

Python JARVIS Speech Recognition

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Time required: 120 minutes

This series of tutorials were inspired by

<https://www.freecodecamp.org/news/python-project-how-to-build-your-own-jarvis-using-python/>

NOTE: You may need to run this program from the command line for it to work.

The JARVIS Project

Speech Recognition

What good is an Iron Man suit if we can't communicate with it? Until the next release of Python, JARVIS can't read your mind . . . yet.

The Python SpeechRecognition library performs speech recognition. It has support for several engines and APIs, online and offline.

<https://pypi.org/project/SpeechRecognition/>

PyAudio

To use your microphone, we need to install the PyAudio library. PyAudio is a cross-platform audio input/output stream library.

1. Go to a command prompt

```
pip install SpeechRecognition
pip install setuptools
pip install pyaudio
```

Troubleshooting the Microphone

If your speech recognition gets hung on Listening . . .

Copy and paste the following program into a python file and run it. This will give you the index of the device you wish to use.

```
# The recognizer hangs on recognizer_instance.listen;
# when it's calling Microphone.MicrophoneStream.read
# Once you do this, change all instances of Microphone() to
# Microphone(device_index=MICROPHONE_INDEX),
# where MICROPHONE_INDEX is the hardware-specific index of the microphone.

# To figure out what the value of MICROPHONE_INDEX should be,
# run the following code:

import speech_recognition as sr
for index, name in enumerate(sr.Microphone.list_microphone_names()):
    print(
        f'Microphone: \"{name}\" found for
`Microphone(device_index={index})`'
    )
```

Tutorial Part 1

With all the JARVIS tutorials, we will start from the bare bones, and build to an OOP version. This code is based on sample code from the SpeechRecognition library GitHub.

https://github.com/Uberi/speech_recognition/blob/master/examples/microphone_recognition.py

```
1  """
2      Name: jarvis_speech_recognition_1.py
3      Author:
4      Created:
5      Purpose: Voice recognition from Google
6      Sample code using Google Speech Recognition
7      from the SpeechRecognition library sample code.
8      You can use the Google Speech API for free 50 times a day
9  """
10 # We have to install pyaudio, we do not have to import it
11 # SpeechRecognition uses pyaudio directly
12 # pip install pyaudio
13 # pip install setuptools
14 # pip install SpeechRecognition
15 import speech_recognition as sr
16
17 # Create SpeechRecognition recognizer object
18 r = sr.Recognizer()
```

```

20 # With your local microphone as the source
21 with sr.Microphone() as source:
22     print('Listening . . . .')
23     audio = r.listen(source)
24
25     try:
26         print('Recognizing . . .')
27         # Capture the recognized word in a variable
28         recognized_words = r.recognize_google(
29             audio,
30             language='en-US',
31             show_all=True
32         )
33
34         # Google Speech Recognition returns a list of dictionaries
35         # Pull only the transcript with the highest confidence
36         recognized_words = recognized_words.get(
37             'alternative'
38         )[0].get(
39             'transcript'
40         )
41         print(f"You may have said: {recognized_words}")
42
43     except sr.UnknownValueError:
44         print("Google Speech Recognition could not understand audio")
45
46     except sr.RequestError as e:
47         # If there was an error communicating with Google Speech
48         print(f"Google Speech did not respond: {e}")

```

Tutorial Part 2

We can recognize speech. Time to start controlling our computer with our voice. This is an OOP example that allows you to quit the program by saying quit. This leads to many possibilities for a voice-controlled AI Python program.

```

1  """
2      Name: jarvis_speech_recognition_2.py
3      Author:
4      Created:
5      Purpose: Voice recognition from Google Speech API OOP
6      You can use the Google Speech API for free 50 times a day
7  """
8  # We have to install pyaudio, we do not have to import it
9  # SpeechRecognition uses pyaudio directly
10 # pip install pyaudio
11 # pip install setuptools
12 # pip install SpeechRecognition
13 import speech_recognition as sr
14 from sys import exit
15
16
17     Codiumate: Options | Test this class
18 class Jarvis:
19     Codiumate: Options | Test this method
20     def __init__(self) -> None:
21         # Create SpeechRecognition recognizer object
22         self.r = sr.Recognizer()

```

```

22  # ----- USER INPUT -----#
    Codiumate: Options | Test this method
23  def user_input(self):
24      """Recognizes user voice input using
25      | Speech Recognition module, converts it to text
26      """
27      # Your local microphone as the source
28      with sr.Microphone() as source:
29          print('Listening....')
30
31          # Start listening for speech
32          audio = self.r.listen(source)
33
34          try:
35              print('Recognizing . . .')
36              # Capture the recognized word in a string variable
37              recognized_words = self.r.recognize_google(
38                  audio,
39                  language='en-US',
40                  show_all=True
41              )
42
43              # Google Speech Recognition returns a list of dictionaries
44              # Pull only the transcript with the highest confidence
45              self.query = recognized_words['alternative'][0]['transcript']
46              print(self.query)
47              # If you say quit, the program will exit
48
49          except sr.UnknownValueError:
50              print("Google Speech Recognition could not understand audio")
51
52          except sr.RequestError as e:
53              # If there was an error communicating with Google Speech
54              print(f"Google Speech did not respond: {e}")

```

```

56  # ----- VOICE COMMANDS -----#
    Codiumate: Options | Test this method
57  def voice_commands(self):
58      if "quit" in self.query:
59          print("Goodbye!")
60          exit()

```

```

63 # Create a jarvis program object
64 jarvis = Jarvis()
65 while True:
66     jarvis.user_input()
67     jarvis.voice_commands()

```

Assignment: The JARVIS Project

It is now up to you. The world is under attack, aliens are everywhere, the space time continuum is falling apart, where is Iron Man?

Combine the text to speech and the speech recognition program into a program named **jarvis.py**

1. Import your latest version of the text to speech program. Make sure you have Lines 58-59 to allow the program to be imported as a module.

Text to speech program.

```

45 def main():
46     # Create text to speech object
47     text_to_speech = TextToSpeech()
48
49     while True:
50         # Get input from user
51         speak = input("What would you like me to say? ")
52
53         # Access object speak method
54         text_to_speech.speak(speak)
55
56
57 # Run the main function unless this file is imported
58 if __name__ == "__main__":
59     main()

```

Start of Jarvis program.

```

8  # We have to install pyaudio, we do not have to import it
9  # SpeechRecognition uses pyaudio directly
10 # pip install pyaudio
11 # pip install setuptools
12 # pip install SpeechRecognition
13 import speech_recognition as sr
14 from sys import exit
15 from time import sleep
16 from text_to_speech import TextToSpeech
17
18
19 class Jarvis:
20     def __init__(self) -> None:
21         # Create SpeechRecognition recognizer object
22         self.r = sr.Recognizer()
23
24         # Create text to speech object
25         self.text_to_speech = TextToSpeech()
26
27         # Greet the user
28         self.greet_user()

```

2. When the words you are speaking are recognized:
 - a. They are displayed on the screen.
 - b. JARVIS repeats the words.
 - c. Add another command for JARVIS to do something. For example, you could have Jarvis print your name.

```

Listening....
Recognizing...
hello Jarvis
Listening....
Recognizing...
how are you this evening
Listening....
Recognizing...
quit
Goodbye!

```

Assignment Submission

1. Attach code files for both programs.
2. Attach screenshots showing the successful operation of the program.

3. Submit in Blackboard.