中原大學 雲端計算平台實務

12/10-作業報告

Microsoft Azure AI Fundamentals Explore natural language processing

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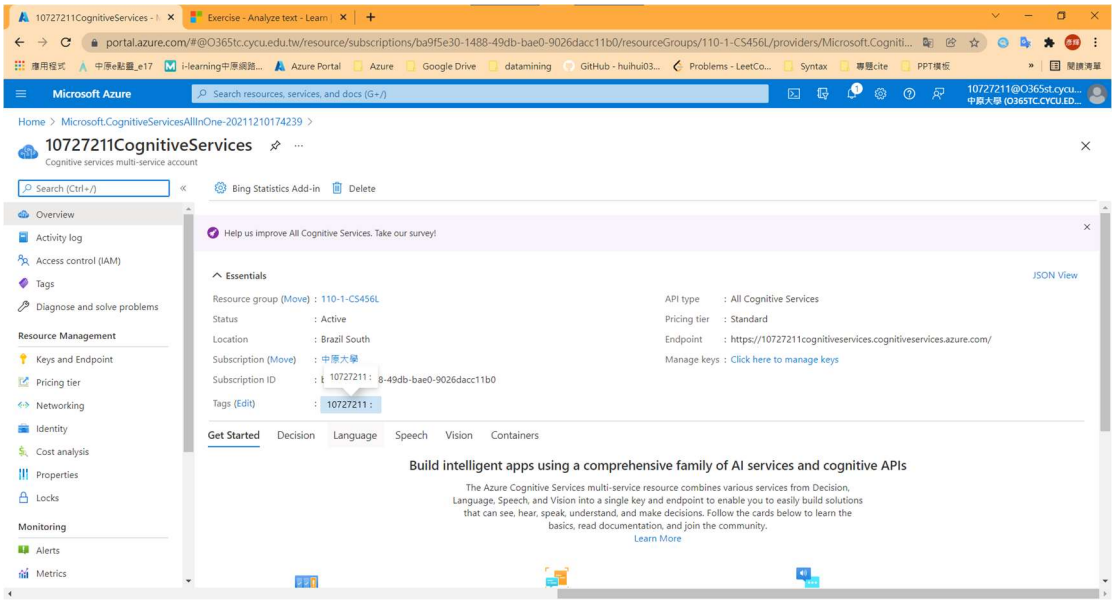
1. Learning Path Intro

Microsoft Azure AI Fundamentals Explore natural language processing
https://docs.microsoft.com/en-us/learn/paths/explore-natural-language-processing/

2. Summary Homework Assignment

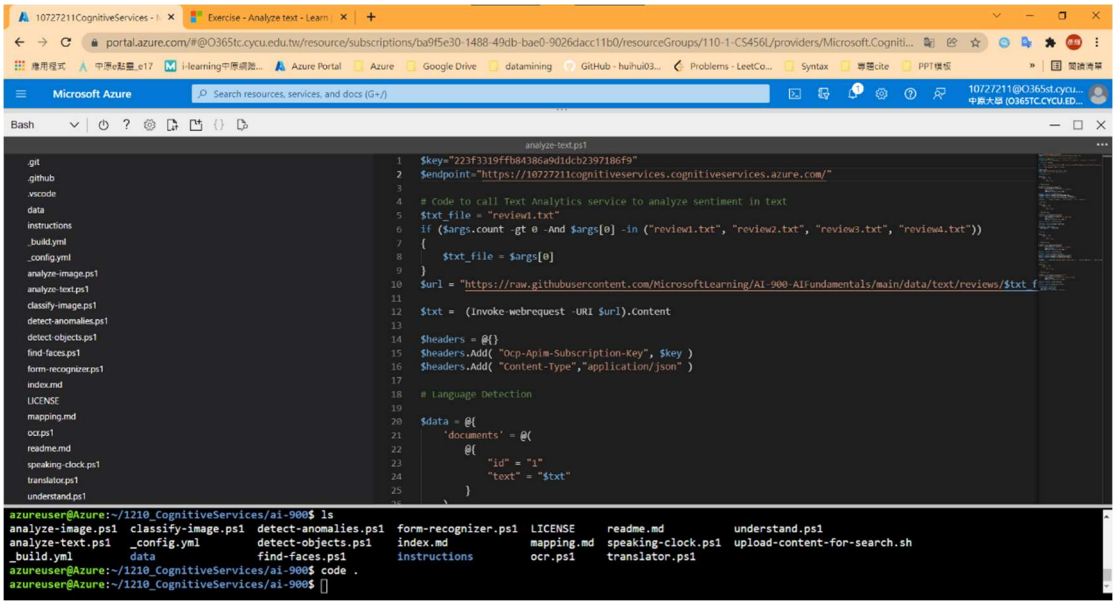
Model 1: Analyze text with the Language service

1. Create a Cognitive Services resource



Part1：英文版網頁教程

1-2. config client application



1-3. Run code and get results

review1.txt

```
***Detecting Language***
  - Language: English
  - Code: en
  - Score: 0.99
```

```
***Finding Key Phrases***
  - Key Phrases:
    The Royal Hotel
    Good Hotel
    good service
    great location
    Buckingham Palace
    Westminster Abbey
    same group
    West coast
    Michelin Star
    taster menu
    enormous bathroom
    Clean rooms
    staff
    London
    UK
    stay
    courtyard
    restaurant
    part
    plenty
    fish
    kitchen
    lounge
    bedroom
```

```
***Analyzing Sentiment***
  - A positive sentiment based on these scores:
    - Positive: 0.99
    - Neutral: 0.01
    - Negative: 0
```

```
***Identifying known entities***
  - GOOD Music : https://en.wikipedia.org/wiki/GOOD_Music
  - Hotel : https://en.wikipedia.org/wiki/Hotel
  - The Royal Hotel : https://en.wikipedia.org/wiki/The_Royal_Hotel
  - London : https://en.wikipedia.org/wiki/London
  - Buckingham Palace : https://en.wikipedia.org/wiki/Buckingham_Palace
  - Westminster Abbey : https://en.wikipedia.org/wiki/Westminster_Abbey
  - India : https://en.wikipedia.org/wiki/India
  - West Coast Main Line : https://en.wikipedia.org/wiki/West_Coast_Main_Line
  - Michelin Guide : https://en.wikipedia.org/wiki/Michelin_Guide
```

review2.txt

```
***Detecting Language***
  - Language: English
  - Code: en
  - Score: 1
```

```
***Finding Key Phrases***
  - Key Phrases:
    The Royal Hotel
    Tired hotel
    old hotel
    poor service
    United Kingdom
    room furnishings
    office rooms
    flight home
    British Museum
    London
    changing
    internet
    website
    1950
```

```
***Analyzing Sentiment***
  - A negative sentiment based on these scores:
    - Positive: 0
    - Neutral: 0.04
    - Negative: 0.96
```

```
***Identifying known entities***
  - The Royal Hotel : https://en.wikipedia.org/wiki/The_Royal_Hotel
  - London : https://en.wikipedia.org/wiki/London
  - British Museum : https://en.wikipedia.org/wiki/British_Museum
```

