




## 1. Tabular Data:

Here I am using the same project that I have created for Image classification AutoML.


1. Project id: hw2p1-image

**Project name \***  
hw2p1-image 

Project ID: hw2p1-image. It cannot be changed later. [EDIT](#)

**Organization \***  
sjsu.edu  




Select an organization to attach it to a project. This selection can't be changed later.

**Location \***  
 sjsu.edu [BROWSE](#)

Parent organization or folder

[CREATE](#) [CANCEL](#)

2. API is enabled

 **Google Cloud Platform**  hw2p1-image 

The API is enabled

Cloud AI Platform API has been enabled.

Next, to use the API you'll need the right credentials.

[Go to credentials](#)

3. Authentication Setup

## Create service account key

### Service account

New service account

Service account name ?

hw2p1

Role ?

Owner

Service account ID

hw2p1-306

@hw2p1-image.iam.gserviceaccount.com

### 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

#### 4. Set environment variable

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.19041.804]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>set GOOGLE_APPLICATION_CREDENTIALS=C:\Users\subar\Downloads\Study\8_CMPE-258-Sec49-DeepLearning\hw2\hw2p1-image-3ce38964a5bf.json

C:\WINDOWS\system32>
```

#### 5. Cloud Console:

```
CLOUD SHELL
Terminal (hw2p1-image) x + v

Welcome to Cloud Shell! Type "help" to get started.
To set your Cloud Platform project in this session use "gcloud config set project [PROJECT_ID]"
subarnachowdhury_soma@cloudshell:~$ gcloud config set project hw2p1-image
Updated property [core/project].
subarnachowdhury_soma@cloudshell:~ (hw2p1-image) $
```

6. Create Dataset 'Structured\_AutoML\_Tutorial'

Dataset name \*

Structured\_AutoML\_Tutorial

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, w

IMAGE

**TABULAR**

TEXT

VIDEO



☒ **Regression/classification**

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

Region

us-central1 (Iowa)



7. Import Data from Storage

## Select a data source

- **CSV file:** Can be uploaded from your computer or on Cloud Storage. [Learn more](#)
- **BigQuery:** Select a table or view from BigQuery. [Learn more](#)

- ☐ Upload CSV files from your computer
- ☒ Select CSV files from Cloud Storage
- ☐ Select a table or view from BigQuery

