



Microsoft Azure AI Fundamentals: Explore computer vision

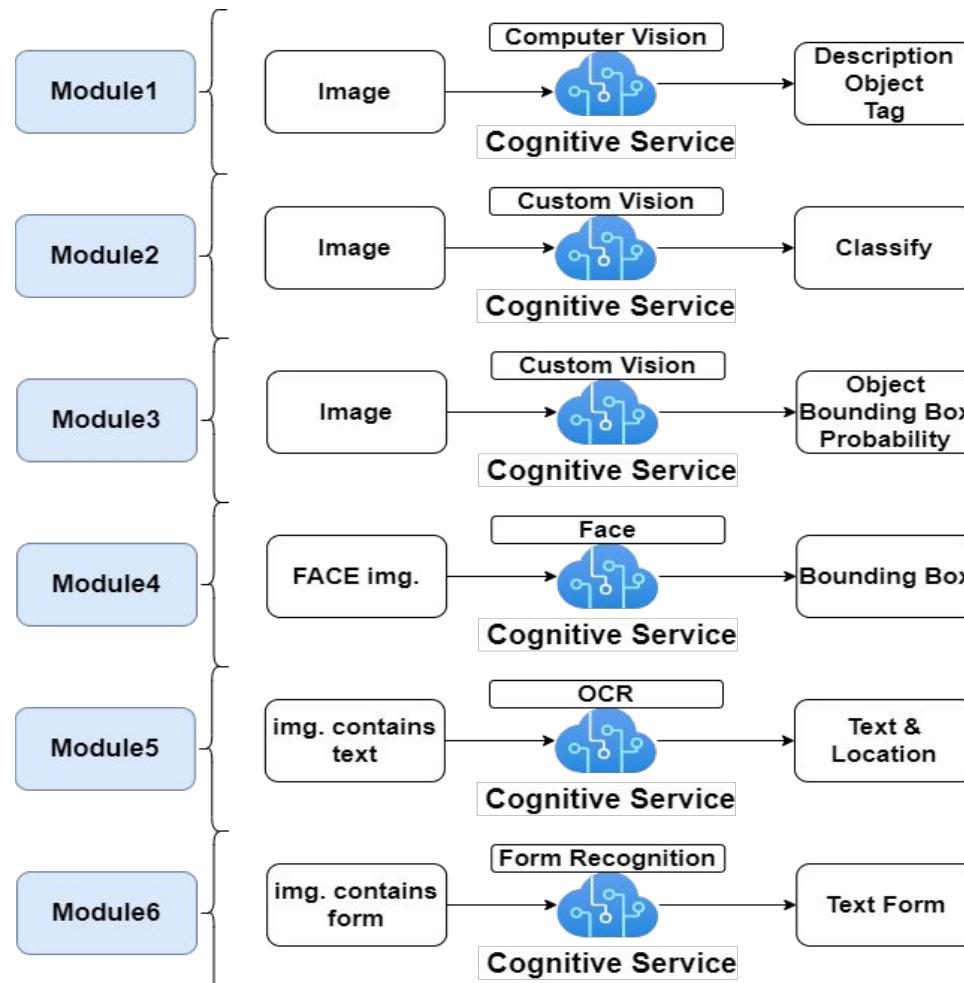
Team 1

11177034 王派霆
11177035 林彥輝

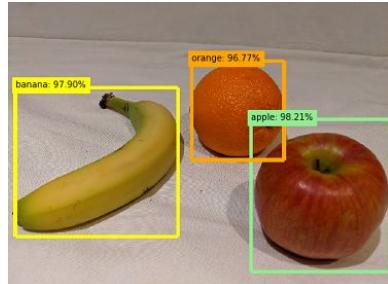
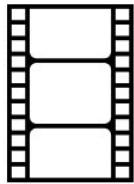
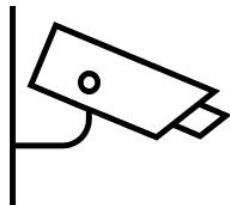
Overview

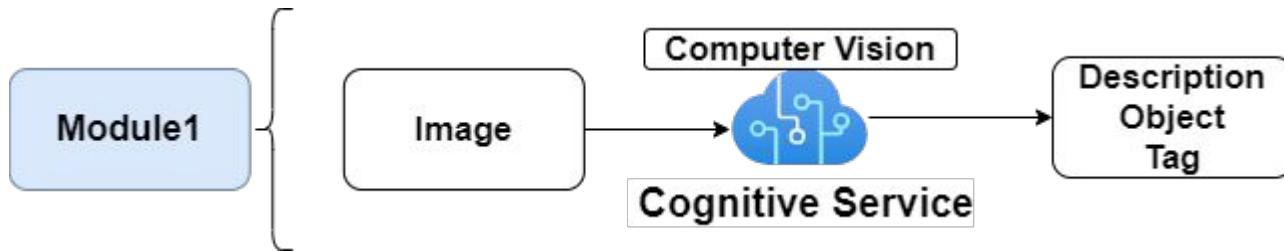
注意：臉部辨識功能限制

Overview



Introduction - Computer Vision (CV)





Module 1

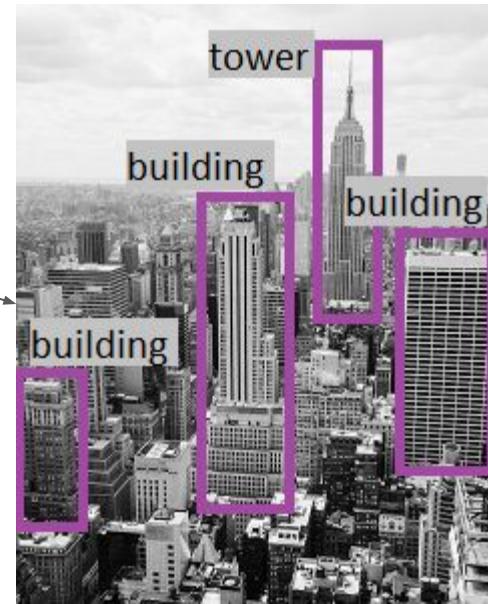
Analyze images with the Computer Vision service



Azure Computer Vision



"一座城市中的大型白色建築"



Create a Cognitive Services resource

目次 /

建立資源

...

開始使用

 搜尋服務和市集

最近建立的項目

熱門 Azure 服務 在所有服務中查看更多資訊

類別

AI + 機器學習服務

分析

區塊鏈

計算

容器

資料庫

開發人員工具

DevOps

身分識別



Azure Synapse Analytics

[建立](#) | [文件](#) | [MS Learn](#)



認知服務

[建立](#) | [文件](#) | [MS Learn](#)



語音

[建立](#) | [文件](#) | [MS Learn](#)



文字分析

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電腦視覺

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Create a Cognitive Services resource

自頁 > 建立資源 > 認知服務 >

建立認知服務

名稱 * ⓘ

11177034

專案詳細資料

訂用帳戶 * ⓘ

Azure for Students

資源群組 * ⓘ

(新增) Cong

新建

執行個體詳細資料

區域 ⓘ

East Asia

名稱 * ⓘ

11177034

i Location 只會為包含的區域服務指定區域。這不會為包含的非區域需詳細資料，請按一下這裡。

定價層 * ⓘ

Standard S0

[檢視完整定價詳細資料](#)

選中此方塊即表示我確認我已閱讀並了解
下列所有條款 *



找到標籤

檢閱 + 建立

< 上一步

下一步 : Network >

Create a Cognitive Services resource

基本 Network Identity **標籤** 檢閱 + 建立

標籤為成對的名稱和數值，可讓您透過將相同標籤套用至多個資源與資源群組，進而分類資源並檢視合併的帳單。 [深入了解標籤](#)

請注意，若您在建立標籤後變更其他索引標籤上的資源設定，您的標籤將會自動更新。

名稱 ①	值 ①	資源	
11177034	:	認知服務	
11177034	:	認知服務	

檢閱 + 建立

< 上一步

下一步 : 檢閱 + 建立 >

Run Cloud Shell



您未掛接任何儲存體

Cloud Shell 離線

Azure for Students 東南亞

隱藏進階設定 顯示 VNET 隔離設定

* 資源群組 建立新項目 使用現有項目

* 儲存體帳戶 建立新項目 使用現有項目

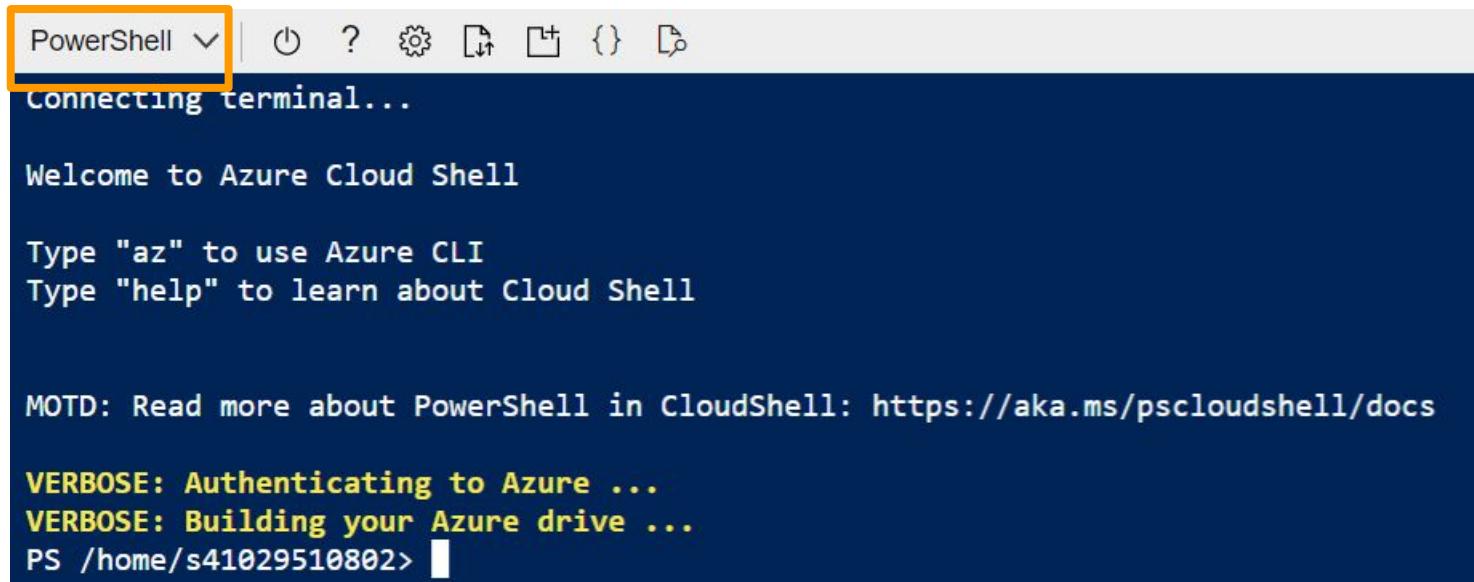
* 檔案共用 建立新項目 使用現有項目

Cognitive 11177034 11177034

[Cloud Shell 儲存體和 VNET 隔離的詳細資訊。](#)