review3.txt

```
***Detecting Language***
  - Language: English
  - Code: en
  - Score: 0.99
```

```
***Finding Key Phrases***
  - Key Phrases:
     Golden Gate bridge
     The Lombard Hotel
     The
Marina district
     San Francisco Museum
     Lombard Street
     busy road
     Chestnut Street
     trendy area
     interesting houses
     Fine Arts
     good view
     bus route
     down side
     Good location
     helpful staff
     traffic noise
     USA
     We
     August
     reviews
     cosmopolitan
     plenty
     restaurants
     city
     centre
     Rooms
```

```
***Analyzing Sentiment***
  - A mixed sentiment based on these scores:
    - Positive: 0.86
    - Neutral: 0
    - Negative: 0.14
```

```
***Identifying known entities***
  - Lombardy : https://en.wikipedia.org/wiki/Lombardy
  - Hotel : https://en.wikipedia.org/wiki/Hotel
  - San Francisco : https://en.wikipedia.org/wiki/San_Francisco
  - Chestnut Street (Philadelphia) : https://en.wikipedia.org/wiki/Chestnut_Street_(Philadelphia)
  - Marina District, San Francisco : https://en.wikipedia.org/wiki/Marina_District,_San_Francisco
  - Museum of Fine Arts, Boston : https://en.wikipedia.org/wiki/Museum_of_Fine_Arts,_Boston
  - Golden Gate Bridge : https://en.wikipedia.org/wiki/Golden_Gate_Bridge
  - Room : https://en.wikipedia.org/wiki/Room
  - Lombard Street (San Francisco) : https://en.wikipedia.org/wiki/Lombard_Street_(San_Francisco)
```

review4.txt

```
***Detecting Language***
  - Language: English
  - Code: en
  - Score: 1
```

```
***Finding Key Phrases***
  - Key Phrases:
     two queen size beds
     busy SIX lane street
     Golden Gate Bridge
     The Lombard Hotel
     Lombard street
     San Francisco
     early morning
     cotton balls
     Marina district
     good places
     walking distance
     late adults
     good hotel
     rooms
     USA
     Traffic
     night
     weekends
     Noise
     ears
     city
     TINY
     space
     family
     effort
     lots
     Presidio
     young
     budget
```

```
***Analyzing Sentiment***
  - A mixed sentiment based on these scores:
    - Positive: 0.47
    - Neutral: 0.01
    - Negative: 0.52
```

```
***Identifying known entities***
  - Lombard, Illinois : https://en.wikipedia.org/wiki/Lombard,_Illinois
  - Hotel : https://en.wikipedia.org/wiki/Hotel
  - San Francisco : https://en.wikipedia.org/wiki/San_Francisco
  - Lombard Street (San Francisco) : https://en.wikipedia.org/wiki/Lombard_Street_(San_Francisco)
  - Golden Gate Bridge : https://en.wikipedia.org/wiki/Golden_Gate_Bridge
  - Traffic : https://en.wikipedia.org/wiki/Traffic
  - Noise rock : https://en.wikipedia.org/wiki/Noise_rock
  - Room : https://en.wikipedia.org/wiki/Room
  - Marina District, San Francisco : https://en.wikipedia.org/wiki/Marina_District,_San_Francisco
  - Presidio of San Francisco : https://en.wikipedia.org/wiki/Presidio_of_San_Francisco
  - May : https://en.wikipedia.org/wiki/May
```

Part2: 中文網頁教程

2-2 View Review Documents

review1.txt

Good Hotel and staff

The Royal Hotel, London, UK

3/2/2018

Clean rooms, good service, great location near Buckingham Palace and Westminster Abbey, and so on. We thoroughly enjoyed our stay. The courtyard is very peaceful and we went to a restaurant which is part of the same group and is Indian (West coast so plenty of fish) with a Michelin Star. We had the taster menu which was fabulous. The rooms were very well appointed with a kitchen, lounge, bedroom and enormous bathroom. Thoroughly recommended.

review2.txt

Tired hotel with poor service

The Royal Hotel, London, United Kingdom

5/6/2018

This is a old hotel (has been around since 1950's) and the room furnishings are average - becoming a bit old now and require changing. The internet didn't work and had to come to one of their office rooms to check in for my flight home. The website says it's close to the British Museum, but it's too far to walk.

review3.txt

Good location and helpful staff, but on a busy road.

The Lombard Hotel, San Francisco, USA

8/16/2018

We stayed here in August after reading reviews. We were very pleased with location, just behind Chestnut Street, a cosmopolitan and trendy area with plenty of restaurants to choose from. The

Marina district was lovely to wander through, very interesting houses. Make sure to walk to the San Francisco Museum of Fine Arts and the Marina to get a good view of Golden Gate bridge and the city. On a bus route and easy to get into centre. Rooms were clean with plenty of room and staff were friendly and helpful. The only down side was the noise from Lombard Street so ask to have a room furthest away from traffic noise.

```
review4.txt
Very noisy and rooms are tiny
The Lombard Hotel, San Francisco, USA
9/5/2018
Hotel is located on Lombard street which is a very busy SIX lane street directly
off the Golden Gate Bridge. Traffic from early morning until late at night
especially on weekends. Noise would not be so bad if rooms were better insulated
but they are not. Had to put cotton balls in my ears to be able to sleep--was too
tired to enjoy the city the next day. Rooms are TINY. I picked the room because it
had two queen size beds--but the room barely had space to fit them. With family of
four in the room it was tight. With all that said, rooms are clean and they've made
an effort to update them. The hotel is in Marina district with lots of good places
to eat, within walking distance to Presidio. May be good hotel for young stay-up-
late adults on a budget
```

2-3 Get the Key and Endpoint for Cognitive Services resource

```
cog_key = '223f3319ffb84386a9d1dcb2397186f9'
cog_endpoint = 'https://10727211cognitiveservices.cognitiveservices.azure.com/'

print('Ready to use cognitive services at {} using key {}'.format(cog_endpoint, c
```