## Select CSV files from Cloud Storage

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

Import file path \*

☒ gs:// cloud-ml-tables-data/bank-marketing.csv

BROWSE

?

[ADD ANOTHER FILE](#)

8. Analyze Pan:

## ← Structured\_AutoML\_Tutorial

SOURCE

ANALYZE

### Dataset Info

Created: Feb 22, 2021 12:18 AM

Dataset format: CSV

Dataset location: <gs://cloud-ml-.../bank-marketing.csv> [↗](#)

### Summary




Total columns: 17

Total rows: -

☰ Enter property name or value

Field Name ↑	Missing % (count) ?	Distinct values ?
Age	-	-
Balance	-	-
Campaign	-	-
Contact	-	-
Day	-	-
Default	-	-
Deposit	-	-
Duration	-	-

## 9. Generated Statistics

Field Name 	Missing % (count) 	Distinct values 
Age	-	77
Balance	-	7168
Campaign	-	48
Contact	-	3
Day	-	31
Default	-	2
Deposit	-	2
Duration	-	1573
Education	-	4
Housing	-	2
Job	-	12
Loan	-	2
MaritalStatus	-	3
Month	-	12
PDays	-	559
POutcome	-	4
Previous	-	41
Row		

## 10. Selecting Training Model: Structured\_AutoML\_Tutorial

## Train new model

- 1 Choose training method
- 2 Define your model
- 3 Choose training options
- 4 Compute and pricing

START TRAINING

CANCEL

Dataset

Structured\_AutoML\_Tutorial

Objective \*

Classification

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](#)

☐ 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

## 11. Defined the model:

### Train new model

- ☒ Choose training method
- 2 Define your model
- 3 Choose training options
- 4 Compute and pricing

START TRAINING

CANCEL

Model name \*

Structured\_AutoML\_Tutorial

Target column \*

Deposit

☐ Export test dataset to BigQuery

▼ ADVANCED OPTIONS

CONTINUE

## 12. Training Budget

Enter property name or value

	Field Name ↑	Transformation	Missing % (count) ?	Distinct values ?	Correlation w/ target ?	
<input type="checkbox"/>	Age	Numeric ▾	-	77	-	⊖
<input type="checkbox"/>	Balance	Numeric ▾	-	7168	-	⊖
<input type="checkbox"/>	Campaign	Numeric ▾	-	48	-	⊖
<input type="checkbox"/>	Contact	Categorical ▾	-	3	-	⊖
<input type="checkbox"/>	Day	Numeric ▾	-	31	-	⊖
<input type="checkbox"/>	Default	Categorical ▾	-	2	-	⊖
<input type="checkbox"/>	Duration	Numeric ▾	-	1573	-	⊖
<input type="checkbox"/>	Education	Categorical ▾	-	4	-	⊖
<input type="checkbox"/>	Housing	Categorical ▾	-	2	-	⊖
<input type="checkbox"/>	Job	Categorical ▾	-	12	-	⊖