建立儲存體 關閉

Run Cloud Shell



The screenshot shows the Azure Cloud Shell interface. At the top, there is a toolbar with icons for copy, paste, refresh, and others. To the left of the toolbar, the text "PowerShell" is displayed with a dropdown arrow, and the entire "PowerShell" section is highlighted with an orange border. Below the toolbar, the text "CONNECTING terminal..." is shown in white on a dark background. The main area of the terminal window displays the following text:

```
Welcome to Azure Cloud Shell  
Type "az" to use Azure CLI  
Type "help" to learn about Cloud Shell  
  
MOTD: Read more about PowerShell in CloudShell: https://aka.ms/pscloudshell/docs  
  
VERBOSE: Authenticating to Azure ...  
VERBOSE: Building your Azure drive ...  
PS /home/s41029510802> █
```

Configure and run a client application

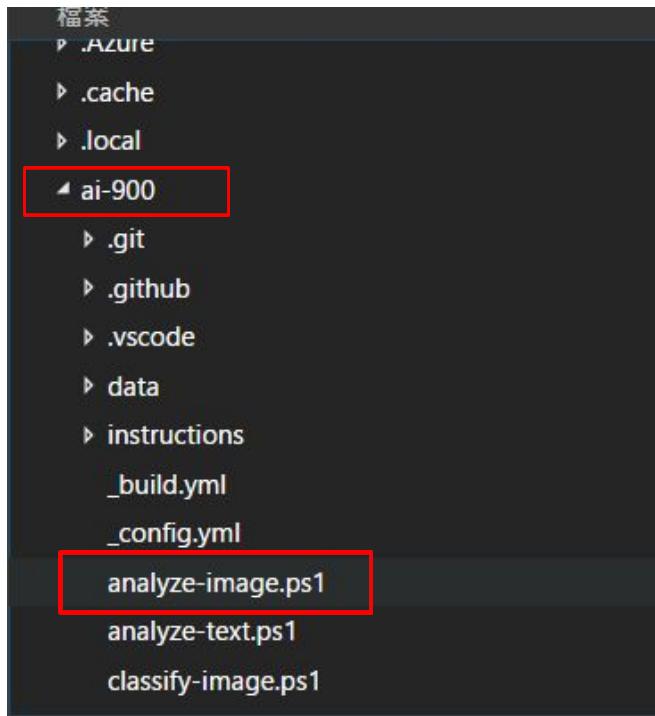
```
PS /home/s41029510802> git clone https://github.com/MicrosoftLearning/AI-900-AIFundamentals ai-900
```

```
$ git clone https://github.com/MicrosoftLearning/AI-900-AIFundamentals ai-900
```

```
PS /home/s41029510802> code .
```

```
$ code .
```

Configure and run a client application



```
analyze-image.ps1
1 $key="YOUR_KEY"
2 $endpoint="YOUR_ENDPOINT"
3
4
5 # Code to call Computer Vision
6 $img_file = "store-camera-1.jpg"
7 if ($args.count -gt 0 -And $arg
8 {
9     $img_file = $args[0]
10 }
11
12 $img = "https://raw.githubusercontent.com
```

Configure and run a client application

The screenshot shows the Azure Cognitive Services Key Management interface. At the top left, there's a yellow key icon and the text "11177034 | 金鑰與端點". Below it, a search bar contains the placeholder "搜尋". On the right, there are two blue circular icons labeled "重新產生 Key1" and "重新產生 Key2". The main area has a title "顯示金鑰" and a note "選其中一把複製即可". On the left, a sidebar lists "資源管理" categories: "金鑰與端點" (highlighted with an orange box), "定價層", "網路功能", "識別", "成本分析", "屬性", and "鎖定". The "金鑰與端點" section displays two entries: "金鑰 1" and "金鑰 2", each with a redacted key value. To the right of these entries are two blue "Copy" icons. Below this, there's a "位置/區域" field set to "eastasia" with a copy icon to its right. At the bottom, a URL "https://11177034.cognitiveservices.azure.com/" is highlighted with an orange box, along with its own copy icon.

11177034 | 金鑰與端點 ☆ ...

認知服務多重服務帳戶

搜尋

重新產生 Key1 重新產生 Key2

顯示金鑰

選其中一把複製即可

資源管理

金鑰與端點

定價層

網路功能

識別

成本分析

屬性

鎖定

金鑰 1

金鑰 2

位置/區域

eastasia

端點

https://11177034.cognitiveservices.azure.com/

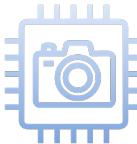
Configure and run a client application

```
$key="96a41f635cc44f3e807c08006c220699"  
$endpoint="https://11177034.cognitiveservices.azure.com/"
```

Code

```
"$endpoint/vision/v3.2/analyze?visualFeatures=Categories,Description,Objects"
```

```
++  
12 $img = "https://raw.githubusercontent.com/MicrosoftLearning/AI-900-AIFundamentals/main/data/vision/$img_file"  
13  
14 $headers = @{}  
15 $headers.Add( "Ocp-Apim-Subscription-Key", $key )  
16 $headers.Add( "Content-Type", "application/json" )  
17  
18 $body = "{'url' : '$img'}"  
19  
20 write-host "Analyzing image..."  
21 $result = Invoke-RestMethod -Method Post `  
22     -Uri "$endpoint/vision/v3.2/analyze?visualFeatures=Categories,Description,Objects" `  
23     -Headers $headers `  
24     -Body $body | ConvertTo-Json -Depth 5  
25
```



Run a client application

```
PS /home/s41029510802> cd ./ai-900/
```

```
PS /home/s41029510802/ai-900> ./analyze-image.ps1 store-camera-1.jpg
```

Analyzing image...

Description:

a woman showing her phone to a child

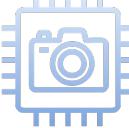
Objects in this image:

- cell phone
- person
- person
- room

Tags relevant to this image:

- text
- person
- woman
- store
- shop





Run a client application

```
PS /home/s41029510802/ai-900> ./analyze-image.ps1 store-camera-2.jpg  
Analyzing image...
```

Description:

a woman holding a shopping cart in a grocery store

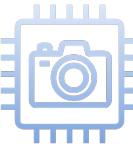
Objects in this image:

- person

Tags relevant to this image:

- text
- person
- woman
- marketplace
- shop





Run a client application

```
PS /home/s41029510802/ai-900> ./analyze-image.ps1 store-camera-3.jpg
```

```
Analyzing image...
```

Description:

a person pushing a shopping cart

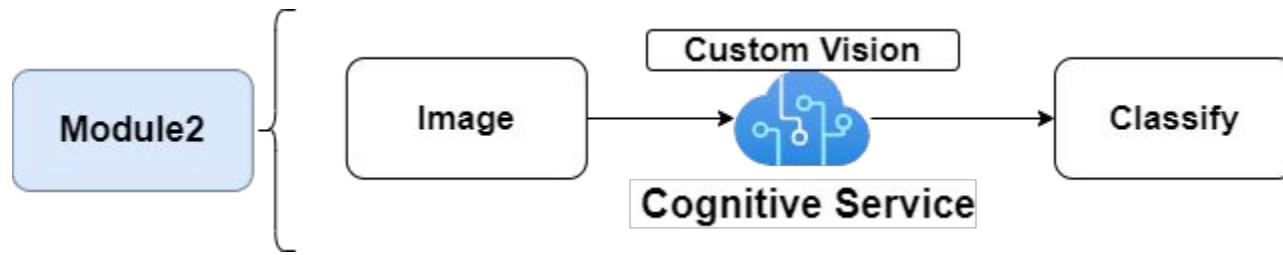
Objects in this image:

- person
- supermarket

Tags relevant to this image:

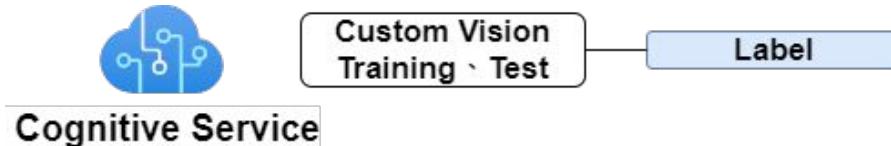
- text
- marketplace
- person
- scene
- produce
- shop



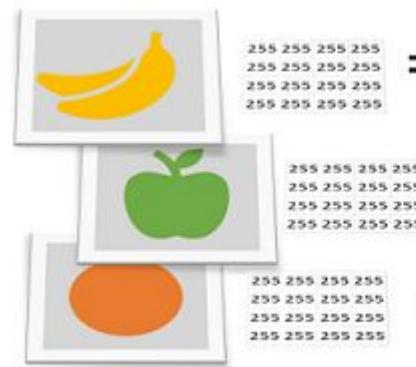
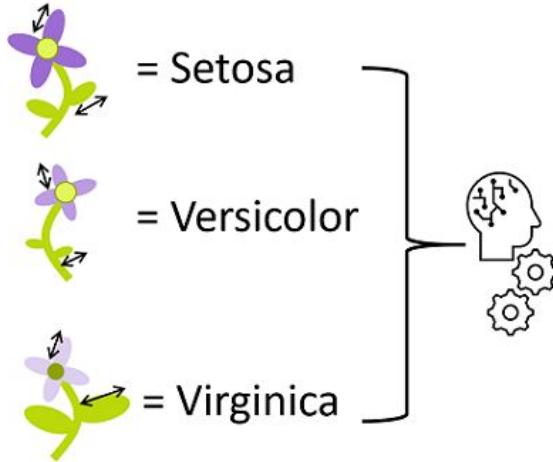


Module 2

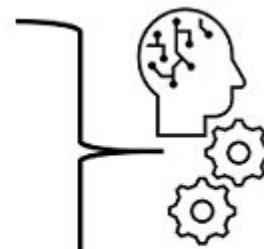
Classify images with the Custom Vision service



Introduction



= banana
= apple
= orange



Create a Custom Vision project



Cognitive Services

Custom Vision

Visual Intelligence Made Easy

Easily customize your own state-of-the-art computer vision
models that fit perfectly with your unique use case.

