AI BASED CHATBOT USING PYTHON

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DECLARATION CERTIFICATE

This is to certify that the work presented in the thesis entitled **"AI BASED CHATBOT USING PYTHON"** in partial fulfillment of the requirement for the award of degree of **Bachelor of Computer Application** of Institute of Engineering & Management is an authentic work carried out under my supervision and guidance.

To the best of my knowledge the content of this thesis does not form a basis for the award of any previous Degree to anyone else.

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CERTIFICATE OF APPROVAL

The foregoing thesis entitled **"AI BASED CHATBOT USING PYTHON"** is hereby approved as a creditable study of research topic and has been presented in satisfactory manner to warrant its acceptance as prerequisite to the degree for which it has been submitted.

It is understood that by this approval, the undersigned do not necessarily endorse any conclusion drawn or opinion expressed therein, but approve the thesis for the purpose for which it is submitted.

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Abstract

Our project comprises of three modules, the first module was a part of our minor project and it was creating an AI based chatbot using basic python libraries which include nltk, rest api and the chatterbot corpus. The major project comprises of two modules, one in which we extract the audio from the user and convert it into text which will include the python text-to-speech library so that whenever the user gives an audio command to the chatbot it will fetch the audio recording , convert it into the corresponding text and then execute its corresponding command. This module helps the customers or the end user to reduce the labor as they can easily interact with the chatbot just by giving audio instructions.

The final module a deep learning api installed within the chatbot so that it also acts as a virtual assistant. It has a default text format and can also be given audio instructions, it can be used for several purposes, mainly focusing but not limited to primarily aiding physically handicapped people and indisposed individuals.

Chapter 1

1.1 Introduction

Our Project is about Chatbots based on AI using the Python programming language. The chatbot API will allow developers to create new chatbots, powered by rules or artificial intelligence that can interact like a human with users. Example chatbots that can be developed with this API are feedback chatbots in service based applications or as a simple virtual assistant. Over the past few years, messaging applications have become more popular than the Social networking sites. People are using messaging applications these days such as Facebook Messenger, WhatsApp, Skype, Telegram etc. This is making other businesses available on messaging platforms leads to proactive interaction with users about their products. To interact on such messaging platforms with many users, the businesses can create a program that can converse like a human which is called a chatbot.

Chatbot that uses limited set of rules are the kind of chatbots which are very limited to set of texts or commands. They have ability to respond only to those texts or commands. If the user asks something different or other than the set of texts or commands which are defined to the bot, it would not respond as desired since it does not understand or it has not trained what user asked.

Chapter 2

2.1 Scope of the project

The main objective of this project is to design an **AI based automated Chatbot using Python** to lower the work load as well as to increase the customer satisfaction with higher efficiency for expecting a better result and faster customer services.

2.2 User wise Functionalities

Some of the objectives are as follows:

- Interactive and user-friendly UI/UX.
- Auto-reply instantly without human supervision.
- Can be connected to websites.
- Answer multiple users at the same time, saving human labor.
- Can give response in URLs along with words.
- Can take audio responses.
- Gives result output through audio response as well as text response.
- Has access to social websites like YouTube and Wikipedia and can gather information from those sites.
- Can give real time information such as date, time and event.
- Can socially interact with humans.

Chapter 3

3.1 Importance and Need for Chatbot

Chatbot is far more cost-effective and efficient than human operators. It can carry out operations and commands with much more ease, efficiency, and precision which would have otherwise taken much more manpower and time to complete, while also greatly reducing the chance of errors.

Chatbot is used by several large companies for various purposes, like customer service and support, employee support, automated website support, handling transactions, etc. Some of them are:

- Customer service: like Zomato bot, Airtel bot. Helps in interacting with customers. Improves customer support.
- Virtual Assistant: like Google Assistant from Google and Alexa from amazon. Are essentially created from voice-based chatbots.
- Messaging bots: like whatsapp bot, messenger bot, and discord bots. Handles queries of several customers simultaneously as well as instantly, greatly increasing the response time.

Internal uses: works internally and facilitates employee support.

The rapidly evolving digital world is altering and increasing customer expectations. Hence, many consumers expect organization's helpline to be available all the time and hold the importance of customer experience on the same level as the company's products.