<input type="checkbox"/>	Loan	Categorical ▾	-	2	-	⊖
<input type="checkbox"/>	MaritalStatus	Categorical ▾	-	3	-	⊖
<input type="checkbox"/>	Month	Categorical ▾	-	12	-	⊖
<input type="checkbox"/>	PDays	Numeric ▾	-	559	-	⊖
<input type="checkbox"/>	POutcome	Categorical ▾	-	4	-	⊖
<input type="checkbox"/>	Previous	Numeric ▾	-	41	-	⊖

Rows per page: 50 ▾

1 – 16 of 16

< >

## Train new model

- ☒ Choose training method
- ☒ Define your model
- ☒ Choose training options
- 4** ☐ 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: Feb 22, 2021 2 AM 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.

## 13. Got Email Notification about successful training



# AI Platform finished training model "Structured\_AutoML\_Tutorial"

**AI Platform** <noreply-aipatform@google.com>

to me ▾

Hello AI Platform Customer,

AI Platform finished training model "Structured\_AutoML\_Tutorial".

Additional Details:

Operation State: Succeeded

Resource Name:

projects/589827040428/locations/us-central1/trainingPipelines/5627089404725035008

To continue your progress, go back to your training pipeline using

<https://console.cloud.google.com/ai/platform/models?authuser=1&project=hw2p1-image>

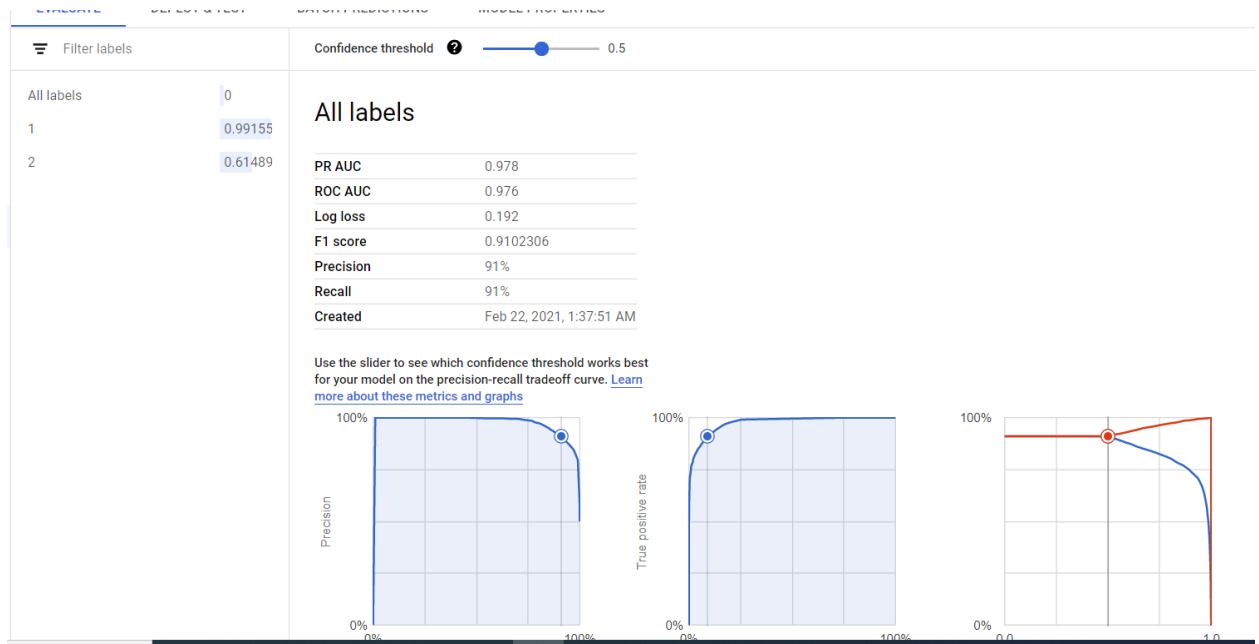
Sincerely,

The Google Cloud AI Team

## 14. Trained Model: It has taken 1+ hours to train


Name	ID	Job type	Model type	Status	Created	Elapsed time
✔ Structured_AutoML_Tutorial	5627089404725035008	Training pipeline	Tabular classification	Succeeded	Feb 22, 2021, 12:29:20 AM	1 hr 8 min

## 15. Evaluation



## 16. Confusion Matrix

### Confusion matrix

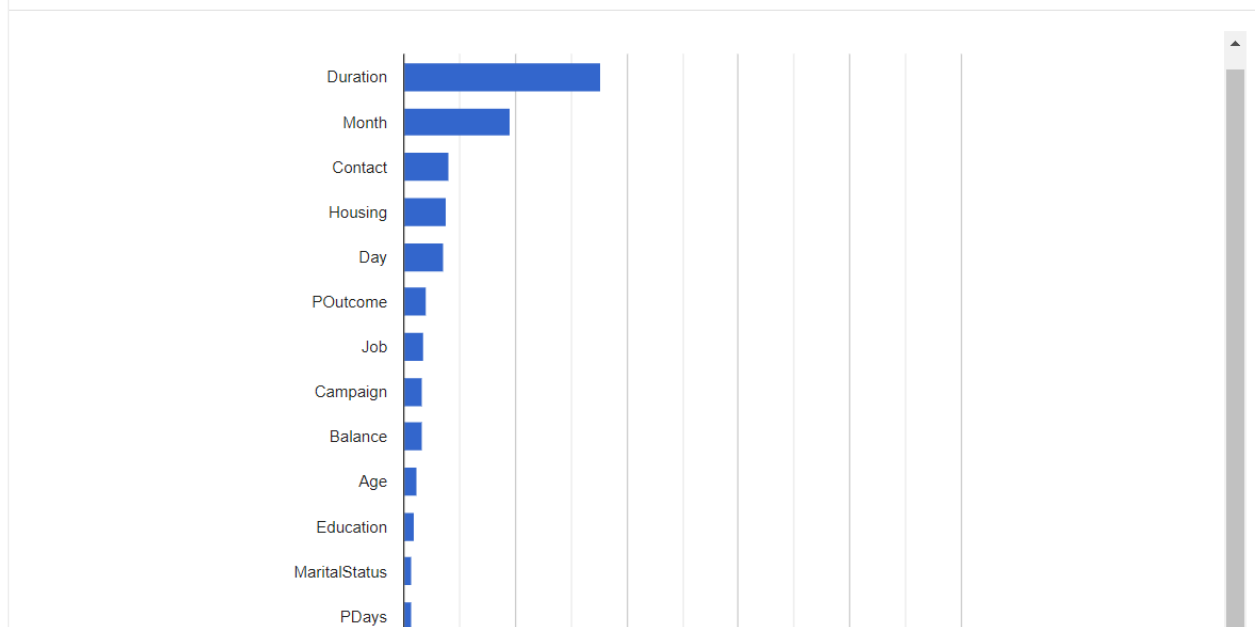
☐ Item counts 

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.

True label	Predicted label	
	1	2
1	97%	3%
2	52%	48%

## 17. Feature Importance :

### Feature Importance



## 18. Created Deployment Endpoint 'Structured\_AutoML\_Tutorial'

### Deploy to endpoint

1 Define your endpoint

2 Endpoint details

DEPLOY

CANCEL

☒ Create new endpoint ☐ Add to existing endpoint

Endpoint name \*  
Structured\_AutoML\_Tutorial

### Model settings

Structured\_AutoML\_Tutorial

Traffic split \*  
100 %

## 19. Successful Deployment

### 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
Structured_AutoML_Tutorial	4430240211565281280	1	us-central1	Feb 22, 2021, 2:07:25 AM	<a href="#">Sample request</a>			Google-managed key

