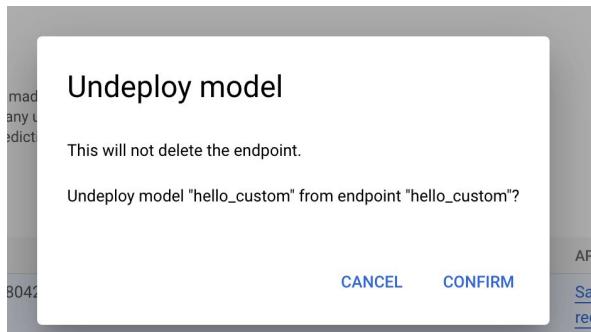
Remove the cloud function:

```

yuxing_wang01@cloudshell:~$ gcloud functions delete classify_flower --region=us-central1 --quiet --project serene-art-307423
Waiting for operation to finish...done.
Deleted [projects/serene-art-307423/locations/us-central1/functions/classify_flower].

```

Undeploy model and remove endpoint and model:



Delete model

Your model and its evaluations will be removed from your Google Cloud project. This may affect any active endpoints using this model. Delete model "hello_custom"?

[CANCEL](#) [DELETE](#)

Hello Video

1. Create a dataset

Create a dataset by selecting

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

Video action recognition
Identify the action moments in your videos.

Video classification
Get label predictions for entire videos, shots, and frames.

Video object tracking
Get labels, tracks, and timestamps for objects you want to track in a video.

Importing the demo dataset:

`automl-video-demo-data/hmdb_split1_5classes_all.csv`

IMPORT BROWSE ANALYZE

All	500
Labeled	500
Unlabeled	0

Filter Filter labels +

Videos ▾

cartwheel	100
golf	100
kick_ball	100
pullup	100
ride_horse	100

[ADD NEW LABEL](#)

Select all


kick_ball



Training jobs and models
Use this dataset and annotation set 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](#)

2. Train new model

Train new model

- 1 Choose training method
- 2 Define your model

START TRAINING **CANCEL**

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

Node hours will be calculated when training begins. You will receive an email with node hours estimation. You can choose to cancel training at any time.

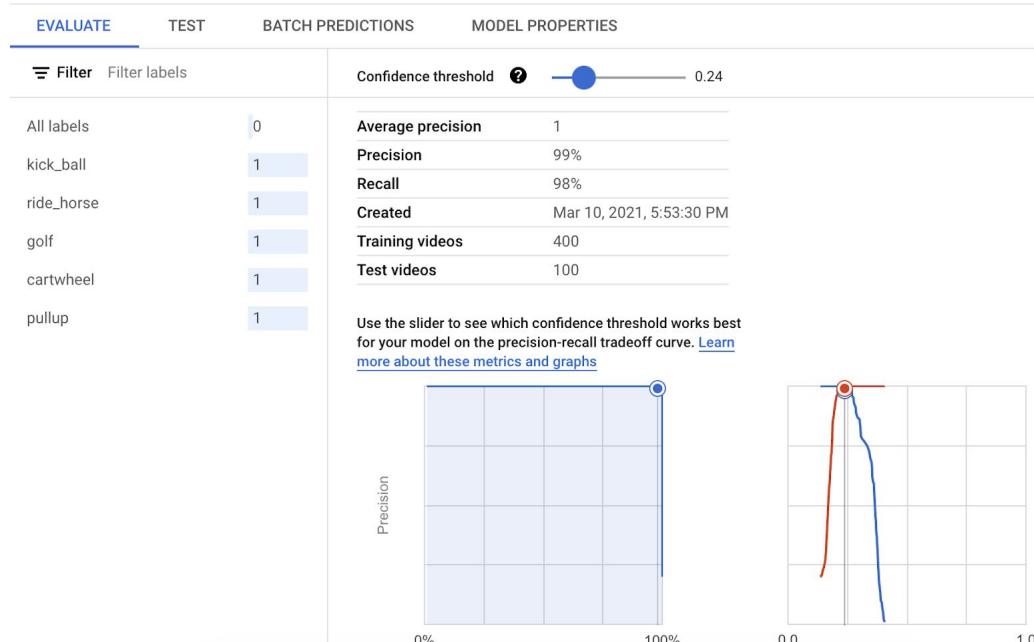
AutoML
Train high-quality models with minimal effort and machine learning expertise. AutoML training automatically ends when your model stop improving. [Learn more](#)