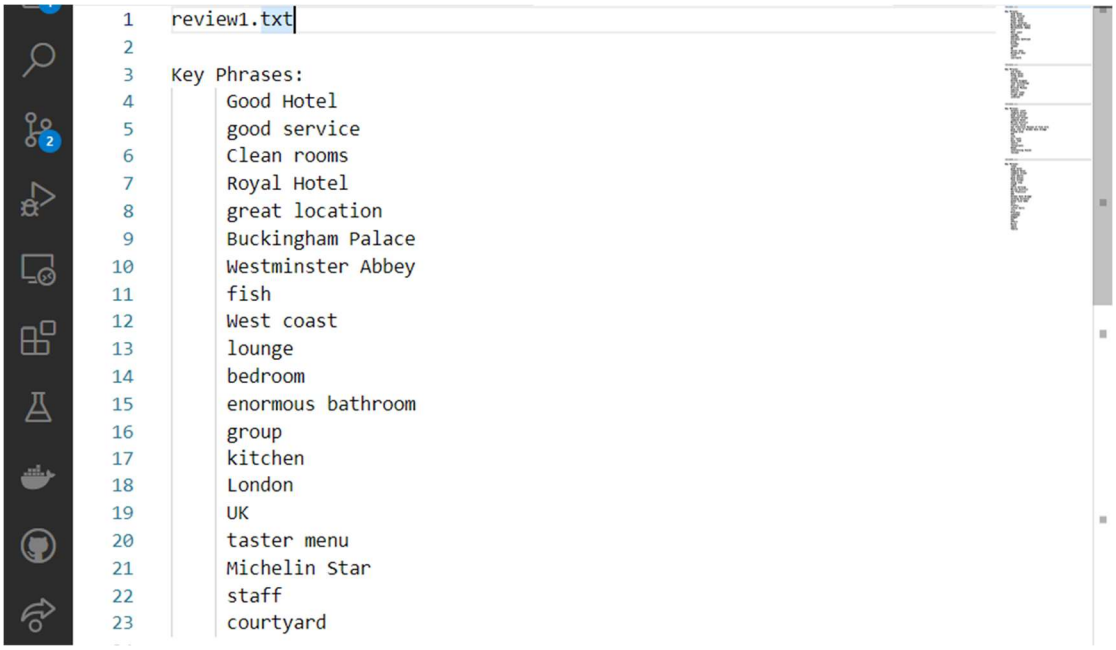
[4] ✓ 0.2s Python

```
Ready to use cognitive services at
https://10727211cognitiveservices.cognitiveservices.azure.com/ using key
223f3319ffb84386a9d1dcb2397186f9
```

2-4 Detect Language

```
review1.txt
 - Language: English
 - Code: en
 - Score: 1.0

review2.txt
 - Language: English
 - Code: en
 - Score: 1.0

review3.txt
 - Language: English
 - Code: en
 - Score: 1.0

review4.txt
 - Language: English
 - Code: en
 - Score: 1.0
```

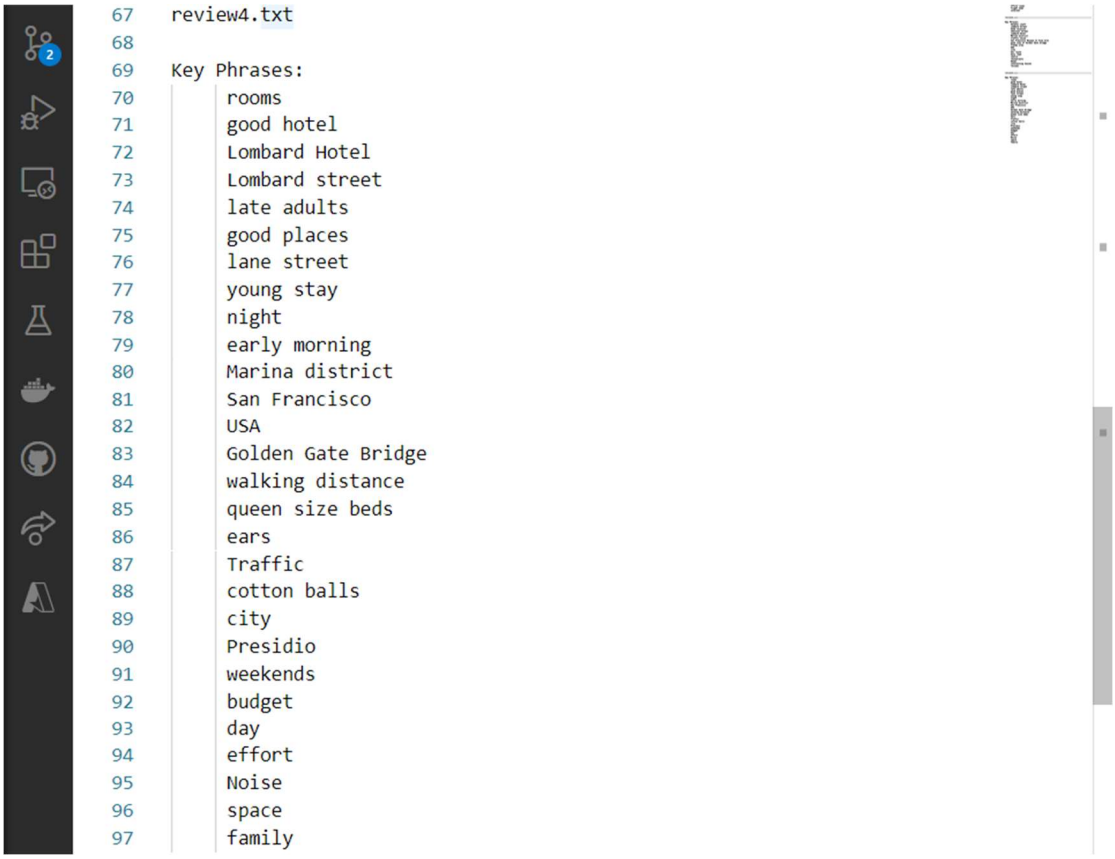
2-5 Extract Key Phrases



```
review1.txt

Key Phrases:
    Good Hotel
    good service
    Clean rooms
    Royal Hotel
    great location
    Buckingham Palace
    Westminster Abbey
    fish
    West coast
    lounge
    bedroom
    enormous bathroom
    group
    kitchen
    London
    UK
    taster menu
    Michelin Star
    staff
    courtyard
```

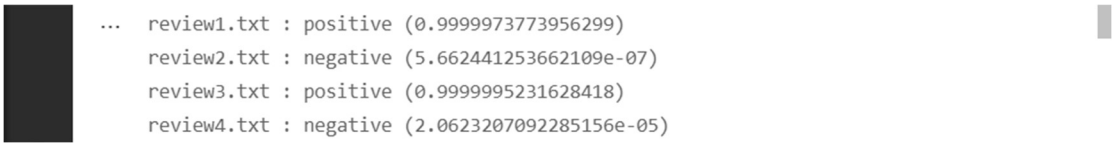
```
review2.txt

Key Phrases:
    old hotel
    Royal Hotel
    Tired hotel
    London
    United Kingdom
    room furnishings
    poor service
    British Museum
    website
    office rooms
    flight home
    internet
```

```
review3.txt

Key Phrases:
    helpful staff
    Lombard Street
    Good location
    Chestnut Street
    Lombard Hotel
    Marina district
    traffic noise
    San Francisco Museum of Fine Arts
    good view of Golden Gate bridge
    trendy area
    USA
    city
    bus route
    busy road
    centre
    restaurants
    Rooms
    interesting houses
    reviews
```



```
review4.txt

Key Phrases:
    rooms
    good hotel
    Lombard Hotel
    Lombard street
    late adults
    good places
    lane street
    young stay
    night
    early morning
    Marina district
    San Francisco
    USA
    Golden Gate Bridge
    walking distance
    queen size beds
    ears
    Traffic
    cotton balls
    city
    Presidio
    weekends
    budget
    day
    effort
    Noise
    space
    family
```

2-6 Determine Sentiment



```
review1.txt : positive (0.9999973773956299)
review2.txt : negative (5.662441253662109e-07)
review3.txt : positive (0.9999995231628418)
review4.txt : negative (2.0623207092285156e-05)
```