### 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
Structured_AutoML_Tutorial	4430240211565281280	1	us-central1	Feb 22, 2021, 2:07:25 AM	<a href="#">Sample request</a>			Google-managed key

Test your model PREVIEW

AI Platform finished creating endpoint "Structured\_AutoML\_Tutorial" Inbox x

**AI Platform** <noreply-aiplatform@google.com>  
to me ▾

Hello AI Platform Customer,

AI Platform finished creating endpoint "Structured\_AutoML\_Tutorial".  
Additional Details:  
Operation State: Succeeded  
Resource Name:  
projects/589827040428/locations/us-central1/endpoints/4430240211565281280

To continue your progress, go back to your endpoint using  
<https://console.cloud.google.com/ai/platform/locations/us-central1/models/4731893425668882432/deploy?authuser=1&project=hw2p1-image>

Sincerely,  
The Google Cloud AI Team

20. Prediction 100% Correct

Feature column name	Type	Required or optional	Value	Local feature importance
Age	Text	Required	<input type="text" value="38.000000"/>	--
Balance	Text	Required	<input type="text" value="389.000000"/>	--
Campaign	Text	Required	<input type="text" value="2.000000"/>	--
Contact	Text	Required	<input type="text" value="cellular"/>	--
Day	Text	Required	<input type="text" value="15.000000"/>	--
Default	Text	Required	<input type="text" value="no"/>	--
Duration	Text	Required	<input type="text" value="171.000000"/>	--

## Test your model PREVIEW

Feature column name	Type	Required or optional	Value	Local feature importance
Age	Text	Required	<input type="text" value="38.000000"/>	0
Balance	Text	Required	<input type="text" value="389.000000"/>	0
Campaign	Text	Required	<input type="text" value="2.000000"/>	0
Contact	Text	Required	<input type="text" value="cellular"/>	0

Predict label

Prediction result

1

Confidence score: 0.991442084312439

## 21. Removed Storage

```
CommandException: Encountered non-existent bucket during listing
subarnachowdhury_soma@cloudshell:~ (hw2p1-image)$ gsutil -m rm -rf gs://hw2p1-image-lcm
Removing gs://hw2p1-image-lcm/text/happiness.csv#1613948229909685...
/ [1/1 objects] 100% Done
Operation completed over 1 objects.
Removing gs://hw2p1-image-lcm/...
subarnachowdhury_soma@cloudshell:~ (hw2p1-image)$
```