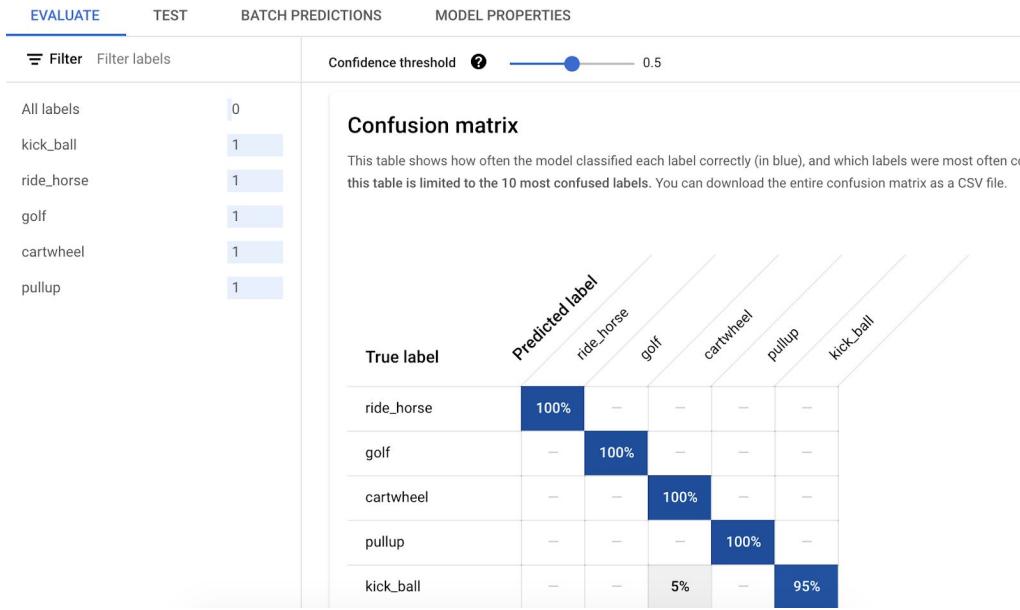
AutoML Edge
Train a model that can be exported for on-prem/on-device use. Typically has lower accuracy. [Learn more](#)

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

Converting between the models output scores to a set of applicable labels requires a threshold. Lower thresholds typically increase recall but lower precision.