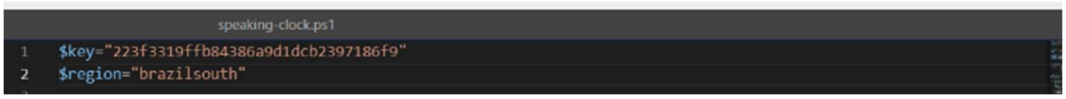
2-7 Exract Known Entities

```
review1.txt
 - Location: The Royal Hotel (https://en.wikipedia.org/wiki/The_Royal_Hotel)
 - Location: London (https://en.wikipedia.org/wiki/London)
 - DateTime: 3/2/2018
 - Location: Buckingham Palace (https://en.wikipedia.org/wiki/Buckingham_Palace)
 - Location: Westminster Abbey (https://en.wikipedia.org/wiki/Westminster_Abbey)
 - Location: India (https://en.wikipedia.org/wiki/India)
 - Location: West Coast Main Line (https://en.wikipedia.org/wiki/West_Coast_Main_Line)
review2.txt
 - Location: The Royal Hotel (https://en.wikipedia.org/wiki/The_Royal_Hotel)
 - Location: London (https://en.wikipedia.org/wiki/London)
 - Location: London
 - Location: United Kingdom
 - DateTime: 5/6/2018
 - DateTime: since 1950's
 - DateTime: now
 - Location: British Museum (https://en.wikipedia.org/wiki/British_Museum)
review3.txt
 - Location: Lombardy (https://en.wikipedia.org/wiki/Lombardy)
 - Location: San Francisco (https://en.wikipedia.org/wiki/San_Francisco)
 - DateTime: 8/16/2018
 - DateTime: August
 - Location: Chestnut Street (Philadelphia) (https://en.wikipedia.org/wiki/Chestnut_Street_(Philadelphia))
 - Location: Marina District, San Francisco (https://en.wikipedia.org/wiki/Marina_District,_San_Francisco)
 - Location: Marina
 - Location: Golden Gate Bridge (https://en.wikipedia.org/wiki/Golden_Gate_Bridge)
 - Location: Lombard Street (San Francisco) (https://en.wikipedia.org/wiki/Lombard_Street_(San_Francisco))
review4.txt
 - Location: Lombard, Illinois (https://en.wikipedia.org/wiki/Lombard,_Illinois)
 - Location: San Francisco (https://en.wikipedia.org/wiki/San_Francisco)
 - Location: Lombard Street (San Francisco) (https://en.wikipedia.org/wiki/Lombard_Street_(San_Francisco))
 - Location: Lombard
 - Location: Golden Gate Bridge (https://en.wikipedia.org/wiki/Golden_Gate_Bridge)
 - DateTime: from early morning
 - DateTime: night
 - DateTime: the next day
 - Location: Marina
 - Location: Marina District, San Francisco (https://en.wikipedia.org/wiki/Marina_District,_San_Francisco)
 - Location: Presidio of San Francisco (https://en.wikipedia.org/wiki/Presidio_of_San_Francisco)
```

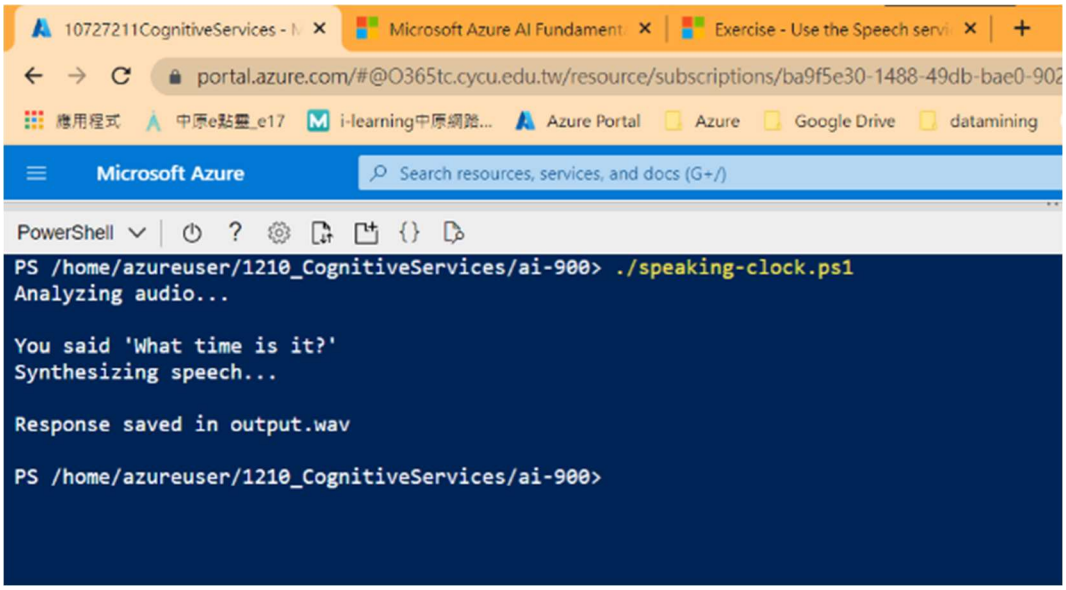
Model 2: Recognize and synthesize speech

Part1: 英文網頁教程

1-1. Get the Key and Location for your Cognitive Services resource



1-2. Speech recognition



Part2: 中文網頁教程

2-1. Get the Key and Location for your Cognitive Services resource

2-2. Speech Recognition

```
# Get spoken command from audio file
file_name = "light-on.wav"
audio_file = 'data/speech/light-on.wav'
# audio_file = os.path.join("data", "speech", file_name)

# Configure speech recognizer
speech_config = SpeechConfig(cog_key, cog_location)
speech_config.speech_synthesis_voice_name = 'en-US-ChristopherNeural'
audio_config = AudioConfig(filename=audio_file) # Use file instead of default (mi
speech_recognizer = SpeechRecognizer(speech_config, audio_config)

# Use a one-time, synchronous call to transcribe the speech
speech = speech_recognizer.recognize_once()

# Play the original audio file
playsound(audio_file)

# Show transcribed text from audio file
print(speech.text)
```

[5] ✓ 7.7s Python

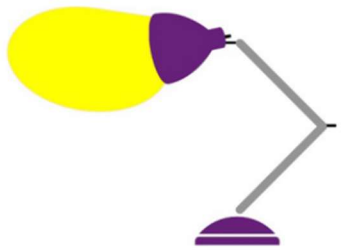
```
Turn the light on.
```

2-3. Speech synthesis

```
# Get text to be spoken
response_text = 'Turning the light on.'

# Configure speech synthesis
speech_config = SpeechConfig(cog_key, cog_location)
speech_config.speech_synthesis_voice_name = 'en-US-ChristopherNeural'
speech_synthesizer = SpeechSynthesizer(speech_config)

# Transcribe text into speech
result = speech_synthesizer.speak_text(response_text)

# Display an appropriate image
file_name = response_text.lower() + "jpg"
img = Image.open(os.path.join("data", "speech", file_name))
plt.axis('off')
plt. imshow(img)
```

