

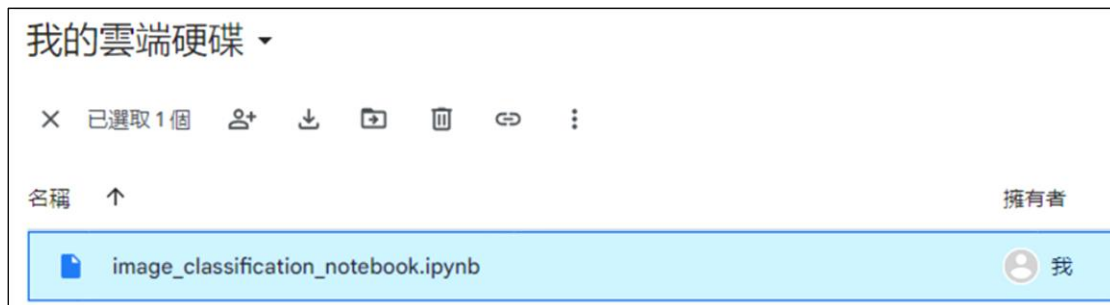
人工智慧影像分類實作：貓狗辨識

本教程將帶您逐步完成一個簡單的影像分類任務，使用深度學習來區分貓和狗的圖片。無論您是否有程式設計背景，都能輕鬆跟隨並了解整個過程。這個方法不僅限於二分類(如貓狗辨識)，系統也支援多個類別的分類任務(如雲朵辨識)。您只需要將分類後的文件夾放在同一路徑下，系統會自動辨識。

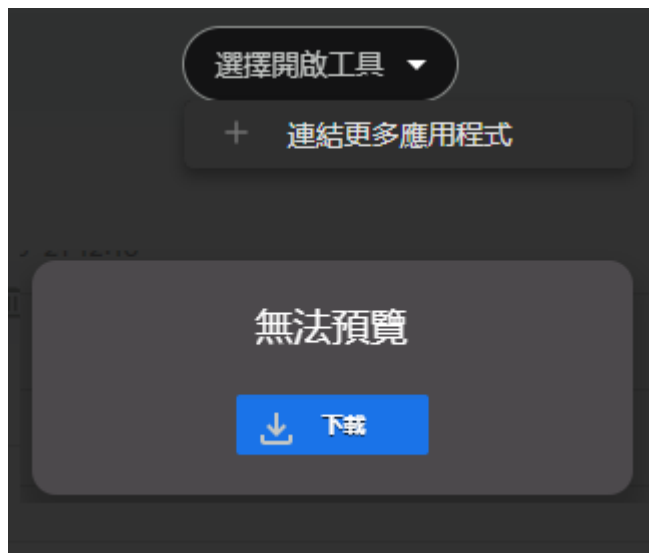
1. 下載我們準備好的 ipynb 檔，再上傳到您的 Google 雲端硬碟

https://li.ntou.edu.tw/var/file/29/1029/img/1423/image_classification_notebook.ipynb