Just bring a few examples of labeled images and let Custom Vision
do the hard work.

SIGN IN

Create a Custom Vision project

Terms of Service



I agree that my use of this service is governed by the [Microsoft Online Subscription Agreement](#), which incorporates the [Online Services Terms](#).

I agree

Create a Custom Vision project

If you are using customer-managed keys, your data will be encrypted by your own key but project name, description, tag and published model name fields will be encrypted by Microsoft-managed key. X
Please make sure you don't include any sensitive information in these text fields.

Ok

Projects

Project Name: Search by project name Project Type: Any project type

 NEW PROJECT

1. 先下載右下角的data
2.解壓縮
3.再建立新專案

https://aka.ms/fruit-images

Yes, your data will be encrypted by your own key but project name, description, tag and published model name may sensitive information in these text fields.

Create new project

Name*

Description

Resource*

- Please Choose -

create new

Cancel Create project

Create New Resource

X

Name*

CustomVision

Subscription*

Azure for Students

Resource Group*

[create new](#)

Cognitive

Kind

CognitiveServices

Location

Japan East

Pricing Tier

S0

Resource*

- Please Choose -

- Please Choose -

Azure for Students

CustomVision [S0]

Create resource

Create new project

X

Name*

結帳櫃檯

Description

商品影像分類

Resource*

create new

CustomVision [S0]



[Manage Resource Permissions](#)

Project Types ⓘ

- Classification
- Object Detection

Classification Types ⓘ

- Multilabel (Multiple tags per image)
- Multiclass (Single tag per image)

Domains:

- General [A2]
- General [A1]
- General
- Food
- Landmarks



結帳櫃檯

Training Images

Performance

Predictions

Train

Quick Test



Iteration

Workspace

Tags

Tagged



Untagged

Showing: all tagged images

Search For Tags:

Add images

Delete

Tag images

Select all



IMG_20200229_164759



IMG_20200229_164760



IMG_20200229_164804



IMG_20200229_164811



IMG_20200229_164819



IMG_20200229_164823



IMG_20200229_164830



IMG_20200229_164851



IMG_20200229_164901



IMG_20200229_164918



IMG_20200229_164919



IMG_20200229_164925



IMG_20200229_164926.jpg



IMG_20200229_164932



IMG_20200229_164936

名稱(N):

圖片檔

Looks like you don't have any images here!

Go ahead and browse for images to upload to your project, tag them, and they will be ready to be trained.

Add images

.JPG, .PNG, .BMP format, up to 6 MB per image

25%

Get started

training-images.zip



全部顯示

Image upload

X

Add Tags

Uploading

Summary



15 images will be added...

Add some tags to this batch of images...

My Tags

apple

Upload 15 files

Done

Image upload

X

Add Tags

Uploading

Summary

✓ 15 images uploaded successfully

Done

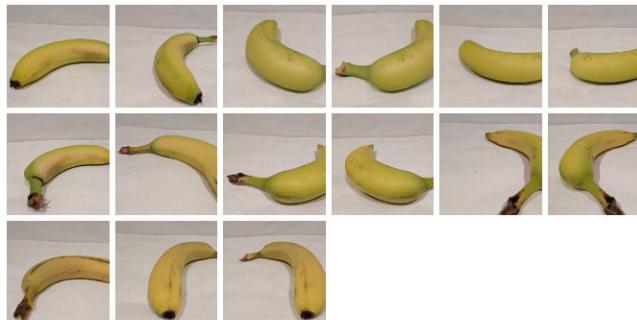
接續上傳「banana」、「orange」的圖片並標上 tag。

Image upload

Add Tags

Uploading

Summary



15 images will be added...

Add some tags to this batch of images...

My Tags

banana

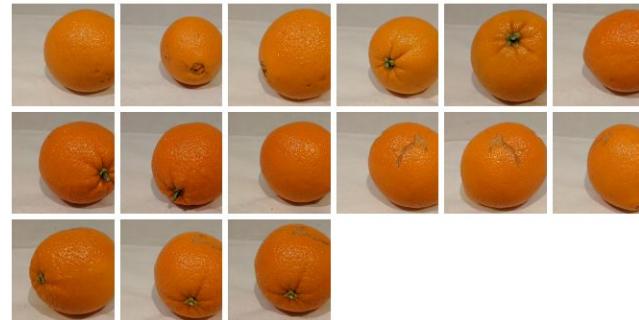
Upload 15 files

Image upload

Add Tags

Uploading

Summary



15 images will be added...

Add some tags to this batch of images...

My Tags

orange

Upload 15 files

Training Images

Performance

Predictions

Train

Quick Test



Add images

Delete

Tag images

Select all

Choose Training Type



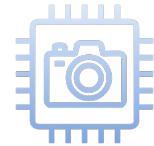
Training Types (i)

Quick Training

Advanced Training

Est. Minimum Budget: 1 hour

Train



Performance Per Tag

Iteration 1

Finished training on 2022/10/28 下午2:37:04 using **Food** domain

Iteration id: **6a8b205e-738e-4852-883c-225ae7422a7d**

Classification type: **Multiclass (Single tag per image)**

Tag	Precision	Recall	A.P.	Image count
orange	100.0%	100.0%	100.0%	15 
banana	100.0%	100.0%	100.0%	15 
apple	100.0%	100.0%	100.0%	15 

Precision ⓘ



Recall ⓘ



AP ⓘ



Test the model

Quick Test

Test image will show up here

<https://aka.ms/apple-image>

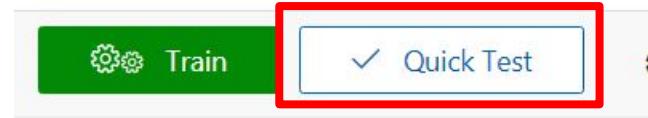


Image URL

<https://aka.ms/apple-image>



or

[Browse local files](#)

File formats accepted: jpg, png, bmp

File size should not exceed: 4mb

Using model trained in

Iteration

Iteration 1 ▾

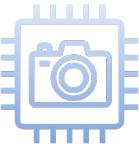


Image URL

<https://aka.ms/apple-image>



or

[Browse local files](#)

File formats accepted: [jpg](#), [png](#), [bmp](#)

File size should not exceed: [4mb](#)

Using model trained in

Iteration

Iteration 1 ▾

Predictions

Tag	Probability
apple	98.1%
orange	1.8%
banana	0%

Publish the image classification model

The screenshot shows a user interface for managing a machine learning model. At the top, there is a navigation bar with four tabs: "Training Images", "Performance" (which is currently selected and highlighted in blue), "Predictions", and "Train". To the right of the tabs are two buttons: "Quick Test" (with a checkmark icon) and a settings gear icon. Below the navigation bar, there are four action buttons: "Publish" (with a red rectangular box drawn around it), "Prediction URL" (with a globe icon), "Delete" (with a trash bin icon), and "Export" (with a downward arrow icon).

Training Images **Performance** Predictions ⚙️ Train ✓ Quick Test ⚙️

✓ Publish 🌐 Prediction URL 🗑 Delete ⬇️ Export

Publish Model



We only support publishing to a prediction resource in the same region as the training resource the project resides in.

Please check if you have a prediction resource and if the prediction resource is in the same region as the training resource.

Model name

商品

Prediction resource

CustomVision

Publish

Cancel

 Unpublish

 Prediction URL

 Delete

 Export

Iteration 1

Finished training on **2022/10/28 下午2:37:04** using **Food** domain

Iteration id: **6a8b205e-738e-4852-883c-225ae7422a7d**

Classification type: **Multiclass (Single tag per image)**

Published as: **商品**

How to use the Prediction API



If you have an image URL:

```
https://japaneast.api.cognitive.microsoft.com/customvision/v3.0/Prediction/4c9bb64
```

Set `Prediction-Key` Header to : `3da3c3c7e63748b380ff9e1f21f27359`

Set `Content-Type` Header to : `application/json`

Set Body to : `{"Url": "https://example.com/image.png"}`

If you have an image file:

```
https://japaneast.api.cognitive.microsoft.com/customvision/v3.0/Prediction/4c9bb64
```

Set `Prediction-Key` Header to : `3da3c3c7e63748b380ff9e1f21f27359`

Set `Content-Type` Header to : `application/octet-stream`

Set Body to : <image file>

Got it!