[6] ✓ 5.2s Python

```
<matplotlib.image.AxesImage at 0x2a6eda2cb08>
```



Model 3: Translate text and speech

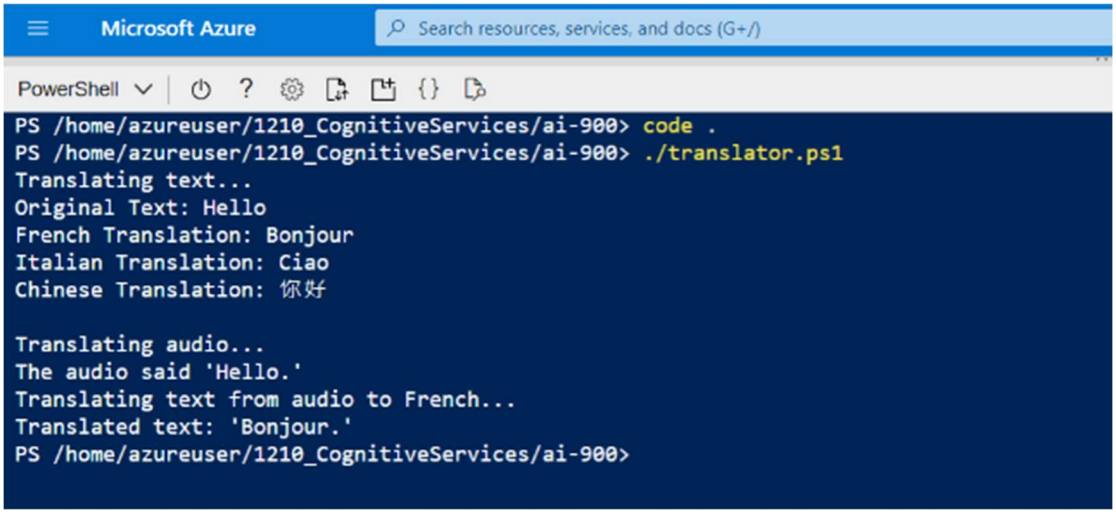
Part1: 英文網頁教程

1-1. Get the Key and Location for your Cognitive Services resource

translator.ps1

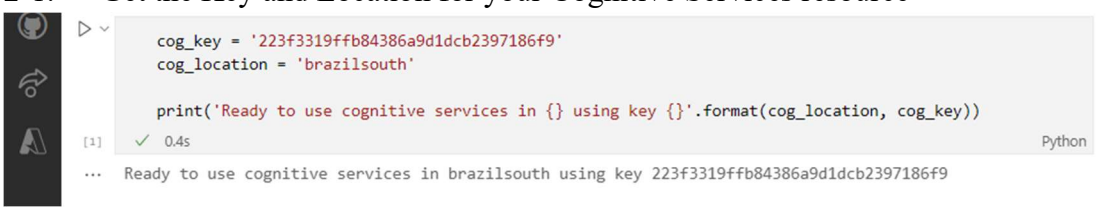
```
#Add your key here
$key="223f3319ffb84386a9d1dcb2397186f9"

#You need to add your resource location if you use a Cognitive Services resource
$location="brazilsouth"

#The endpoint is global for the Translator service, DO NOT change it
$endpoint="https://api.cognitive.microsofttranslator.com/"

#Text to be translated
$text="Hello"

# Code to call Text Analytics service to analyze sentiment in text
$headers = @{}
$headers.Add( "Ocp-Apim-Subscription-Key", $key )
$headers.Add( "Ocp-Apim-Subscription-Region", $location )
$headers.Add( "Content-Type","application/json" )

```

1-2. Speech Translation



Part2: 中文網頁教程

2-1. Get the Key and Location for your Cognitive Services resource



```
cog_key = '223f3319ffb84386a9d1dcb2397186f9'
cog_location = 'brazilsouth'

print('Ready to use cognitive services in {} using key {}'.format(cog_location, cog_key))
```

[1] ✓ 0.4s Python

```
Ready to use cognitive services in brazilsouth using key 223f3319ffb84386a9d1dcb2397186f9
```

2-2. Translating Text

```python
# Create a function that makes a REST request to the Text Translation service
def translate_text(cog_location, cog_key, text, to_lang='fr', from_lang='en'):
    import requests, uuid, json

    # Create the URL for the Text Translator service REST request
    path = 'https://api.cognitive.microsofttranslator.com/translate?api-version=3.0'
    params = '&from={}&to={}'.format(from_lang, to_lang)
    constructed_url = path + params

    # Prepare the request headers with Cognitive Services resource key and region
    headers = {
        'Ocp-Apim-Subscription-Key': cog_key,
        'Ocp-Apim-Subscription-Region':cog_location,
        'Content-type': 'application/json',
        'X-ClientTraceId': str(uuid.uuid4())
    }

    # Add the text to be translated to the body
    body = [{
        'text': text
    }]

    # Get the translation
    request = requests.post(constructed_url, headers=headers, json=body)
    response = request.json()
    return response[0]["translations"][0]["text"]


# Test the function
text_to_translate = "Hello"

translation = translate_text(cog_location, cog_key, text_to_translate, to_lang='fr', from_lang='en')
print('{} -> {}'.format(text_to_translate,translation))
```

[2] ✓ 2.5s Python

```
Hello -> Bonjour
```

```python
text_to_translate = "Hello"

translation = translate_text(cog_location, cog_key, text_to_translate, to_lang='it-IT', from_lang='en-GB')
print('{} -> {}'.format(text_to_translate,translation))
```

[8] ✓ 0.6s Python

```
Hello -> Ciao
```

```python
text_to_translate = "Hello"

translation = translate_text(cog_location, cog_key, text_to_translate, to_lang='zh-CN', from_lang='en-US')
print('{} -> {}'.format(text_to_translate,translation))
```

[4] ✓ 2.4s Python

```
Hello -> 你好
```

2-3. Speech Translation

```python
# Create a function to translate audio in one language to text in another
def translate_speech(cog_location, cog_key, audio_file=None, to_lang='fr-FR', from_lang='en-US'):
    from azure.cognitiveservices.speech import SpeechConfig, AudioConfig, ResultReason
    from azure.cognitiveservices.speech.translation import SpeechTranslationConfig, TranslationRecognizer

    # Configure the speech translation service
    translation_config = SpeechTranslationConfig(subscription=cog_key, region=cog_location)
    translation_config.speech_recognition_language = from_lang
    translation_config.add_target_language(to_lang)

    # Configure audio input
    if audio_file is None:
        audio_config = AudioConfig() # Use default input (microphone)
    else:
        audio_config = AudioConfig(filename=audio_file) # Use file input

    # Create a translation recognizer and use it to translate speech input
    recognizer = TranslationRecognizer(translation_config, audio_config)
    result = recognizer.recognize_once()

    # Did we get it?
    translation = ''
    speech_text = ''
    if result.reason == ResultReason.TranslatedSpeech:
        speech_text = result.text
        translation =  result.translations[to_lang]
    elif result.reason == ResultReason.RecognizedSpeech:
        speech_text = result.text
        translation =  'Unable to translate speech'
    else:
        translation = 'Unknown'
        speech_text = 'Unknown'

    # rturn the translation
    return speech_text, translation


# Test the function
import os

file_name = 'english.wav'
file_path = os.path.join('data', 'translation', file_name)
speech, translated_speech = translate_speech(cog_location, cog_key, file_path, to_lang='es', from_lang='en-US')
result = '{} -> {}'.format(speech, translated_speech)

# Show translated text
print(result)
```

