Using an Image Dataset to Train an AutoML Model

Overview

In this lab, you create an image classification dataset and import images, train an AutoML image classification model, deploy a model to an endpoint, and send a prediction.

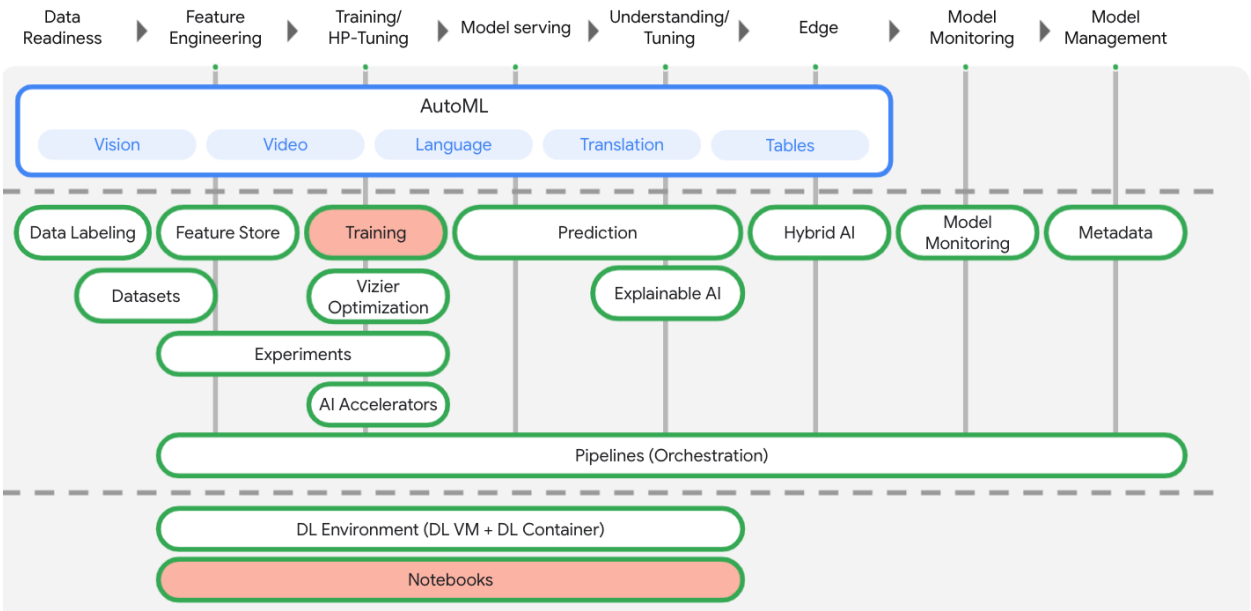
Learning objectives

- Create an image classification dataset and import images.
- Train an AutoML image classification model.
- Deploy a model to an endpoint and send a prediction.

Introduction to Vertex AI

This lab uses the newest AI product offering available on Google Cloud. Vertex AI integrates the ML offerings across Google Cloud into a seamless development experience. Previously, models trained with AutoML and custom models were accessible via separate services. The new offering combines both into a single API, along with other new products. You can also migrate existing projects to Vertex AI. If you have any feedback, please see the support page.

Vertex AI includes many different products to support end-to-end ML workflows. This lab focuses on the products highlighted below: Training/HP-Tuning and Notebooks.



Task 2. Set up your environment

Enable the Vertex AI API

1. In the Google Cloud Console, on the **Navigation menu**, click **Vertex AI**.
2. Click **Enable Vertex AI API**.

Task 3. Create an image classification dataset and import images

Image data input file

The image files you use in this tutorial are from the flower dataset used in this Tensorflow blog post. These input images are stored in a public Cloud Storage bucket. This publicly accessible bucket also contains a CSV file you use for data import. This file has two columns: the first column lists an image's URI in Cloud Storage, and the second column contains the image's label. Following are some sample rows:

`gs://cloud-training/mlongcp/v3.0_MLonGC/toy_data/flowers_toy.csv`:

```
gs://cloud-samples-data/ai-platform/flowers/daisy/10559679065_50d2b16f6d.jpg,daisy
gs://cloud-samples-data/ai-platform/flowers/dandelion/10828951106_c3cd47983f.jpg,dandelion
gs://cloud-samples-data/ai-platform/flowers/roses/14312910041_b747240d56_n.jpg,roses
gs://cloud-samples-data/ai-platform/flowers/sunflowers/127192624_afa3d9cb84.jpg,sunflowers
gs://cloud-samples-data/ai-platform/flowers/tulips/13979098645_50b9eebc02_n.jpg,tulips
```

Create an image classification dataset and import data

1. To begin the process of creating your dataset and training your image classification model, on the **Vertex AI** page, in the navigation pane, click **Dashboard**.
2. In the central pane, click **Create dataset**.
3. (Optional) Specify a name for this dataset.
4. For **Select a data type and objective**, on the **Image tab**, select **Image classification (Single-label)**.
5. For **Region**, select **us-central1**.
6. To create the empty dataset, click **Create**. The **Data import** page opens.
7. Select **Select import files from Cloud Storage**, and specify the Cloud Storage URI of the CSV file with the image location and label data. The CSV file is at **gs://cloud-training/mlongcp/v3.0_MLonGC/toy_data/flowers_toy.csv**.
8. For **Import file path**, type **cloud-training/mlongcp/v3.0_MLonGC/toy_data/flowers_toy.csv**

9. To begin image import, click **Continue**. The import process takes about 15 minutes. When it is complete, the next page shows all of the images, both labeled and unlabeled, identified for your dataset.

Task 4. Train an AutoML image classification model

Use the Google Cloud Console to train an AutoML image classification model. After your dataset is created and data is imported, use the Cloud Console to review the training images and begin model training.

Review imported images

After the dataset is imported, the Browse tab opens. You can also access this tab by selecting Datasets from the side menu, and then selecting the *annotation set* (set of single-label image annotations) associated with your new dataset.

Begin AutoML model training

On the **Browse tab**, you can choose **Train new model** to begin training. You can also start training by selecting Models from the side menu, then selecting **Create**.

1. On the **Vertex AI** page, in the navigation pane, click **Models**.
2. To open the **Train new model** page, click **Create**.
3. Under **Training method**, select the target **Dataset** and **Annotation set** if they are not automatically selected.
4. Select **AutoML**, and then click **Continue**.
5. (Optional) Under **Model details**, type a **Model name**.
6. Click **Continue**.
7. Leave the **Explainability** section as default and click **Continue**.

8. Under **Compute and pricing**, for **Budget**, select **8 node hours**, and then click **Start training**.

Training takes about **25-35** minutes. When the model finishes training, it is displayed with a green checkmark status icon.

Task 5. Deploy a model to an endpoint and send a prediction

After your AutoML image classification model training is complete, use the Google Cloud Console to create an endpoint and deploy your model to the endpoint. After your model is deployed to this new endpoint, send an image to the model for label prediction.

Deploy your model to an endpoint

Access your trained model to deploy it to a new or existing endpoint from the Models page.

1. On the **Vertex AI** page, in the navigation pane, click **Models**.
2. Select your trained AutoML model. The **Evaluate** tab opens, where you can view model performance metrics.
3. On the **Deploy & Test** tab, click **Deploy to endpoint**. The **Endpoint options** page opens.
4. Under **Define your endpoint**, select **Create new endpoint**, and for **Endpoint name**, type **hello_automl_image**.
5. Click **Continue**.
6. Under **Model settings**, accept the **Traffic split** of **100%**, and set the **Number of compute nodes** to **1**.
7. Click **Deploy**.

It takes about 20 minutes to create the endpoint and deploy the AutoML model to the new endpoint.

Send a prediction to your model

After the endpoint creation process finishes, you can send a single image annotation (prediction) request in the Cloud Console.

1. In the **Test your model** section of the same **Deploy & test** tab you used to create an endpoint in the previous subtask .
2. Click **Upload image**, choose a local image for prediction, and view its predicted label.