Configure

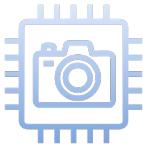
```
PS /home/s41029510802> code .
```

```
  ▾ ai-900
    ▶ .git
    ▶ .github
    ▶ .vscode
    ▶ data
    ▶ instructions
      _build.yml
      _config.yml
      analyze-image.ps1
      analyze-text.ps1
    classify-image.ps1
    detect-anomalies.ps1
    detect-objects.ps1
    find-faces.ps1
    form-recognizer.ps1
```

```
...  
classify-image.ps1  
1 $predictionUrl="YOUR_PREDICTION_URL"  
2 $predictionKey = "YOUR_PREDITION_KEY"  
3  
4  
5 # Code to call Custom Vision service for image classificat  
6  
7 $img_num = 1  
8 if ($args.count -gt 0 -And $args[0] -in (1..3))  
9 {  
10   $img_num = $args[0]  
11 }  
12  
13 $img = "https://raw.githubusercontent.com/MicrosoftLearnin  
14  
15 $headers = @{}  
16 $headers.Add( "Prediction-Key", $predictionKey )  
17 $headers.Add( "Content-Type", "application/json" )  
18  
19 $body = "{ 'url' : '$img' }"  
20  
21 write-host "Analyzing image..."
```

Configure

```
classify-image.ps1  
$predictionUrl="https://japaneast.api.cognitive.microsoft.  
$predictionKey = "3da3c3c7e63748b380ff9e1f21f27359"
```



Run a client application

```
PS /home/s41029510802> cd ai-900
```

```
PS /home/s41029510802/ai-900> ./classify-image.ps1 1
```

```
Analyzing image...
```

```
apple
```

```
PS /home/s41029510802/ai-900> ./classify-image.ps1 2
```

```
Analyzing image...
```

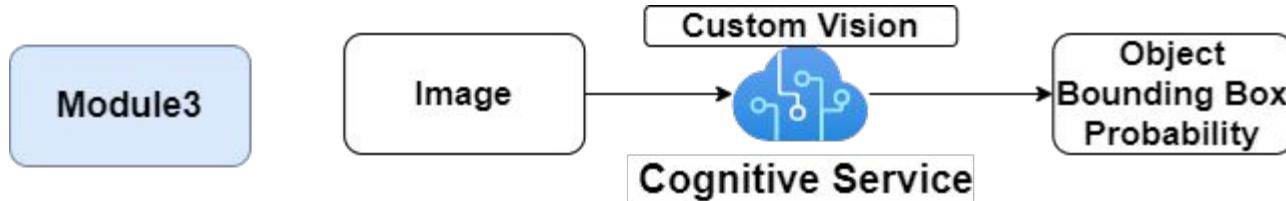
```
banana
```

```
PS /home/s41029510802/ai-900> ./classify-image.ps1 3
```

```
Analyzing image...
```

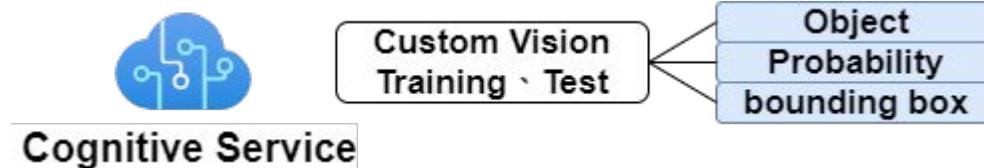
```
orange
```

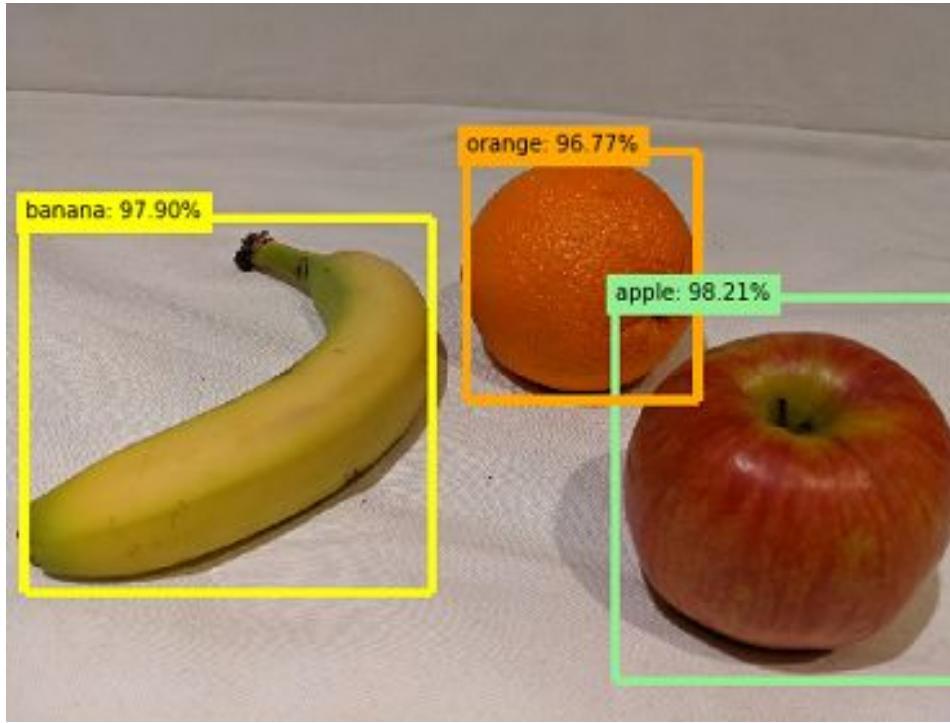




Module 3

Detect objects in images with the Custom Vision service





Create a Custom Vision project

If you are using customer-managed keys, your data will be encrypted by your own key but project name, description, tag and published model name fields will be encrypted by Microsoft-managed key. X

Please make sure you don't include any sensitive information in these text fields.

Ok

Projects

Project Name: Project Type:


NEW PROJECT

Loading your projects...

Create new project

X

Name*

雜貨店偵測

Description

物件偵測

Resource*

create new

11177034 [S0]



[Manage Resource Permissions](#)

Project Types ⓘ

Classification

Object Detection

Domains:

General [A1]

General

Logo

Products on Shelves

General (compact) [S1]

General (compact)

Pick the domain closest to your scenario. Compact domains are lightweight models
that can be exported to iOS/Android and other platforms. [Learn More](#)

Cancel

Create project

Add and tag images

杂货店侦测

Training Images Performance Predictions Train Quick Test

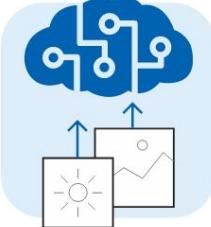
Filter Add images Delete Select all

Iteration: Workspace

Tags: Tagged Untagged

Showing: all tagged images

Search For Tags:



Looks like you don't have any images here!

Go ahead and browse for images to upload to your project, tag them, and they will be ready to be trained.

1. 下載測試資料: <https://aka.ms/fruit-objects>

2. 解壓縮

JPG, .PNG, .BMP format, up to 6 MB per image

Add images

Image upload

X



Upload Preview



Uploading

Summary

A screenshot of a Windows File Explorer window titled "Image upload". The window shows a grid of fruit images being uploaded. A red box highlights the file selection area, which contains 33 files. An orange box highlights the "Upload 33 files" button at the bottom right.

File Explorer window content:

- Path: 本機 > 下載 > objecttrain
- Files listed:
 - IMG_20200314_180827
 - IMG_20200314_180827a
 - IMG_20200314_180911a
 - IMG_20200314_180921
 - IMG_20200314_180921a
 - IMG_20200314_180928
 - IMG_20200314_180928a
 - IMG_20200314_180948
 - IMG_20200314_181002
 - IMG_20200314_181002a
 - IMG_20200314_181012
 - IMG_20200314_181012a
 - IMG_20200314_181033a
 - IMG_20200314_181047a
 - IMG_20200314_181056
 - IMG_20200314_181056a
- File name entry field: "IMG_20200229_164804" "IMG_20200229_164819" "IMG_20200229_164901" "IMG_20200229_164919" "IMG_20200229_164919" "IMG_20200229_164919"
- Buttons: 開啟(O) and 取消

Grid of fruit images:

- Row 1: Apple, Apple, Green Apple, Banana
- Row 2: Apple, Banana, Banana, Orange
- Row 3: Orange, Orange