[5] ✓ 3.1s Python

```
Hello. -> Hola.
```

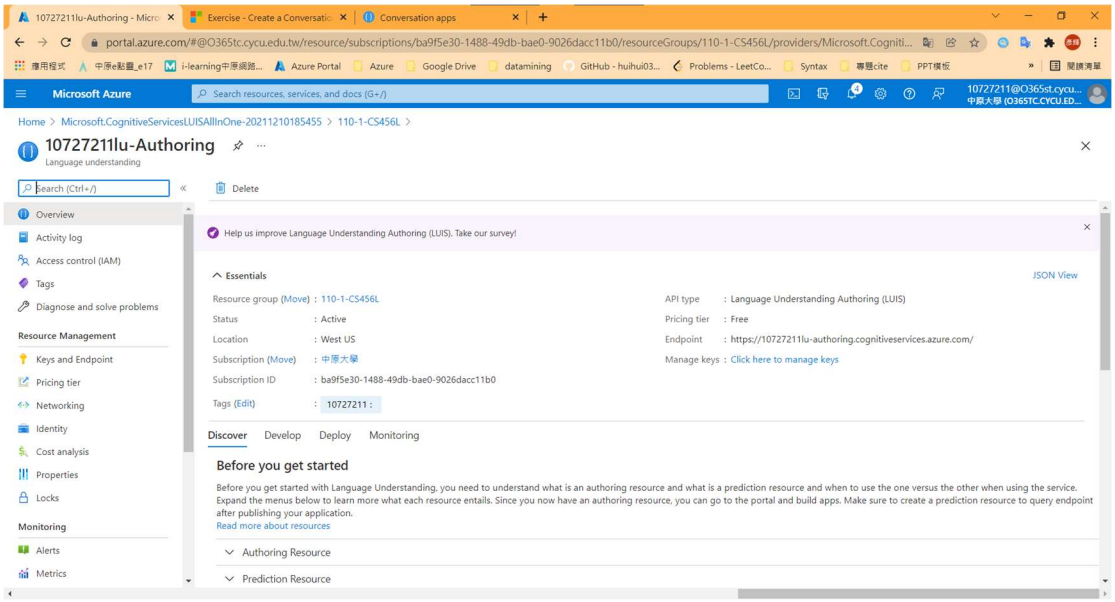
```python
import os

file_name = 'french.wav'
file_path = os.path.join('data', 'translation', file_name)
speech, translated_speech = translate_speech(cog_location, cog_key, file_path, to_lang='en', from_lang='fr-FR')
result = '{} -> {}'.format(speech, translated_speech)

# Show translated text
print(result)
```

[6] ✓ 5.3s Python

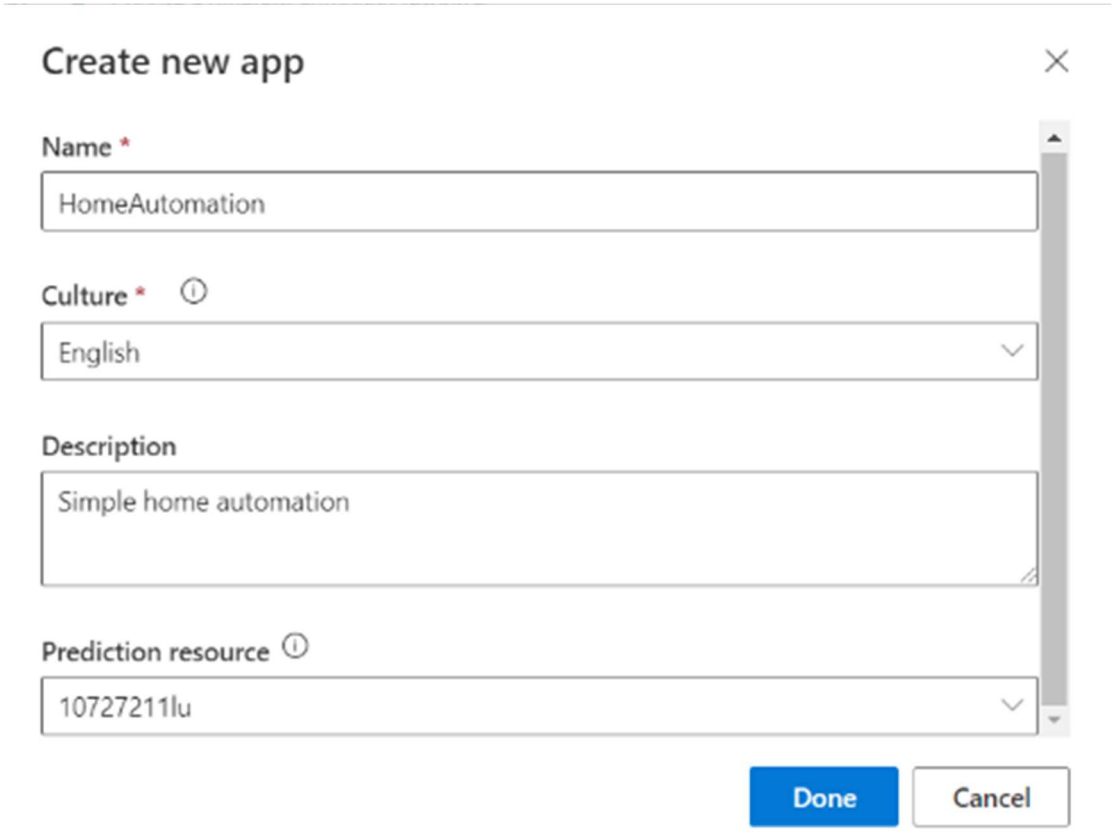
```
Danger. -> Danger.
```

Model 4: Create a language model with Conversational Language Understanding

1. Create a Conversational Language Understanding App



2. Create intents and entities



Intents

+ Create + Add prebuilt domain intent Rename Delete

Name ↑	Examples	Features
None	0	+ Add feature
switch_off	2	+ Add feature
switch_on	2	+ Add feature

switch_on

Machine learning features

+ Add feature

Examples

Confirm all entities Move to Delete ···

Example user input

Type an example of what a user might say and hit Enter.

turn the fan on
de...

turn the light on
device

switch_off

Machine learning features

+ Add feature

Examples

Confirm all entities Move to Delete ···

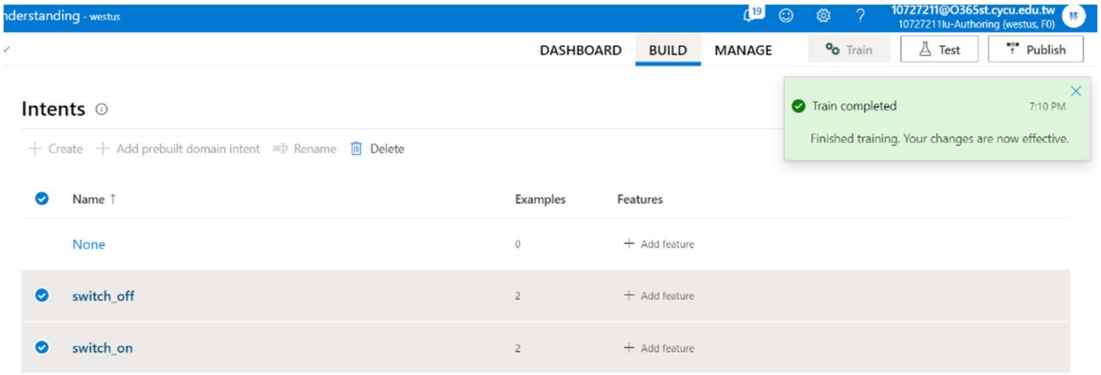
Example user input

Type an example of what a user might say and hit Enter.