Chatbots is crucial for customer service because of their ability to automate tasks performed frequently and at specific times. This means they can provide

immediate response to the customers, reducing customer wait times. Chatbots are also available 24/7 and respond to multiple customers simultaneously.

The potential for improper communication is also avoided due to the lack of human factors, like emotions and moods of the involved parties.

Hence, due to the above reasons, as well as being cheaper and more cost-efficient, chatbots are generally better alternatives to conventional human to human customer services and communication. Chatbots are also customizable increase brand personality and can be personalized using AI.

While chatbots are very useful on the corporate and business side, advanced chatbots like the virtual assistants, like amazon's Alexa can very much help the end users with their daily miscellaneous activities like setting alarms and reminders for certain occasions, maintaining the daily schedule for the user. They can also communicate through speech-to-text, making even for convenient for daily tasks and activities. They can also be connected to internet and can search any fact on behalf of the user. Chatbots can automate and perform several mundane tasks if properly developed, i.e., writing emails based on a topic it is given, finding certain files and documents in a desktop, etc.

Additionally, major tech companies, such as Google and Facebook, have developed their own messaging bots to handle various services and functions like ordering, payments, bookings, etc. When used with messaging apps, chatbots allow the users to find answers from any location or the devices that is used by the user. The interaction is also easier because of the automated nature of chatbots.

Chapter 4

4.1 Software requirement

- Platform used: GOLEM , NLTK
- Operating System: Windows or Linux
- IDE used: PyCharm
- Designing tools used: Google Dialogflow , IBM Watson Assistant ,
- NLP used: Wit.ai , Pywhatkit , Google Speech Recognition , Python Text to Speech Recognition(PTTSX3)

4.2 Hardware Requirement

- Processor: Pentium IV, Minimum 2.80 GHz or more.
- Ethernet connection :(LAN) OR a wireless adapter (Wi-Fi).
- Hard Drive: Minimum 40 GB or above
- Memory (RAM): Recommended 256 MB or above.

Chapter 5

5.1 Working of a Chatbot

Natural Language Processing (NLP) is the engine of a chatbot that allows the chatbot to understand, comprehend and analyze the input of the user, and come up with the appropriate response to the user's input. Unlike a terminal, NLP allows human-to-machine communication without the need of any programming language as it enables machines to understand naturally written or verbal user inputs.

NLP takes the following into account:

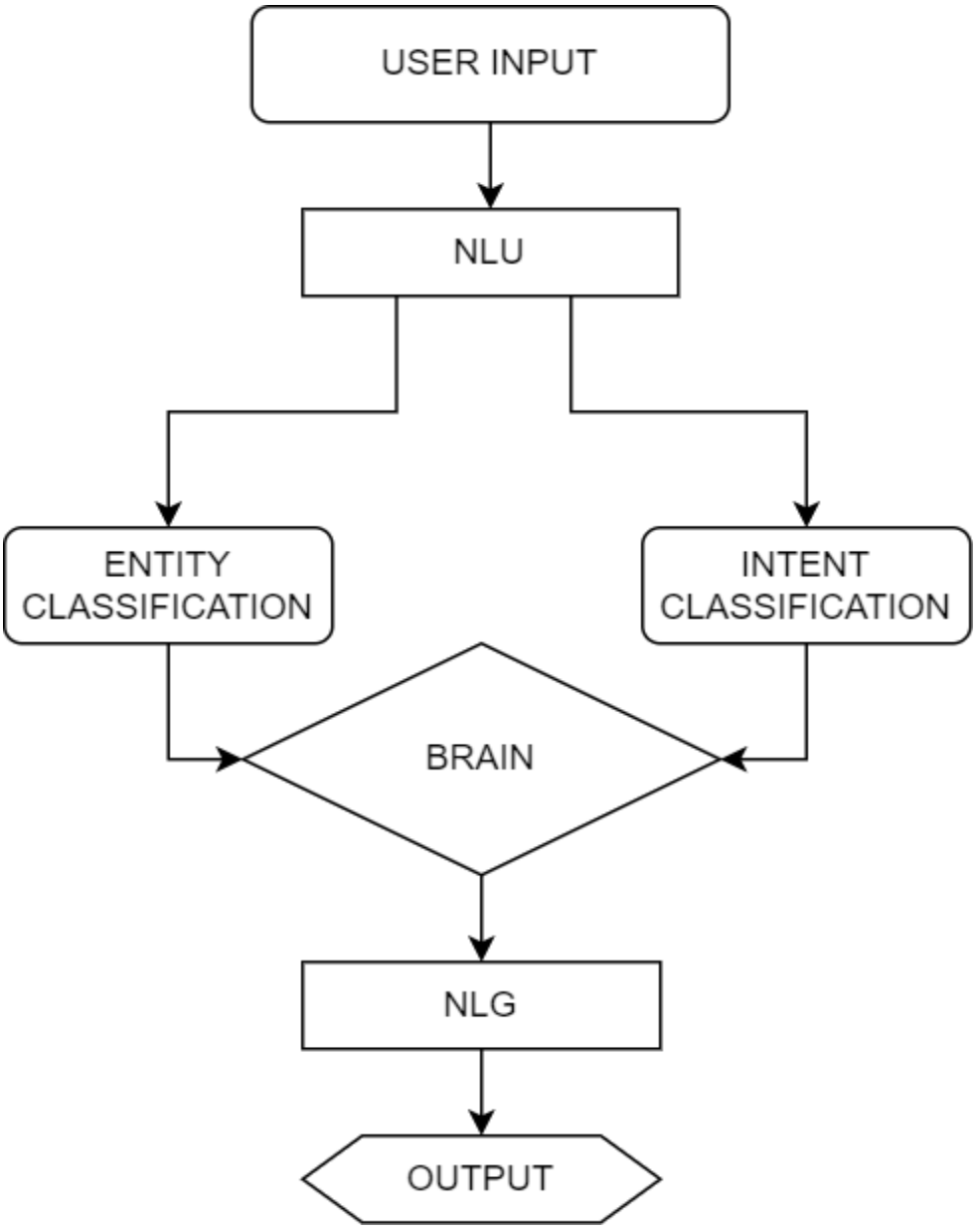
- Named Entity Recognition (NER) or 'entity identification' - locates and classifies named entity mentions in unstructured text into predefined categories
- Part-of-Speech (POS) tagging or 'tokenization' - read a text in some language and assign parts of speech to each word (and other tokens), such as noun, verb, adjective, etc.
- Text categorization – labels natural language texts with relevant categories from a predefined set
- Syntactic parsing – analyses a string of symbols to adhere to the rules of a formal grammar

NLP has two parts:

1. **Natural Language Understanding (NLU):** the main function of NLU is to comprehend and analyze the user input, and obtaining the focal point of the text, i.e., the entity and the intent. Entity is a term or object that modifies and helps in providing the context for the intent. Entities are also called slots. Intent, on the other hand, presents the purpose for the user's request. For example, in the input "Book a train ticket to Darjeeling", 'booking a train ticket' is intent and 'Darjeeling' is the entity. Classification of intent and entity from the input is the most crucial step in the working of a chatbot.

Natural Language Generation (NLG): NLG is responsible for producing an output for the user. It works as the inverse of NLU as it takes the unstructured output and transforms it into structured and natural human language.

Below is a procedural flowchart of the working of a chatbot:



Pywhatkit is a Python library with a large variety of helpful and versatile features. It is very use friendly and does not require any additional setup for it to work. Currently, it is one of the most popular libraries for its functions like WhatsApp and YouTube automation. New updates are released frequently with new features and bug fixes. Its main function is to send individual Whatsapp messages and images to groups and individuals using python language. There are other features like playing YouTube videos and browsing the Internet, sending mails with HTML codes, etc, and even allowing one to control one's own pc using their phone by having the same network on both devices and having the window's operating system.

Pttysx3 is a text-to-speech conversion library used in python. It differs from libraries of the same type is that, unlike the others, this library can still function in an offline environment and can be used with both Python 2 and 3. It supports three TTS engines :

- sapi5 – SAPI5 on Windows
- nsss – NSSpeechSynthesizer on Mac OS X
- espeak – eSpeak on every other platform

Speech recognition library allows python to recognition and understand language and speech. It translates the speech from microphone to text for the device. Most such libraries require online network connection to function.