3. Batch Prediction

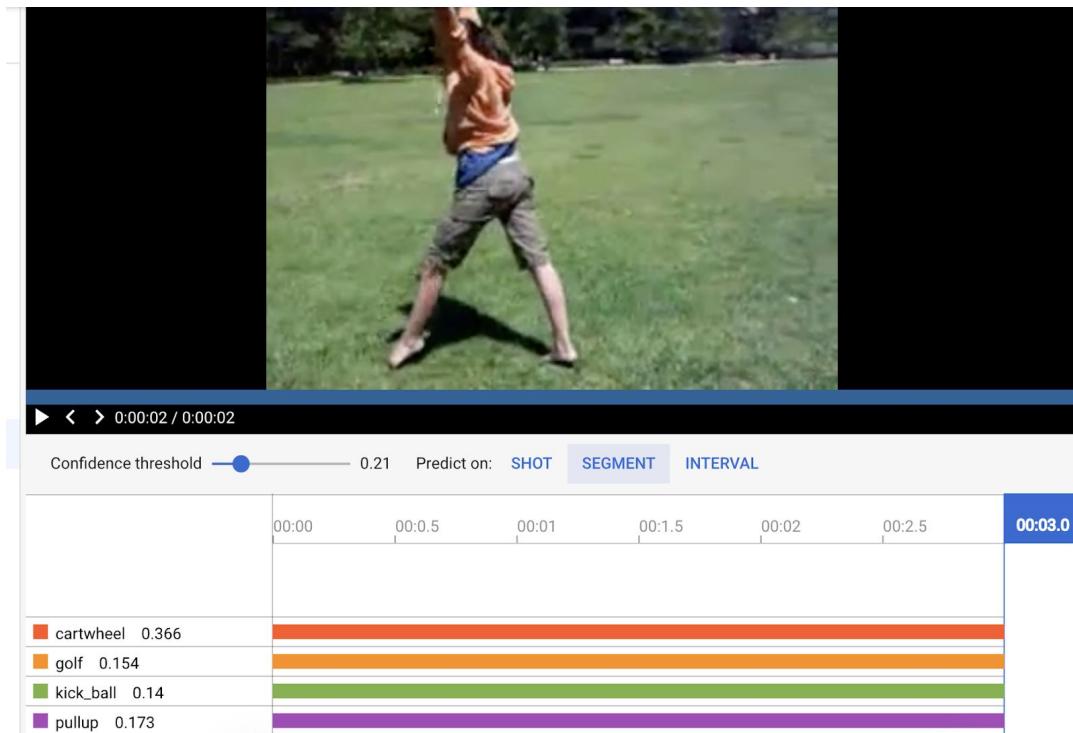
Create a batch prediction using source

`automl-video-demo-data/hmdb_split1_predict.jsonl`

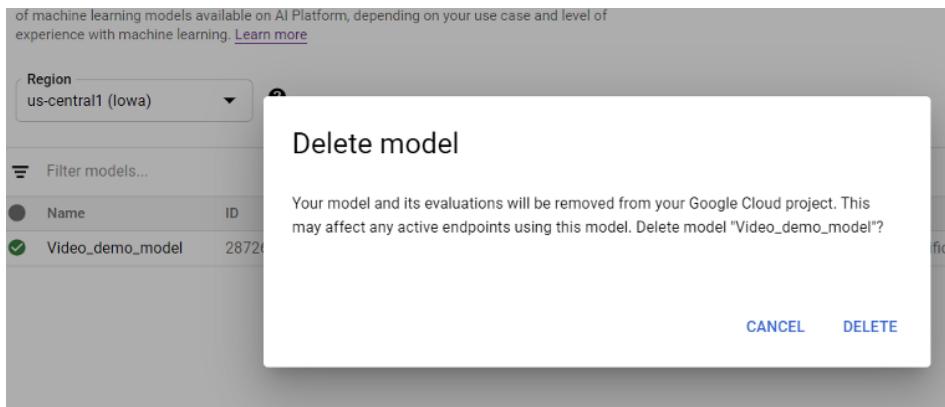
[← mybatch](#)

Model	untitled_1615418938320_2021310234919
Objective	Video classification
Import location	gs://automl-video-demo-data/hmdb_split1_predict.jsonl
Total items	5
Predicted items	5
Created	Mar 10, 2021 at 09:21PM
Updated	Mar 10, 2021 at 09:22PM
Elapsed time	44 sec
Status	Completed without errors
Export location	gs://cloud-ai-platform-1221d4f9-ffb8-49f9-b973-02477d2a76b5/predict_results/prediction-untitled_1615418938320_20213

[VIEW RESULTS](#)



4. Cleanup



Hello Tabular

1. Create a dataset

Select an import file from Cloud Storage , use dataset in cloud storage
cloud-ml-tables-data/bank-marketing.csv

The screenshot shows the Google Cloud Platform AI Platform (Unified) interface. The left sidebar has 'Datasets' selected. The main area is titled 'Structured_AutoML_Tutorial' and shows the 'ANALYZE' tab selected. Under 'Dataset Info', it says 'Created: Mar 07, 2021 12:11 PM' and 'Dataset format: CSV'. The 'Summary' section indicates 'Total columns: 17' and 'Total rows: -'. Below this, there's a table showing field names (Age, Balance, Campaign, Contact, Day, Default, Deposit) with their respective missing percentage and distinct values. A 'GENERATE STATISTICS' button is at the bottom right of this table. To the right, there's a 'Training jobs and models' section with a 'TRAIN NEW MODEL' button.

Generate statistics

This screenshot is similar to the previous one but shows the 'GENERATE STATISTICS' button being clicked, resulting in generated statistics. The 'Summary' section now shows 'Total rows: 45,211'. The statistics table below shows the following data:

Field Name	Missing % (count)	Distinct values
Age	-	77
Balance	-	7168
Campaign	-	48
Contact	-	3
Day	-	31
Default	-	2

2. Train new model

Select Deposit for the target column, and Classification for the objective.