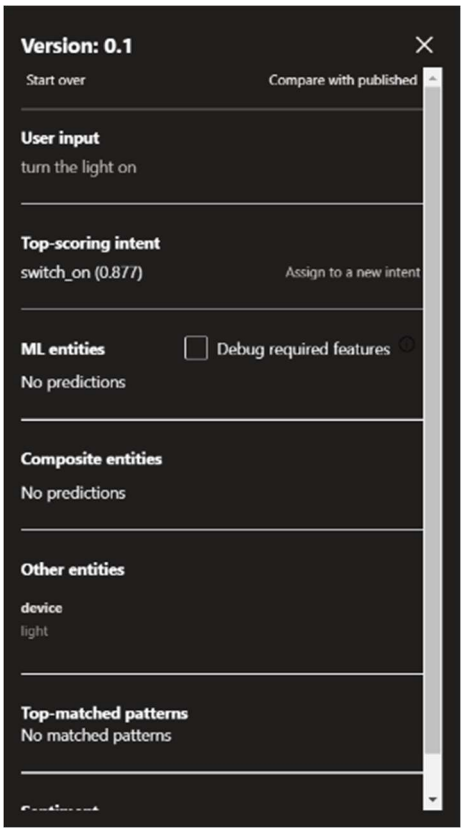
turn the fan off
de...