Upload 33 files



Iteration

Workspace

Tags



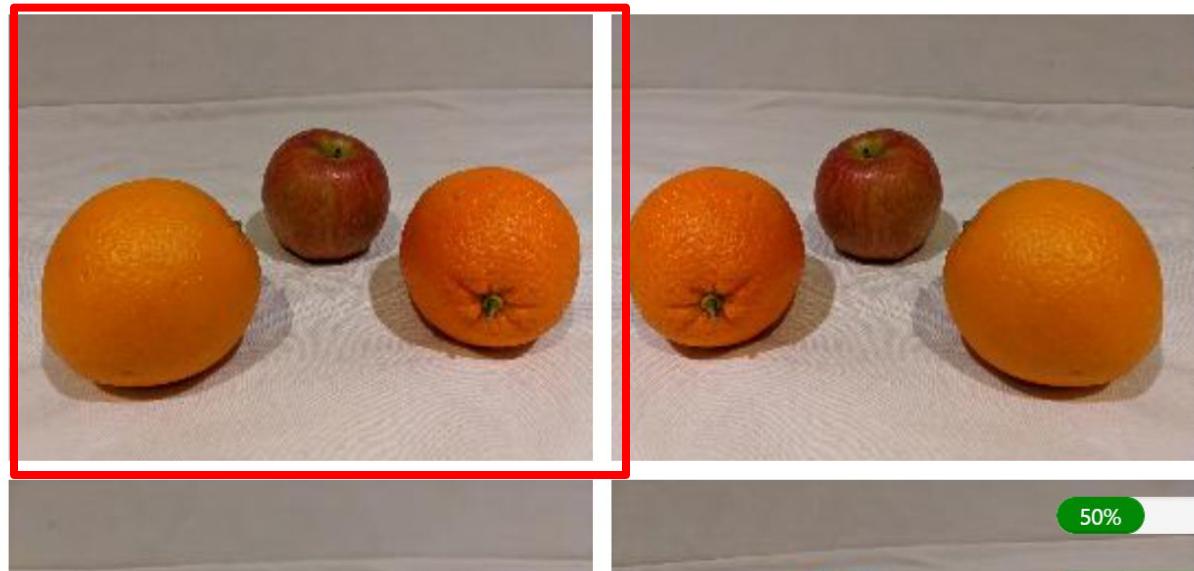
Tagged

Untagged

Showing: all untagged images

Suggested Tags

Quickly label your untagged
images with suggested



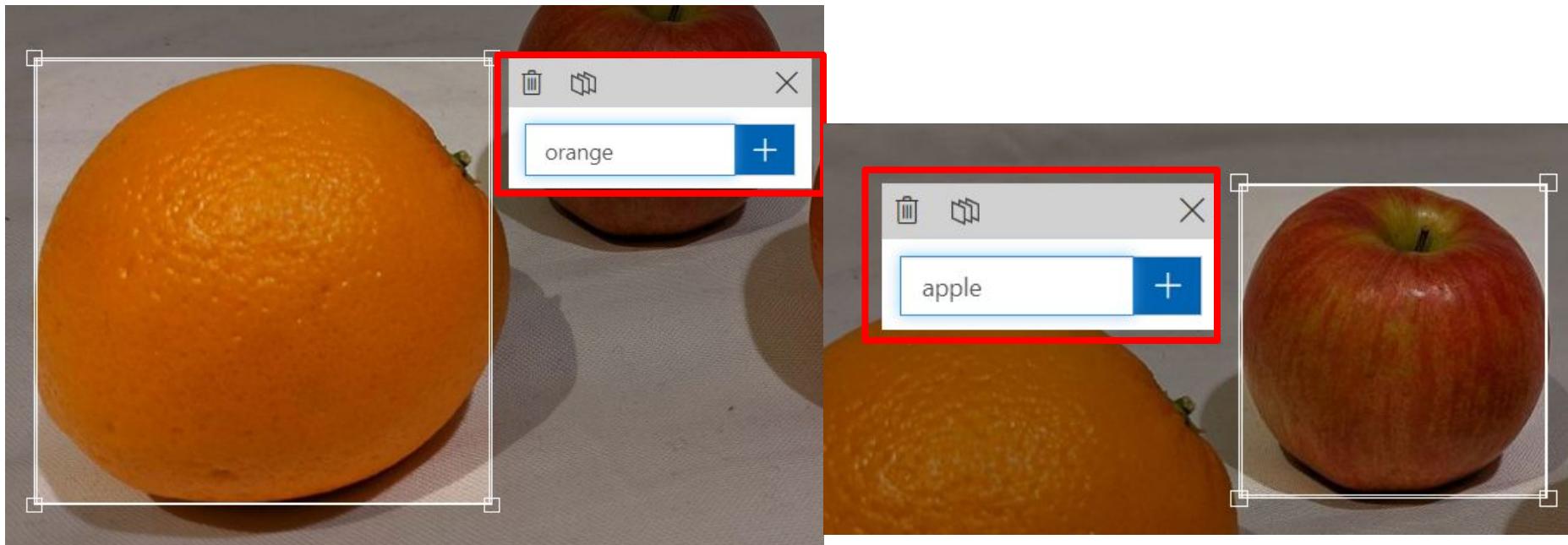
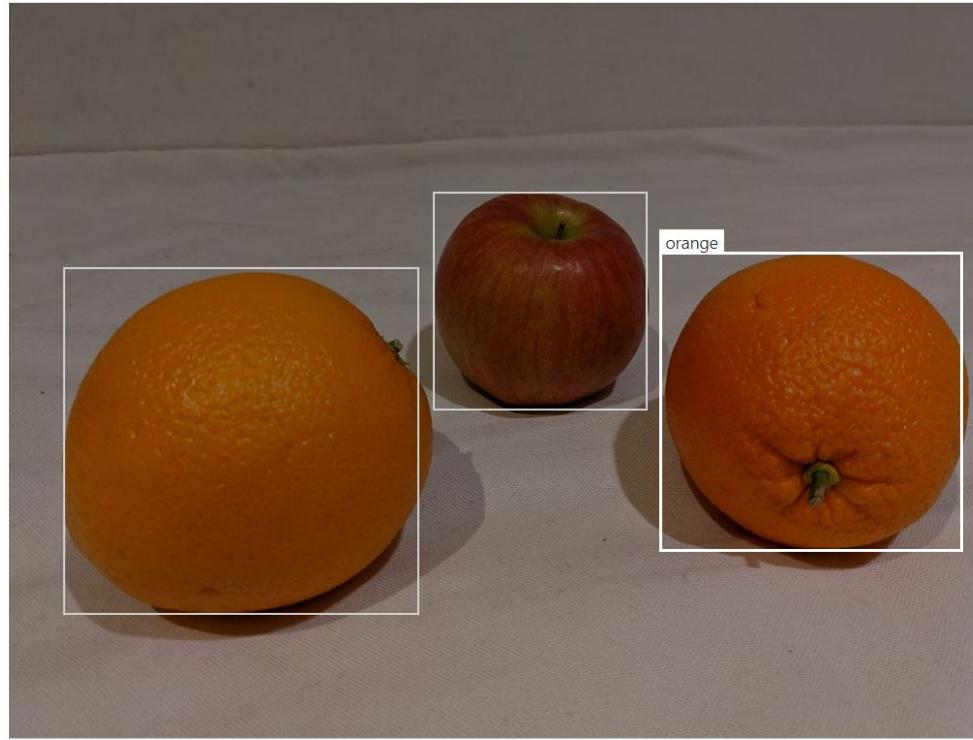


Image Detail

Undo Changes

Regions Shown



My Objects

orange

apple

把所有圖都標上 label(33張圖)

Filter

Add images

Delete

Select all

Iteration

Workspace

Tags

Tagged Untagged

Showing: all tagged images

Search For Tags:

 apple 18 ... banana 20 ... orange 20 ...

Choose Training Type

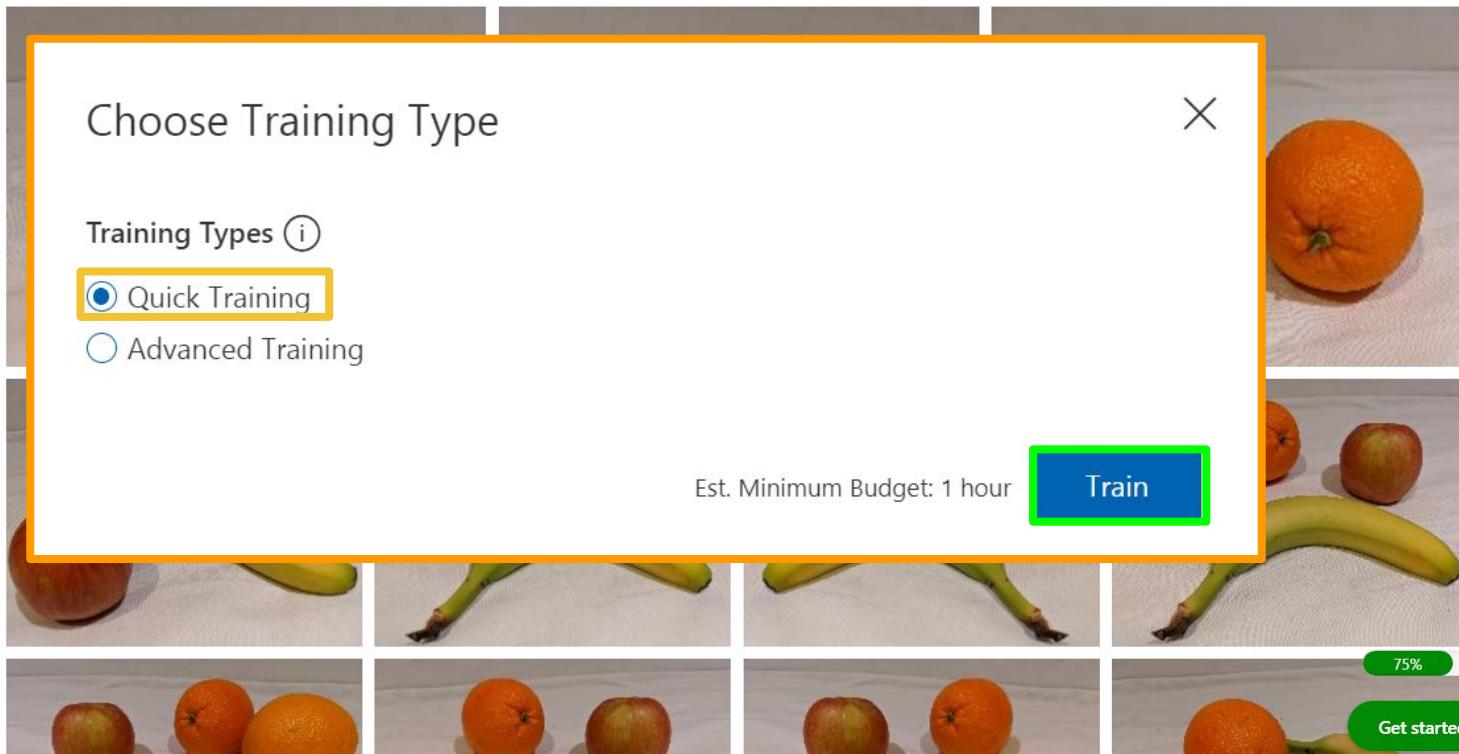
X

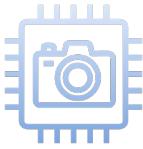
Training Types ⓘ

 Quick Training Advanced Training

Est. Minimum Budget: 1 hour

Train





Test the model

杂货店偵測

Iterations

Probability Threshold: 50% ⓘ

Overlap Threshold: 30% ⓘ

Iteration 1
Trained : 2 minutes ago with General [A1] domain

Publish Prediction URL Delete Export

Precision ⓘ Recall ⓘ mAP ⓘ

88.2% 100.0% 100.0%

Performance Per Tag

Tag	Precision	Recall	A.P.	Image count
apple	100.0%	100.0%	100.0%	18
orange	85.7%	100.0%	100.0%	20
banana	83.3%	100.0%	100.0%	20

Quick Test



Regions Shown



Image URL

<https://aka.ms/apple-orange>



or

[Browse local files](#)

File formats accepted: [jpg](#), [png](#), [bmp](#)

File size should not exceed: [4mb](#)