Train new model

- Choose training method
- Define your model**
- Choose training options
- Compute and pricing

START TRAINING
CANCEL

Model name * Structured_AutoML_Tutorial_202137204254 ?

Target column * Deposit ▼

Export test dataset to BigQuery

ADVANCED OPTIONS

CONTINUE

Train new model

- Choose training method
- Define your model
- Choose training options
- Compute and pricing**

START TRAINING
CANCEL

Enter the **maximum** number of node hours you want to spend training your model.

You can train for as little as 1 node hour. You may also be eligible to train with free node hours. [Pricing guide](#)

Budget * 1 Maximum node hours ?

Estimated completion date: Mar 7, 2021 2 PM GMT-8

Enable early stopping
Ends model training when no more improvements can be made and refunds leftover training budget. If early stopping is disabled, training continues until the budget is exhausted.

STRUCTURED Structured_AutoML_Tutorial

SOURCE
ANALYZE

Dataset Info

Created: Mar 07, 2021 12:11 PM
Dataset format: CSV
Dataset location: gs://cloud-ml.../bank_marketing.csv

General statistics generated by Mar 07, 2021 12:23 PM [GENERATE STATISTICS](#)

Field Name ↑	Missing % (count) ?	Distinct values ?
Age	-	77
Balance	-	7168
Campaign	-	48

Training jobs and models

STRUCTURED Structured_AutoML_Tutorial_202137204254
Training model...

TRAIN NEW MODEL

Training [PREVIEW](#) [+ CREATE](#) [REFRESH](#)

[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
Structured_AutoML_Tutorial_202137204254	2816728888036556800	Training pipeline	Tabular classification	Succeeded	Mar 7, 2021, 12:45:29 PM	1 hr 11 sec

3. Deploy and test

[← Structured_AutoML_Tutorial_202137204254](#) [VIEW DATASET](#) [EXPORT](#)

[EVALUATE](#) [DEPLOY & TEST](#) [BATCH PREDICTIONS](#) [MODEL PROPERTIES](#)

Filter labels

Confidence threshold [?](#) 0.5

All labels	0	PR AUC	0.977
1	0.99149	ROC AUC	0.976
2	0.61319	Log loss	0.192
		F1 score	0.9100067
		Precision	91%
		Recall	91%
		Created	Mar 7, 2021, 1:45:20 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](#)

Deploy to endpoint

1 Define your endpoint 2 Endpoint details

Model settings

Structured_AutoML_Tutorial_202137204254

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 that 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.

Endpoints [PREVIEW](#) [+ CREATE ENDPOINT](#) [REFRESH](#)

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.

To create an endpoint, you need at least one machine learning model

Region us-central1 (Iowa) [?](#)

Filter endpoints

Endpoint	ID	Models	Region	Last updated	API	Notification	Metadata	⋮
Structured_AutoML_Tutorial	6796459603283410944	1	us-central1	Mar 7, 2021, 1:49:17 PM	Sample request			⋮

4. Predict

Test your model [PREVIEW](#)

Feature column name	Type	Required or optional	Value	Local feature importance
age	Text	Required	60.000000	-0.008778204520543417
balance	Text	Required	89.000000	0.0007721980412801107
campaign	Text	Required	1.000000	-0.0046825110912323
contact	Text	Required	cellular	0
duration	Text	Required	15.000000	0
poutcome	Text	Required	no	0

Predict label: 1
Prediction result: 1
Confidence score: 0.9787489175796509

For this model, a prediction result of 1 represents a negative outcome—a deposit is not made at the bank. A prediction result of 2 represents a positive outcome—a deposit is made at the bank.

5. Cleanup

Undeploy model and remove endpoint, then delete model and dataset

Endpoints [PREVIEW](#) [CREATE ENDPOINT](#) [REFRESH](#)

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.

To create an endpoint, you need at least one trained model.

Region: us-central1 (Iowa) [Edit](#)

Filter endpoints: Endpoint Structured_AutoML_Tutorial

Remove endpoint

Your endpoint will no longer be available for online prediction requests.

Remove endpoint "Structured_AutoML_Tutorial"?

CANCEL CONFIRM

Created	API	Notification	Metadata
2021-02-17 5:55 PM	Sample request		