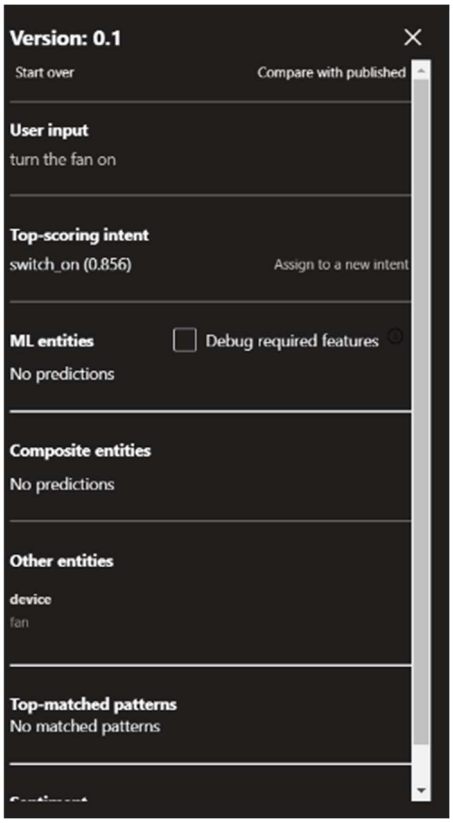
turn the light off
device

3. Train Language Model

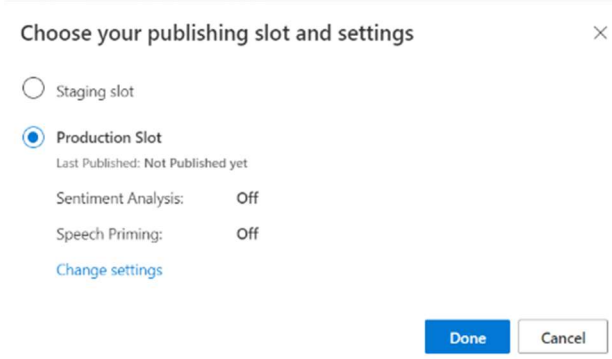


4. Test the Conversational

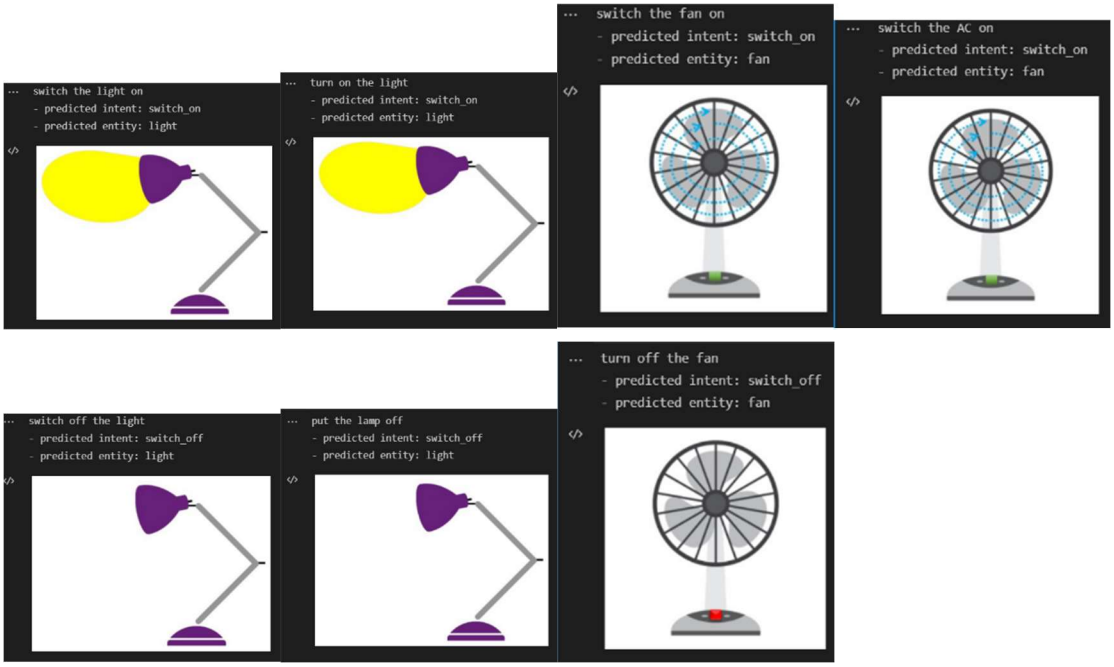




5. Publish



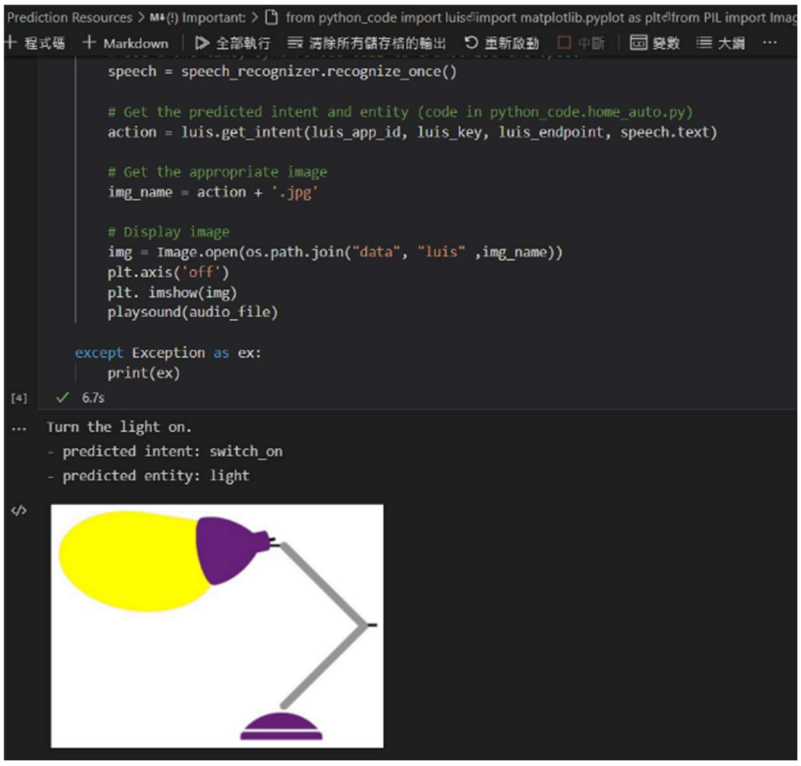
6. Command Input and show appropriate image



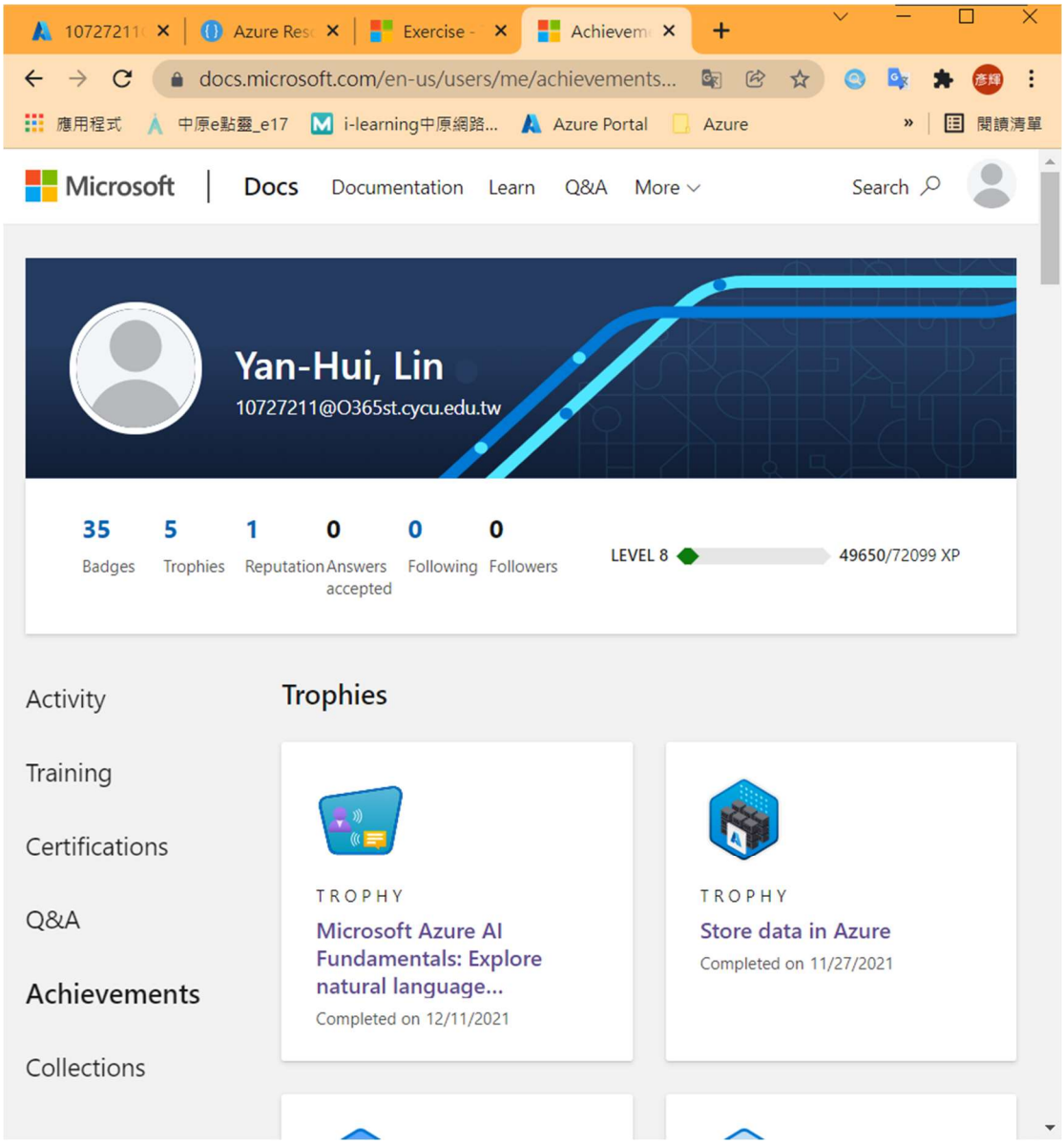
7. config Cognitive Service Resource

```
cog_key = '223f3319ffb84386a9d1dcb2397186f9'
cog_location = 'brazilsouth'

print('Ready to use cognitive services in {} using key {}'.format(cog_location, cog_key))
```

8. Speech Input and show appropriate image



Take screenshots of Badges and Trophies



Learned from the Learning Path

透過這次的 Learning Path 了解 Azure 在 AI、自然語言的服務，從文本分析、語音分析、翻譯、語言理解都能透過 Azure 的 API 簡易達成，且 API 的功能簡單易懂，無須在開發時擔心過多有關自然語言的機器學習問題。Azure 的 Cognitive Services 與 Language Understanding 能夠提供未來有關自然語言任務很大的協助。

Problems

1. (英文版教程)

https://docs.microsoft.com/en-us/learn/modules/create-language-model-with-language-understanding/3-exercise-create-language-understanding-application

教程中缺乏 `home-devices.ps1`，導致教程無法繼續完成。

2. (中文版教程)

實驗室無法開啟，解決方法為在本地環境下載 Github 範例程式碼並下載相關套件，安裝套件問題可直接至 stackoverflow 根據關鍵字找尋相關 azure 安裝指令。

3. DSVM

原先想透過 DSVM 的環境下載 Github 範例程式，但驗證卻遲遲無法通過，無法在 110-1-CS456L 的 ResourceGroup 中建立此資源。

FeedBack

中英文版教程建議要統一內容，在這次學習的過程發現中英文的教程內容差異甚大，希望將來可以修正此類問題。