Using model trained in

Iteration

Iteration 1 ▾

Quick Test



Regions Shown

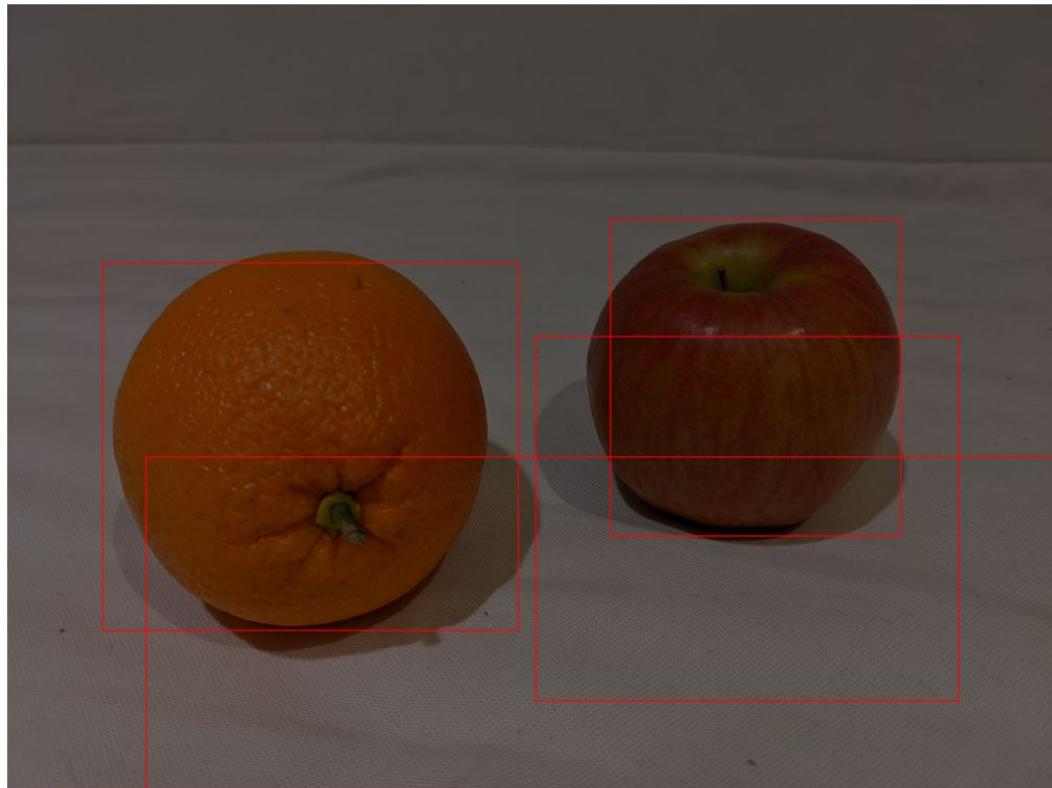


Image URL

<https://aka.ms/apple-orange>



or

[Browse local files](#)

File formats accepted: [jpg](#), [png](#), [bmp](#)
File size should not exceed: [4mb](#)

Using model trained in

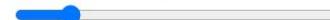
Iteration

Iteration 1 ▾

Predicted Object Threshold

Only show suggested objects if the probability
is above the selected threshold.

Threshold Value: 15%

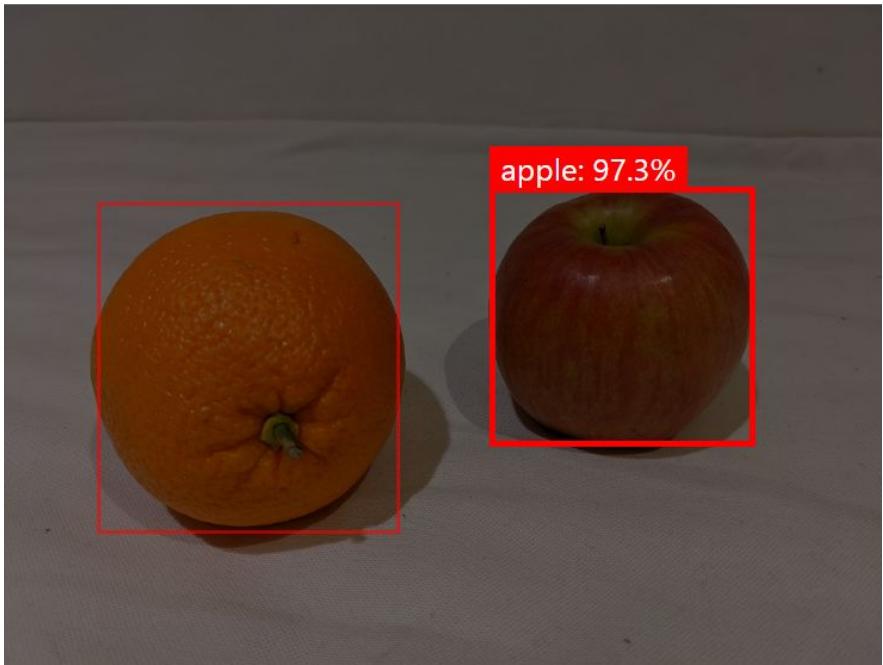
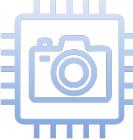


Predictions

Predictions are shown in [red](#)

Tag

Probability



Publish the object detection model

Iterations

✓ Publish

Prediction URL

Delete Export

Probability Threshold: 50% ⓘ

Overlap Threshold: 30% ⓘ

Iteration 1
Trained : 2 minutes ago with General [A1] domain

Precision ⓘ

Recall ⓘ

mAP ⓘ

88.2%

100.0%

100.0%

Performance Per Tag

Tag	Precision	Recall	A.P.	Image count
-----	-----------	--------	------	-------------

Publish Model

X

We only support publishing to a prediction resource in the same region as the training resource the project resides in.

Please check if you have a prediction resource and if the prediction resource is in the same region as the training resource.

Model name

detect-produce

Prediction resource

11177034

Publish

Cancel

Unpublish

Prediction URL

Delete

Export

Iteration 1

How to use the Prediction API

If you have an image URL:

```
https://japaneast.api.cognitive.microsoft.com/customvision/v3.0/Prediction/2e6f962
```

Set `Prediction-Key` Header to : `181bd73f11e64dc582e42f486b404dc4`

Set `Content-Type` Header to : `application/json`

Set Body to : `{"Url": "https://example.com/image.png"}`

If you have an image file:

```
https://japaneast.api.cognitive.microsoft.com/customvision/v3.0/Prediction/2e6f962
```

Set `Prediction-Key` Header to : `181bd73f11e64dc582e42f486b404dc4`

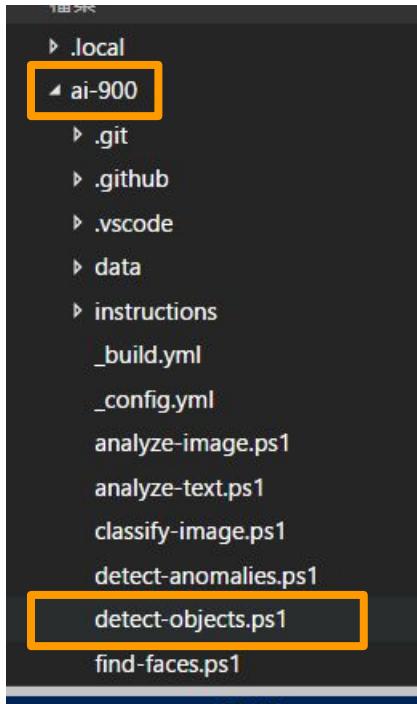
Set `Content-Type` Header to : `application/octet-stream`

Set Body to : <image file>

Got it!

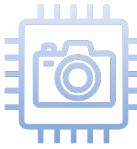
Configure

```
PS /home/s41029510802> code .
```



```
detect-objects.ps1
```

```
$predictionUrl="YOUR_PREDICTION_URL"
$predictionKey = "YOUR PREDITION KEY"
```



Run a client application

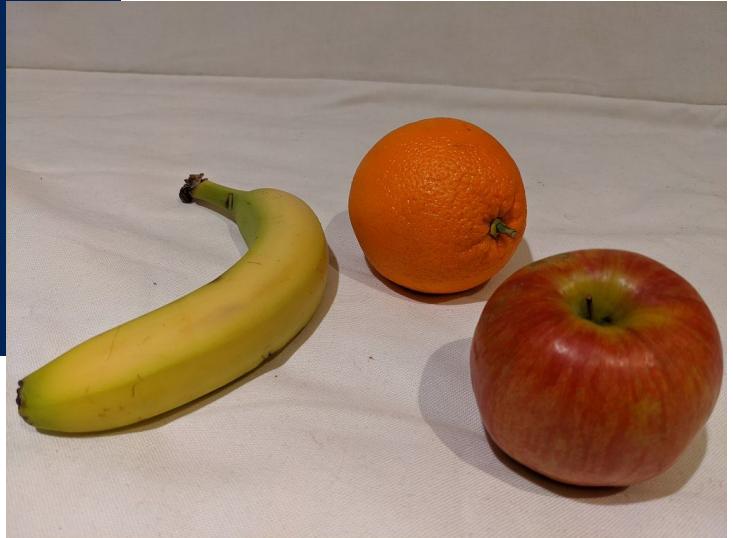
```
PS /home/s41029510802> cd ./ai-900/
```

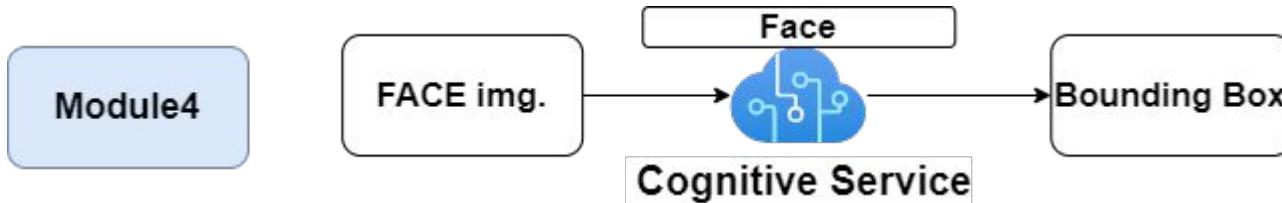
```
PS /home/s41029510802/ai-900> ./detect-objects.ps1  
Analyzing image...
```

```
apple
```

```
banana
```