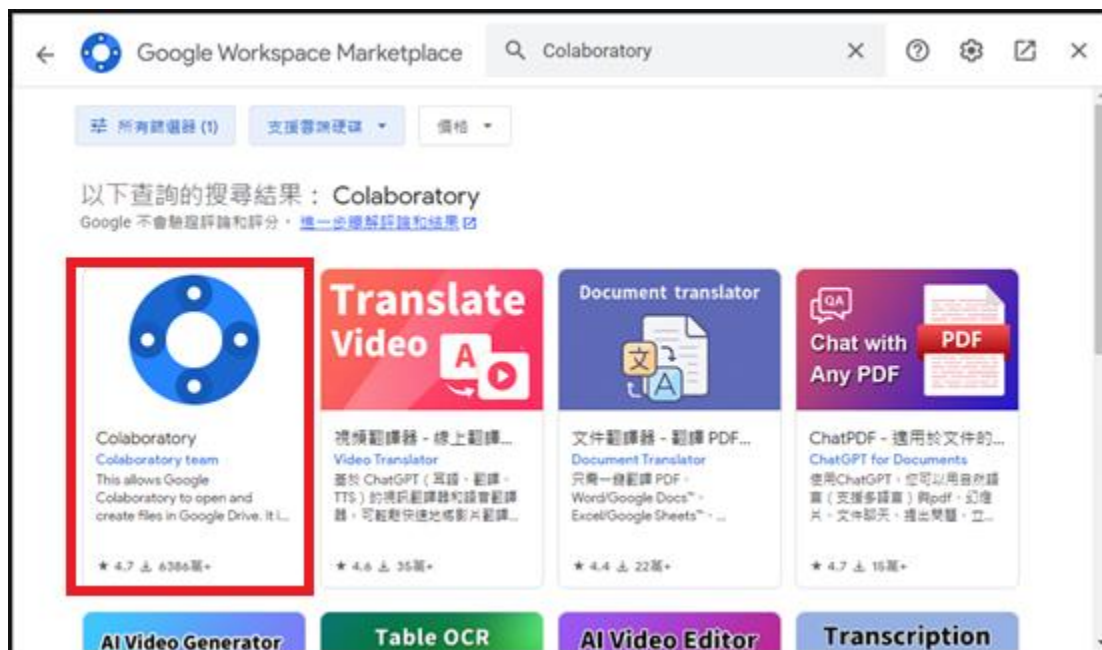
2. 上傳到您的 Google 雲端硬碟之後，點兩下檔案名稱



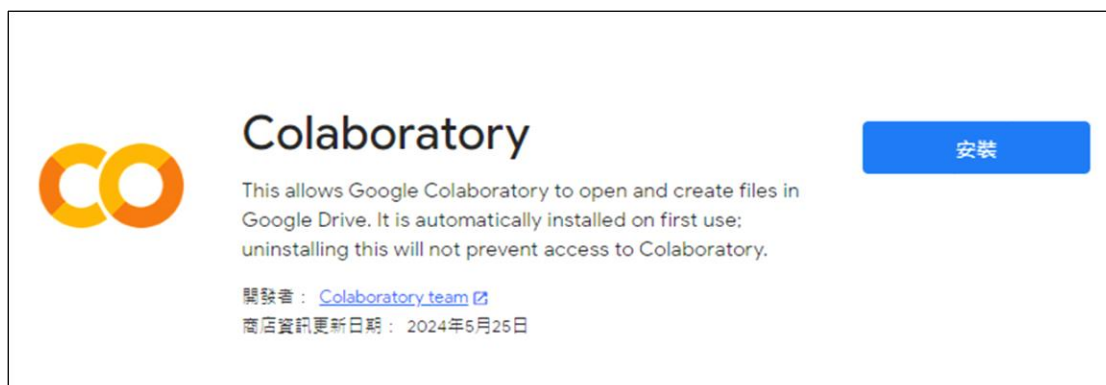
3. 若尚未安裝 Colaboratory 程式則會出現以下畫面，請點擊選擇開啟工具->連結更多應用程式



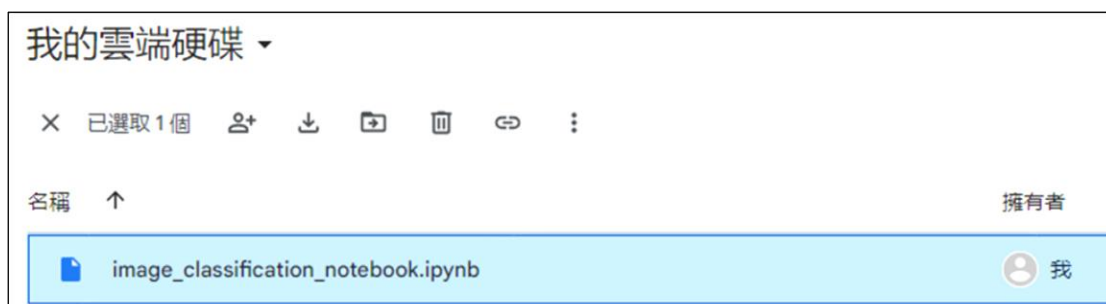
4. 搜尋 colaboratory，從搜尋結果點擊 colaboratory(紅框所示)



5. 點擊安裝



6. 再回到您的雲端硬碟畫面，點兩下剛剛上傳的檔案



7. 成功開啟如下畫面



8. 直接點擊執行階段->全部執行，程式將自動執行方法 1：圖資處的貓狗資料集，您當然也可以自行更改選擇資料集來源及其他參數



9. 程式開始執行(瀏覽器畫面稍微往下拉一點可以看見)



The screenshot shows a Jupyter Notebook cell titled "image_classification_notebook.ipynb". The cell contains the following text:

```
3. 上傳 kaggle.json 文件並輸入要下載的資料集
4. 設定自己的主題名稱與步驟3的文件夾路徑
```