Chapter 6

6.1 The Code of the Chatbot

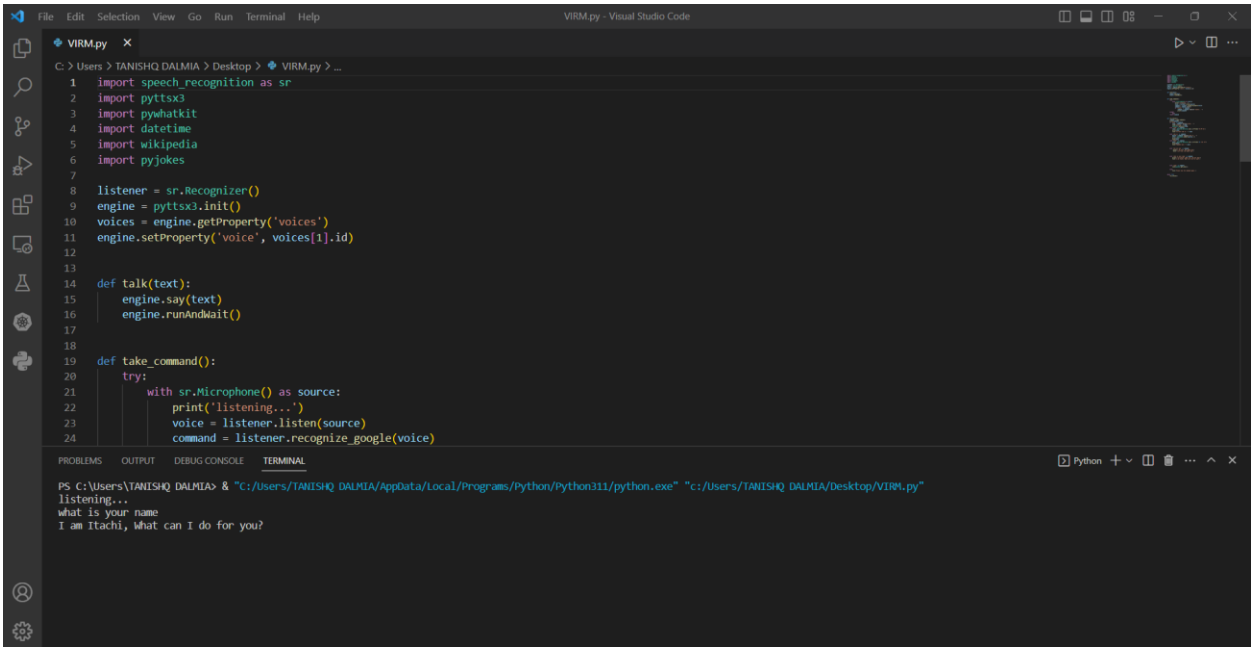
```
import speech_recognition as sr
import pyttsx3
import pywhatkit
import datetime
import wikipedia
import pyjokes

listener = sr.Recognizer()
engine = pyttsx3.init()
voices = engine.getProperty('voices')
engine.setProperty('voice', voices[1].id)
def talk(text):
    engine.say(text)
    engine.runAndWait()
def take_command():
    try:
        with sr.Microphone() as source:
            print('listening...')
            voice = listener.listen(source)
            command = listener.recognize_google(voice)
            command = command.lower()
            if 'itachi' in command:
```

```
            command = command.replace('itachi', '')
            print(command)
    except:
        pass
    return command
def run_itachi():
    command = take_command()
    print(command)
    if 'play' in command:
        song = command.replace('play', '')
        talk('playing ' + song)
        pywhatkit.playonyt(song)
    elif 'time' in command:
        time = datetime.datetime.now().strftime('%I:%M %p')
        print(time)
        talk('Current time is ' + time)
    elif 'who is' in command:
        person = command.replace('who is', '')
        info = wikipedia.summary(person, 1)
        print(info)
        talk(info)
    elif 'date' in command:
        date = datetime.datetime.now().strftime('%d /%m /%Y')
        print(date)
        talk("Today's date " + date)
```