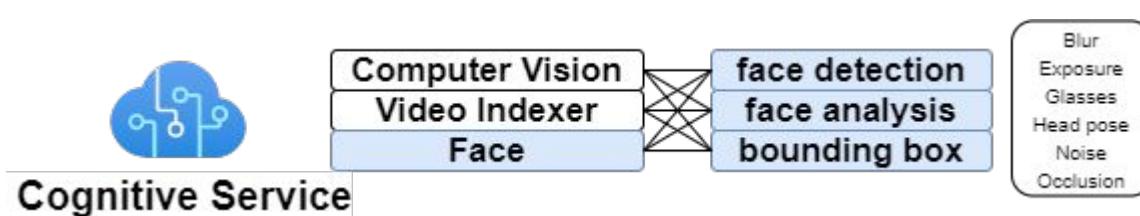
```
orange
```





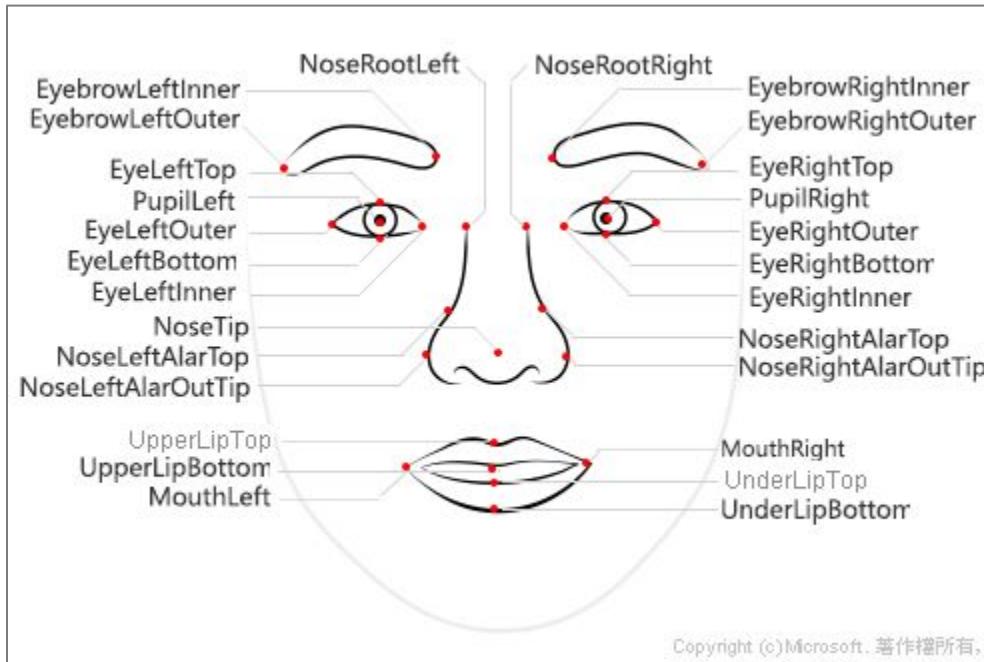
Module 4

Detect and analyze faces with the Face service



Introduction

Face detection and analysis is an area of artificial intelligence (AI) in which **we use algorithms to locate and analyze human faces** in images or video content.



Detect and analyze faces with the Face service

11177034 | 金鑰與端點 ☆ ...

認知服務多重服務帳戶

搜尋

重新產生 Key1 重新產生 Key2

顯示金鑰

資源管理

金鑰與端點

定價層

網路功能

識別

成本分析

屬性

鎖定

金鑰 1

.....

金鑰 2

.....

位置/區域 ⓘ

eastasia

端點

<https://11177034.cognitiveservices.azure.com/>

The screenshot shows the Azure portal interface for managing a Face service resource. On the left, there's a sidebar with various resource management options like '金鑰與端點', '定價層', etc. The main area is titled '11177034 | 金鑰與端點'. It displays two keys ('金鑰 1' and '金鑰 2') as redacted strings. Below that is a '位置/區域' (Region) dropdown set to 'eastasia'. At the bottom, the '端點' (Endpoint) URL is shown as a link: 'https://11177034.cognitiveservices.azure.com/'. Two boxes have been drawn around specific fields: a red box around '金鑰 1' and an orange box around the endpoint URL.

Detect and analyze faces with the Face service

```
PS /home/s41029510802> code .
```

The screenshot shows a terminal window with a file tree on the left and two configuration variables on the right.

File Tree:

- .local
- ◀ ai-900 (highlighted by an orange box)
- .git
- .github
- .vscode
- data
- instructions
- _build.yml
- _config.yml
- analyze-image.ps1
- analyze-text.ps1
- classify-image.ps1
- detect-anomalies.ps1
- detect-objects.ps1
- find-faces.ps1 (highlighted by an orange box)
- form-recognizer.ps1
- index.md

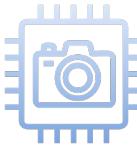
Configuration Variables:

```
$key="b04534507e5b49de838bf447952d8788"  
$endpoint="https://11177034congtive.cognitiveservices.azure.com/"
```

Code

```
"$endpoint/face/v1.0/detect?detectionModel=detection_01"

21  write-host "Analyzing image...`n"
22  $result = Invoke-RestMethod -Method Post ` 
23    -Uri "$endpoint/face/v1.0/detect?detectionModel=detection_01" ` 
24    -Headers $headers ` 
25    -Body $body | ConvertTo-Json -Depth 5
```

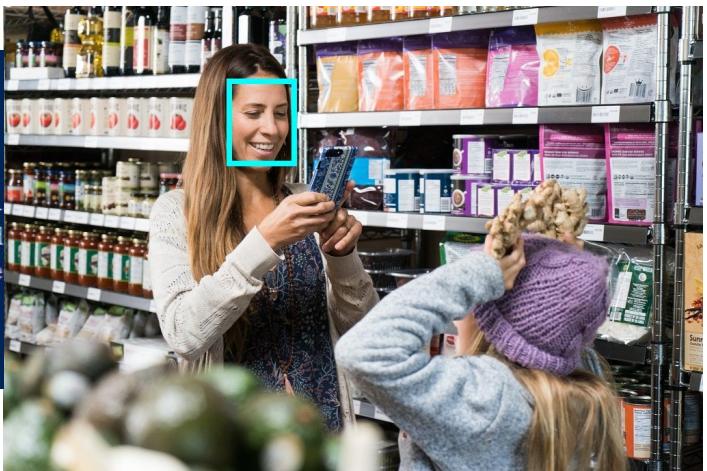


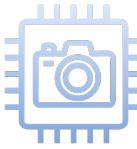
```
PS /home/s41029510802> cd ./ai-900/
```

```
PS /home/s41029510802/ai-900> ./find-faces.ps1 store-camera-1.jpg  
Analyzing image...
```

From June 21st 2022, Face service capabilities that return personal
See <https://azure.microsoft.com/blog/responsible-ai-investments-and>
This code is restricted to returning the location of any faces detected.

```
Face location: @{top=133; left=339; width=94; height=94}
```





```
PS /home/s41029510802/ai-900> ./find-faces.ps1 store-camera-2.jpg  
Analyzing image...
```

From June 21st 2022, Face service capabilities that return personal...
See <https://azure.microsoft.com/blog/responsible-ai-investments-and->
This code is restricted to returning the location of any faces detected

```
Face location: @{top=171; left=454; width=95; height=95}
```



負責任的人工智慧投資和面部識別

NO EXAMPLE

① Note

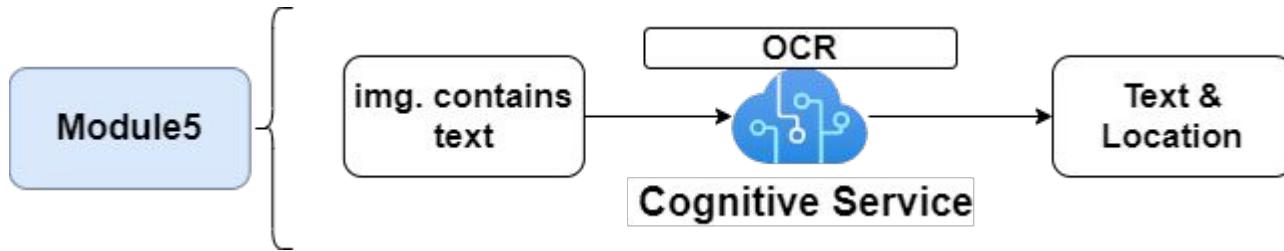
From June 21st 2022, Face service capabilities that return publicly identifiable features are restricted. See <https://azure.microsoft.com/blog/responsible-ai-investment-and-safeguards-for-facial-recognition/> for details.

從今天開始，新客戶需要申請訪問許可權才能在 Azure 人臉 API、計算機視覺和視頻索引器中使用人臉識別操作。現有客戶有一年的時間來申請並獲得批准，以根據其提供的用例繼續訪問面部識別服務。通過引入有限訪問，我們為面部識別的使用和部署增加了額外的審查層，以確保這些服務的使用符合 Microsoft 的負責任 AI 標準，併為高價值的最終用戶和社會效益做出貢獻。這包括引入用例和客戶資格要求，以獲得對這些服務的訪問許可權。在此處閱讀範例用例以及要避免的用例。從 2023 年 6 月 30 日開始，如果現有客戶的面部識別應用程式未獲批准，則將不再能夠訪問面部識別功能。在此處提交人臉 API、計算機視覺和 Azure 視頻索引器中面部和名人識別操作的申請表，我們的團隊將通過電子郵件與您聯繫。

面部檢測功能（包括檢測模糊、曝光、眼鏡、頭部姿勢、地標、雜訊、遮擋和面部邊界框）將保持正式發佈，並且不需要應用程式。

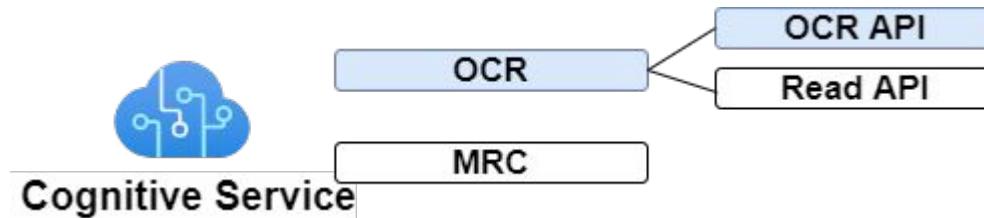
在另一個變化中，我們將停用面部分析功能，這些功能旨在推斷情緒狀態和身份屬性，例如性別，年齡，微笑，面部毛髮，頭髮和化妝。我們與內部和外部研究人員合作，瞭解這項技術的局限性和潛在優勢，並權衡利弊。特別是在情緒分類的情況下，這些努力提出了關於隱私的重要問題，對“情緒”的定義缺乏共識，以及無法跨用例，區域和人口統計學概括面部表情與情緒狀態之間的聯繫。API 對預測敏感屬性的功能的訪問也為濫用敏感屬性開闢了廣泛的方式，包括使人們遭受刻板印象、歧視或不公平的服務拒絕。

為了降低這些風險，我們選擇不支援 Face API 中的通用系統，該系統旨在推斷情緒狀態，性別，年齡，微笑，面部毛髮，頭髮和化妝。從 2022 年 6 月 21 日開始，新客戶將不再能夠檢測到這些屬性，現有客戶必須在 2023 年 6 月 30 日之前停止使用這些屬性，然後才能停用這些屬性。



Module 5

Read text with the Computer Vision service





Contoso

Contoso
123 Main Street
Redmond, WA 98052

123-456-7890

6/10/2019 13:59

Sales Associate: Paul

1 Surface Pro 6
256GB /Intel Core i5 /
8GB RAM (Black) \$ 999.00

1 SurfacePen \$ 99.99

Sub-Total \$ 1098.99
Tax \$ 104.40

Total \$ 1203.39

Read text with the Computer Vision service

11177034 | 金鑰與端點 ☆ ...