Below the text, there is a section titled "選擇資料集來源" (Select Dataset Source) with a dropdown menu set to "method: 方法1: 圖資處的貓狗資料集" (Method 1: Cat and Dog Dataset from the Library). A "顯示程式碼" (Show Code) button is visible.

```
... —2024-11-04 06:39:48— https://li.ntou.edu.tw/var/file/29/1029/img/1423/cat-a
Resolving li.ntou.edu.tw (li.ntou.edu.tw)... 140.121.99.153
Connecting to li.ntou.edu.tw (li.ntou.edu.tw)[140.121.99.153]:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 228487605 (218M) [application/zip]
Saving to: 'cat-and-dog.zip'

cat-and-dog.zip    22%[====>          ] 48.46M  428KB/s   eta 6m 44s
```

Below the terminal output, there is a section titled "設定主題名稱與圖片路徑" (Set Theme Name and Image Path) with a dropdown menu set to "theme: Cat and Dog".

10. 等所有訓練階段完成



The screenshot shows a Jupyter Notebook cell titled "image_classification_notebook.ipynb". The cell contains the following text:

```
> 重新訓練模型
```

Below the text, there is a section titled "重新訓練模型" (Retrain Model) with a dropdown menu set to "epochs: 10". A "顯示程式碼" (Show Code) button is visible.

```
Found 2 classes: cats, dogs
Found 6404 images belonging to 2 classes.
Found 1601 images belonging to 2 classes.
Epoch 1/10
200/200 ————— 25s 120ms/step - accuracy: 0.9970 - loss: 0.0075 - val_accuracy: 0.9970 - val_loss: 0.0075
Epoch 2/10
200/200 ————— 0s 139us/step - accuracy: 1.0000 - loss: 5.4352e-04 - val_accuracy: 1.0000 - val_loss: 5.4352e-04
Epoch 3/10
200/200 ————— 25s 120ms/step - accuracy: 0.9950 - loss: 0.0124 - val_accuracy: 0.9950 - val_loss: 0.0124
Epoch 4/10
200/200 ————— 1s 3ms/step - accuracy: 1.0000 - loss: 0.0041 - val_accuracy: 1.0000 - val_loss: 0.0041
Epoch 5/10
200/200 ————— 40s 120ms/step - accuracy: 0.9977 - loss: 0.0094 - val_accuracy: 0.9977 - val_loss: 0.0094
Epoch 6/10
200/200 ————— 0s 163us/step - accuracy: 1.0000 - loss: 0.0030 - val_accuracy: 1.0000 - val_loss: 0.0030
Epoch 7/10
200/200 ————— 41s 121ms/step - accuracy: 0.9924 - loss: 0.0208 - val_accuracy: 0.9924 - val_loss: 0.0208
Epoch 8/10
200/200 ————— 0s 154us/step - accuracy: 1.0000 - loss: 2.1010e-06 - val_accuracy: 1.0000 - val_loss: 2.1010e-06
Epoch 9/10
200/200 ————— 24s 119ms/step - accuracy: 0.9936 - loss: 0.0230 - val_accuracy: 0.9936 - val_loss: 0.0230
Epoch 10/10
200/200 ————— 0s 137us/step - accuracy: 1.0000 - loss: 6.8726e-05 - val_accuracy: 1.0000 - val_loss: 6.8726e-05
Training results saved as 'Cat and Dog_training_results.png'
51/51 ————— 5s 105ms/step - accuracy: 0.9788 - loss: 0.0828
WARNING:absl:You are saving your model as an HDF5 file via `model.save()` or `keras.save_model`.
Validation Loss: 0.0648
Validation Accuracy: 0.9850
The model is well-trained and ready for predictions.
Model saved to saved_models/Cat and Dog.h5
Class information saved to saved_models/Cat and Dog_class_info.json
```

Below the terminal output, there is a section titled "Cat and Dog - Training Results" with a line graph titled "Model Accuracy". The graph shows the accuracy of the model over 10 epochs, with the accuracy fluctuating between approximately 0.97 and 1.00.

11. 信心程度顯示模型對於該預測的信心值，範圍在 0 到 1 之間，下圖為 1.00 表示非常確定

image_classification_notebook.ipynb ☆

檔案 編輯 檢視畫面 插入 執行階段 工具 說明 已儲存所有變更

+ 程式碼 + 文字

三、使用訓練好的模型做類別預測


> 進行預測

img_path: "datasets/tongpython/cat-and-dog/test_set/test_set/cats/cat.4001.jpg"

顯示程式碼

1/1 3s 3s/step

預測類別: cats
信心程度: 1.00



此文件由 資工系學生 李宇捷 所撰寫