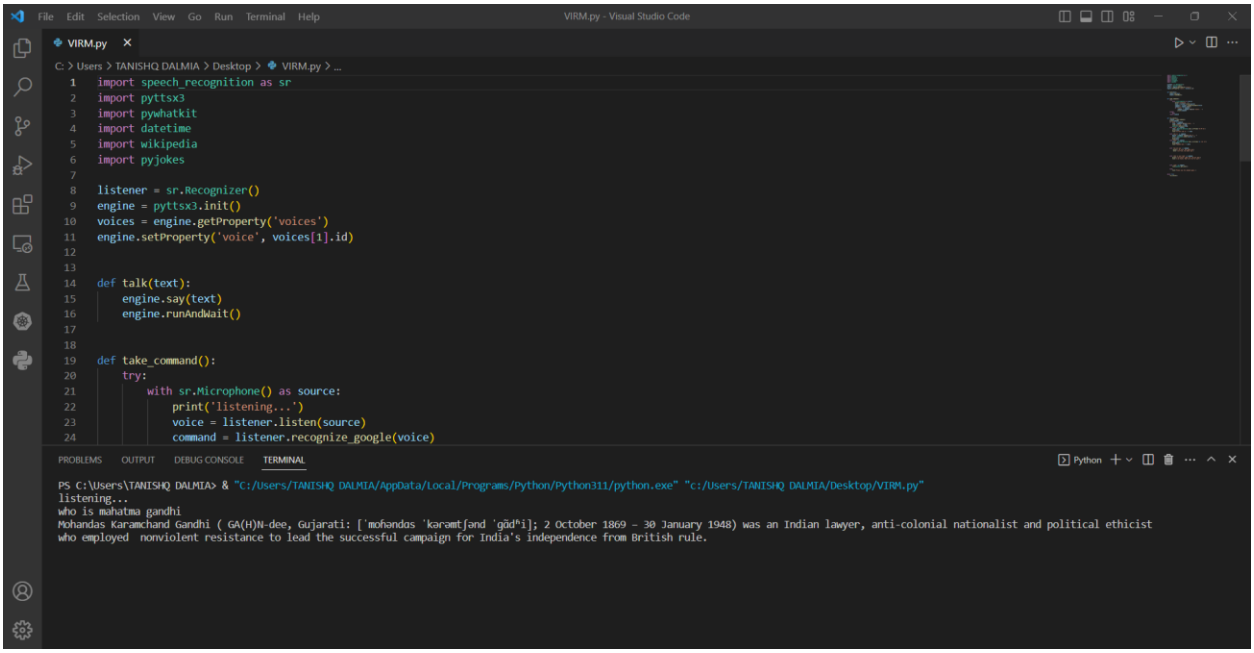
```
    elif 'how are you' in command:
        print('I am fine, how about you')
        talk('I am fine, how about you')
    elif 'what is your name' in command:
        print('I am Itachi, What can I do for you?')
        talk('I am Itachi, What can I do for you?')
    elif 'joke' in command:
        talk(pyjokes.get_joke())
    else:
        talk('Please say the command again.')
while True:
    run_itachi()
```

6.2 The Snapshots of the working code

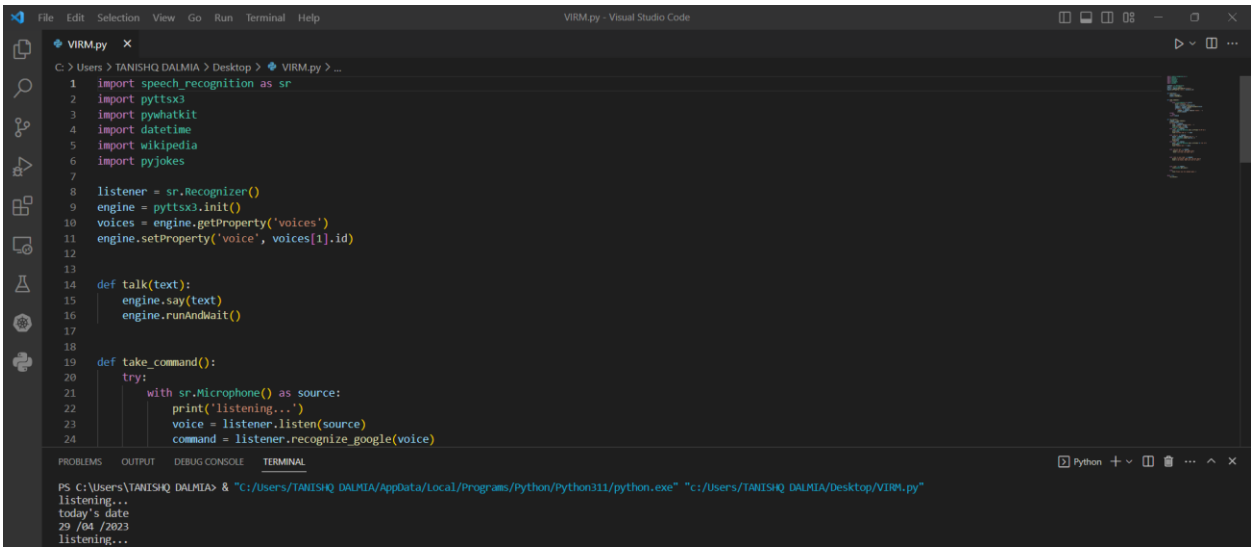
- Asking the Chatbot its name:



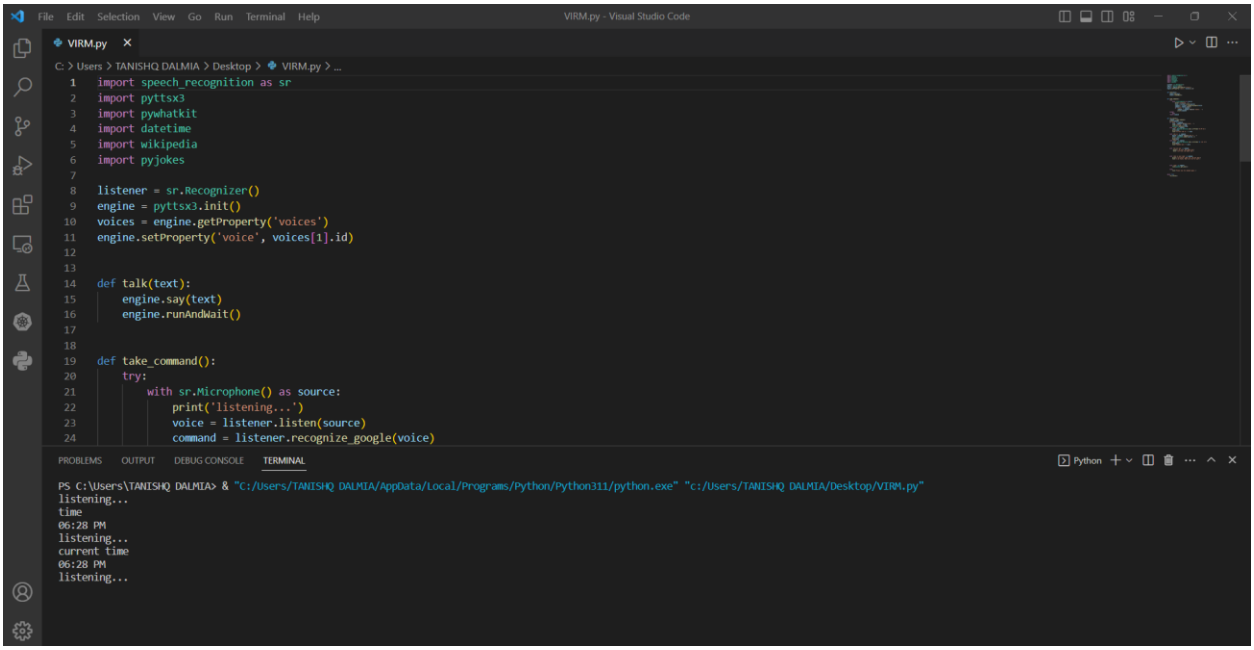
- Chatbot fetching information from Wikipedia:



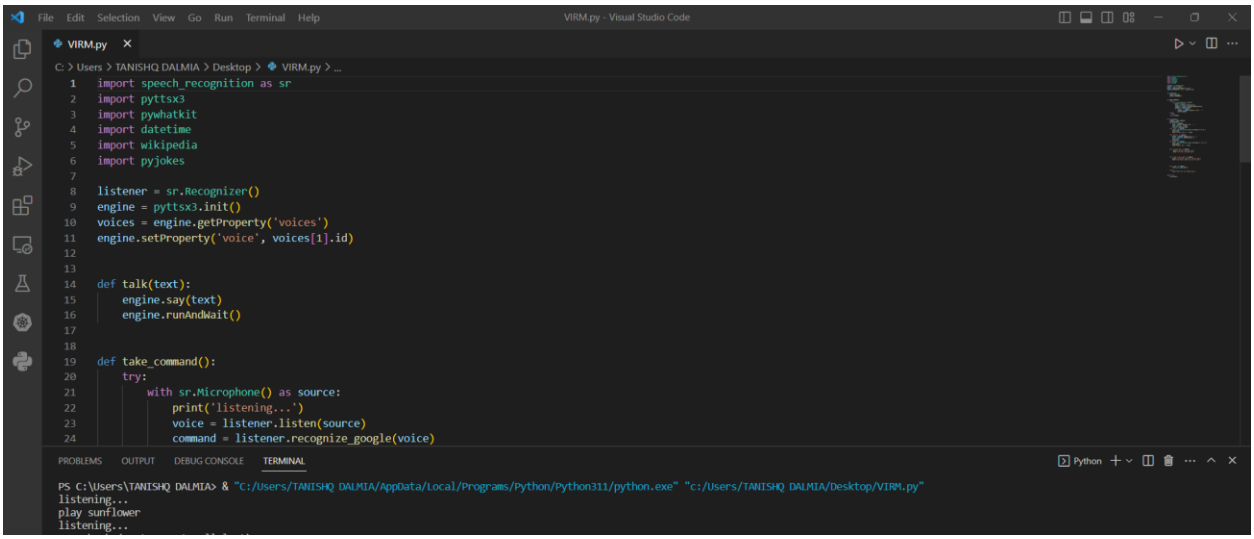
- Asking Chatbot about Today's Date:

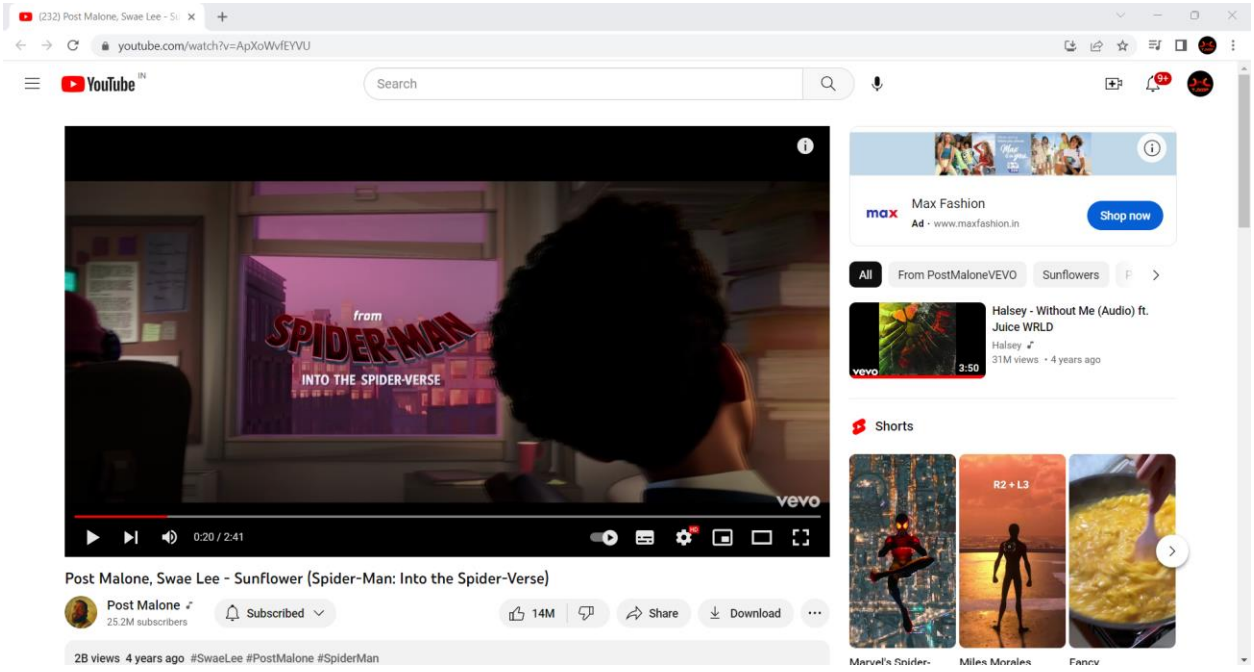


- Asking Chatbot about Current Time:



- Asking Chatbot to play something on YouTube:





6.3 The Algorithm of the Chatbot

STEP 1: Import the Python inbuilt libraries such as speech recognition, pyttsx3, pywhatkit, datetime,Wikipedia and pyjokes.

STEP 2: Initialize Listener as Recognizer.

STEP 3: Initialize Engine as Python text to speech to fetch and analyze the input given as speech.

STEP 4: SET Voice as voice response of the chatbot given through engine.getProperty('voices') and selecting the choice of the voice by defining the voice id i.e voices[1].

STEP 5: Define talk command and set engine to say as well as to Run and Wait.

STEP 6: Define take command.

STEP 7: Open a try block so that if the input is not detected or a invalid input if detected then enable the command to state that the chatbot did not understand what the user is trying to say and to please repeat the instruction.

STEP 8: In the try block set source of input as Device Microphone and speech recognizer as Google Voice Recognizer. If 'Itachi' (name of our Chatbot) is present in the input source instruction then replace the word 'Itachi' and give the resultant output of the said instruction.

STEP 9: Define run_itachi as a start of the processing block of the chatbot where it will accept the instruction from the user and give the resultant output as speech as well as in the text format.

STEP 10: Accept the command as take_command.

STEP 11: Print the command

STEP 12: After accepting the command the python text to speech library helps to breakdown the entire command input given as speech and search for the

appropriate matching keyword from the command and do the necessary if the keyword gets matched. If the keyword such as ‘play’, ‘date’, ‘time’, ‘who’, ‘how are you’ or ‘joke’ is present then it will process to find the needful result and then print the command in the text format as well as give the output in the speech format as talk

STEP 13: If in the input command or instruction no matching keyword is present then it will ask the user to please say the command again.

Chapter 7

7.1 Advantages of Chatbot

- Cost effective: A task that needs multiple trained human personnel can be done by a single chatbot and completed in a shorter time. Hence, chatbot is not only faster but cheaper as hiring human employees.

- Reduces errors: because of lacking human factors, chatbots are not prone to making trivial human errors.

- Can communicate simultaneously: This is very important for customer experiences, chatbot can interact with multiple individuals at the same time. Hence, a customer does not need to wait in queue to contact customer services, reducing waiting time of the customers.

- Gives precise and accurate responses: Chatbots give clear and straightforward responses as they are not prone to human errors.

- Available 24/7: Unlike human services chatbots can be active for all the time. Hence, it is always available.

- Personalize: Chatbots personalize the customer's experience, by providing support to every single customer separately, recommending products based on their preference and giving accurate and swift responses whenever they have in question and problems. This leaves a positive impression with the customers and buyers and greatly reduces the chance of them dropping off. This also leads to the increase in customer base.

Chapter 8

8.1 Conclusion

With the business world becoming more and more digitalizes and online-based, the need for AI-based chatbot is increasing day by day. Hence, it has become crucial for companies to have a capable chatbot to keep up with the current business model. The chatbot developed in this project has the ability to automate frequent yet important tasks, like customer service and care, is not only cost and time effective, allowing companies to divert human resources to more important operations, it also greatly improves customer experience because of the chatbots' ability to respond instantly. All of these functionalities are implemented through codes using the python language.

6.2 Future Work

Though chatbots can hold basic conversations with humans in natural language, it still cannot understand subtleties of human languages. This can lead to frustration from the customer's side if the chatbot cannot properly answer the question. Hence, chatbot could be pre-programed to pass on the conversation to a human agent if it is not designed to manage or understand said interaction. Chatbot can be further upgraded to a more advanced AI virtual assistant, which can hold long, precise, and complex human-like conversations with the user.