認知服務多重服務帳戶

搜尋

重新產生 Key1 重新產生 Key2

顯示金鑰

資源管理

金鑰與端點

定價層

網路功能

識別

成本分析

屬性

鎖定

金鑰 1

.....

金鑰 2

.....

位置/區域 ⓘ

eastasia

端點

<https://11177034.cognitiveservices.azure.com/>

The screenshot shows the 'Keys & Endpoints' section of the Azure Cognitive Services blade. It displays two keys, 'Key 1' and 'Key 2', with their values obscured by red boxes. Below them is a 'Location/Region' field set to 'eastasia'. At the bottom, the 'Endpoint' is listed as 'https://11177034.cognitiveservices.azure.com/'. The URL is highlighted with an orange box.

Configure

```
PS /home/s41029510802> code .
```

```
▲ ai-900
↳ .git
↳ .github
↳ .vscode
↳ data
↳ instructions
  _build.yml
  _config.yml
  analyze-image.ps1
  analyze-text.ps1
  classify-image.ps1
  detect-anomalies.ps1
  detect-objects.ps1
  find-faces.ps1
  form-recognizer.ps1
  index.md
  LICENSE
  mapping.md
  ocr.ps1
```

```
ocr.ps1 ●
$key="b04534507e5b49de838bf447952d8788"
$endpoint="https://11177034congtive.cognitiveservices.azure.com/"
```

Code

```
20  write-host "Analyzing image...`n"
21  $result = Invoke-RestMethod -Method Post ` 
22  | | | -Uri "$endpoint/vision/v3.2/ocr?language=en&detectOrientation=true&model-version=latest" ` 
23  | | | -Headers $headers ` 
24  | | | -Body $body | ConvertTo-Json -Depth 6
```

Run a client application



Northwind Traders

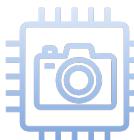
Fresh produce,
friendly service

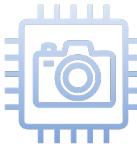
Open 7 days a week

```
PS /home/s41029510802/ai-900> ./ocr.ps1 advert.jpg  
Analyzing Image...
```

Getting results...

```
Text: Northwind Traders | Text Bounding Box: 80 65 1023 64 1024 164 80 165  
Text: PIGE WINKER | Text Bounding Box: 1601 105 1674 62 1695 94 1621 138  
Text: Fresh produce, | Text Bounding Box: 78 262 476 262 475 325 78 323  
Text: IS | Text Bounding Box: 514 211 574 204 580 266 520 272  
Text: friendly service | Text Bounding Box: 78 340 487 337 488 402 78 406  
Text: Open 7 days a week | Text Bounding Box: 1160 1072 1705 1067 1706 1129 1161 1136
```





```
PS /home/s41029510802/ai-900> ./ocr.ps1 letter.jpg
Analyzing Image...
```

Getting results...

```
Text: January 23rd 2020 | Text Bounding Box: 1206 17 1575
Text: For the attention of: | Text Bounding Box: 28 107 4
Text: The manager | Text Bounding Box: 28 152 275 155 275
Text: Northwind Traders | Text Bounding Box: 26 197 412 1
Text: 123 Any Street | Text Bounding Box: 28 241 346 243
Text: Bellevue, WA | Text Bounding Box: 29 285 299 288 29
Text: Dear Sir or Madam, | Text Bounding Box: 28 377 425
Text: I am writing to thank you for the fantastic service
Text: your store on January 20th. The store assistant who
Text: extremely pleasant and attentive; and took the time
Text: the fresh produce I needed. | Text Bounding Box: 32
Text: I've always found the quality of the produce in your
Text: high, and the prices to be competitive; and the helpfulness of
Text: employees is another reason I will continue to remain a loyal
Text: Northwind Traders customer. | Text Bounding Box: 26
Text: Sincerely, | Text Bounding Box: 27 916 247 920 246
Text: A Customer | Text Bounding Box: 25 1011 279 1013 27
Text: A. Customer | Text Bounding Box: 30 1068 277 1069 2
```

January 23rd 2020

For the attention of:

The manager
Northwind Traders
123 Any Street
Bellevue, WA

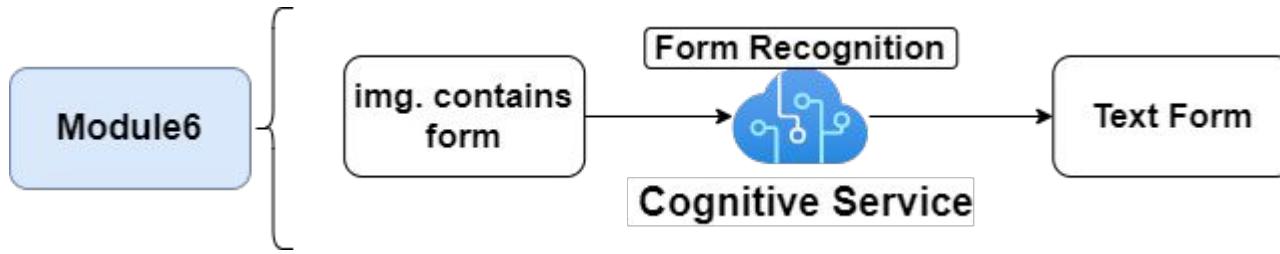
Dear Sir or Madam,

I am writing to thank you for the fantastic service I received at your store on January 20th. The store assistant who helped me was extremely pleasant and attentive; and took the time to find all of the fresh produce I needed.

I've always found the quality of the produce in your store to be high, and the prices to be competitive; and the helpfulness of your employees is another reason I will continue to remain a loyal Northwind Traders customer.

Sincerely,

A Customer
A. Customer



Module 6

Analyze receipts with the Form Recognizer service



Analyze receipts with Form Recognizer

11177034 | 金鑰與端點 ☆ ...

認知服務多重服務帳戶

搜尋

重新產生 Key1 重新產生 Key2

顯示金鑰

資源管理

金鑰與端點

定價層

網路功能

識別

成本分析

屬性

鎖定

金鑰 1

.....

金鑰 2

.....

位置/區域 ⓘ

eastasia

端點

<https://11177034.cognitiveservices.azure.com/>

The screenshot shows the Azure Cognitive Services portal interface. On the left, there's a sidebar with various service icons: Key & Endpoint, Pricing tier, Network features, Identification, Cost analysis, Properties, and Lock. The main area is titled 'Key & Endpoint'. It contains two fields for keys ('Key 1' and 'Key 2'), both of which have red boxes around them. Below that is a 'Location/Region' field set to 'eastasia' with an orange box around it. At the bottom is an 'Endpoint' field containing the URL 'https://11177034.cognitiveservices.azure.com/' with an orange box around it. At the top of the main area, there are search and refresh buttons, along with links to regenerate keys.

Configure

```
PS /home/s41029510802> code .
```

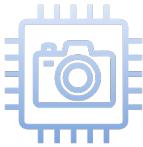
```
▲ ai-900
```

```
↳ .git  
↳ .github  
↳ .vscode  
↳ data  
↳ instructions  
_build.yml  
_config.yml  
analyze-image.ps1  
analyze-text.ps1  
classify-image.ps1  
detect-anomalies.ps1  
detect-objects.ps1  
find-faces.ps1  
form-recognizer.ps1
```

```
$key="b04534507e5b49de838bf447952d8788"  
$endpoint="https://11177034congtive.cognitiveservices.azure.com/"
```

Code

```
19 Write-Host "Sending receipt..."  
20 $response = Invoke-WebRequest -Method Post `  
21     -Uri "$endpoint/formrecognizer/v2.1/prebuilt/receipt/analyze" `  
22     -Headers $headers `  
23     -Body $body  
24 Write-Host "...Receipt sent."
```



Run a client application

```
PS /home/s41029510802/ai-900> ./form-recognizer.ps1
Sending receipt...
...Receipt sent.
Getting results...
...Done

Receipt Type: Itemized
Merchant Address: 123 Main Street
Merchant Phone: 555-123-4567
Transaction Date: 2020-02-17
Receipt Items:
Item # 1
 - Name: Apple
 - Price: 0.9
Item # 2
 - Name: Orange
 - Price: 0.8
Subtotal: $1.70
Tax: $0.17
Total: $1.87
```

Northwind Traders

123 Main Street

555-123-4567

2/17/2020 13:07

1 Apple \$0.90

1 Orange \$0.80

Sub-Total \$1.70

Tax \$0.17

Total \$1.87

Knowledge Check

You want to use the Computer Vision service to analyze images. You also want to use the Language service to analyze text. You want developers to require only one key and endpoint to access all of your services. What kind of resource should you create in your Azure subscription?

- Computer Vision
- Cognitive Services
- Custom Vision

Knowledge Check

You want to use the Computer Vision service to analyze images of locations and identify well-known buildings. What should you do?

- Retrieve the objects in the image.
- Retrieve the categories for the image, specifying the celebrities domain.
- Retrieve the categories for the image, specifying the landmarks domain.

Knowledge Check

You plan to use the Custom Vision service to train an image classification model. You want to create a resource that can only be used for model training, and not for prediction. Which kind of resource should you create in your Azure subscription?

- Custom Vision
- Cognitive Services
- Computer Vision

Knowledge Check

You train an image classification model that achieves less than satisfactory evaluation metrics. How might you improve it?

- Reduce the size of the images used to train the model.
- Add a new label for "unknown" classes.
- Add more images to the training set.

Knowledge Check

You have published an image classification model. What information must you provide to developers who want to use it?

- Only the project ID.
- The project ID, the model name, and the key and endpoint for the prediction resource.
- The project ID, iteration number, and the key and endpoint for the training resource.