PERSONAL AI ASSISTANT

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ABSTRACT

The main agenda of our voice assistance makes people smart and give instant and computed results. In this modern era, day to day life became smarter and interlinked with technology. Voice assistance system, it can act as a basic medical prescriber, daily schedule reminder, note writer, calculator and a search tool. This project works on voice input and gives output through voice and displays the text on the screen. The main agenda of our voice assistance makes people smart and give instant and computed results. The voice assistance takes the voice input through our microphone and it converts our voice into computer understandable language gives the required solutions and answers which are asked by the user. This assistance connects with the World Wide Web to provide results that the user has questioned. Natural Language Processing, algorithm helps computer machines to engage in communication using natural human language in many forms. The aim of this project is to improve user productivity by managing routine tasks of the user and by providing information from an online source to the user.

Keywords: Instant Results, Voice Recognition, Improve Productivity, Natural Language Processing, Reduced Workload.

I.   INTRODUCTION

The project is captioned as **"AI Personal Assistant".** Artificial Intelligence is the new hope today. Virtual Assistance is one of the weighted compliments given by this field. They help accomplish various tasks in just a few seconds. They must be designed in a way to improve the user's experience and adapt to their needs as well. Every mobile phone user is benefiting from it and applying the use of such assistants in their daily life. Seeing this, we came up with an idea of huge exposure of these virtual assistants that people can maximize the gain from it, especially the working men, by introducing user friendly assistants in computers and laptops as they lack some very good and secure assistants to ease out the management of their systems as well. The application is designed keeping in mind the user's current requirement and making them solve their problems more quickly and conveniently without interfering in their privacy by simply the means of their voice commands. The focus is that the users can get inside/outside of anything whether about the hardware of their laptops or the information stored on World Wide Web just by speaking out, ensuring proper retrieval of voice commands and speedy computation in a secure manner. Hence the application encourages multi-versatile-tasking with a good knowledge base, fast secure processing resulting in higher performance and user satisfaction. This system is designed to be used efficiently on desktops. Personal assistants software improves user productivity by managing routine tasks of the user and by providing information from an online source to the user.

II.   METHODOLOGY

The methodology for implementing the AI Personal Assistant involves several key steps to ensure its successful development and deployment. The following is a general outline of the methodology:

1. Methodology:

Requirement Analysis:

The first step is to thoroughly analyze the requirements and needs of the AI personal assistant. This includes understanding the current assistant, identifying pain points, and determining the desired features and functionalities of it.

System Design

Based on the requirements analysis, a detailed system design is created. This includes designing the block diagram, user interfaces, data flow, and system architecture. The design should address the specific needs of the AI Personal Assistant.

Development

The actual development of the voice assistant begins in this phase. The software developers use the system design as a blueprint to create the necessary modules, functions, and features of the system. This may involve programming, integration with hardware devices (such as microphones), and testing of individual components.

Testing

Once the development is complete, thorough testing of the system is performed. This includes unit testing of individual modules, integration testing to ensure proper communication between modules, and system testing to validate the overall functionality and performance of the MSMS. Bugs and issues are identified and fixed during this phase.

Deployment

Deployment phase is initiated after the system has been tested and accepted by the user. In this phase, the system is installed to support the intended functions. System performance is compared to performance objectives established during the planning phase. Implementation includes user notification, user training, installation of hardware, installation of software onto production computers, and integration of the system into daily work processes. This phase continues until the system is operating in production in accordance with the defined user requirements.

Maintenance and Support

Once the personal assistant is operational, ongoing maintenance and support are provided. This includes regular updates and bug fixes, addressing user queries and issues, and ensuring the system remains secure and reliable. Continuous improvements and enhancements may be made based on user feedback and changing requirements.

2. SYSTEM TESTING AND IMPLEMENTATION

TESTING

Testing is a series of different tests that whose primary purpose is to fully exercise the computer based system. Although each test has a different purpose, all work should verify that all system element have been properly integrated and performed allocated function. Testing is the process of checking whether the developed system works according to the actual requirement and objectives of the system. The philosophy behind testing is to find the errors. A good test is one that has a highprobability of finding an undiscovered error. A successful test is one that uncovers the undiscovered error. Test cases are devised with this purpose in mind. A test case is a set of data that the system will process as an input. However the data are created with the intent of determining whether the system will process them correctly withoutany errors to produce the required output.

Types of Testing

Unit testing

Integration testing

Validation testing

Output testing

User acceptance testing

Unit Testing

Unit testing is process in which individual programs are tested for their proper functioning. Program logic is written for a specific usage, so we need to test whether each of the programs is working fine as for our requirement. In this testing subroutines were tested. All modules were tested and individually as soon as they were completed andwere checked for their correct functionality.
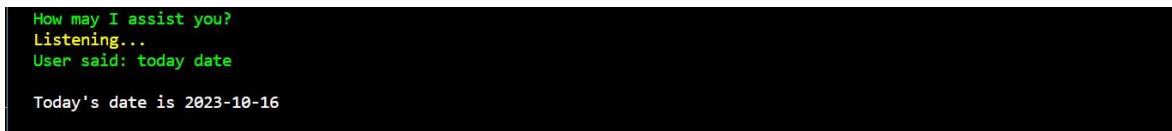
SCREENSHOTS

Figure 1 is the result of locally testing the audio signal in which the assistant is listeningand recognizing the voice input.
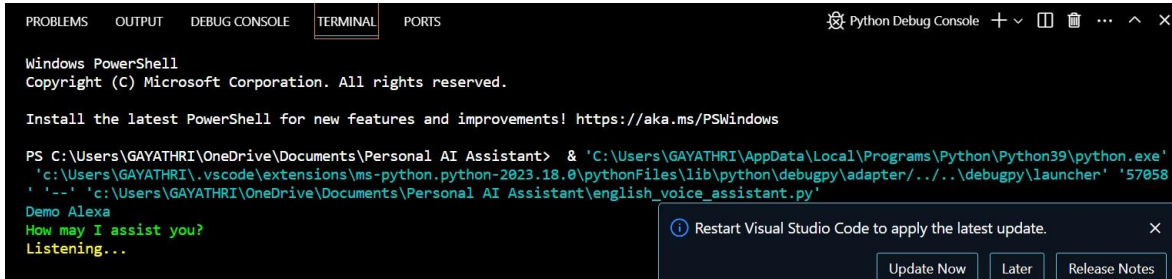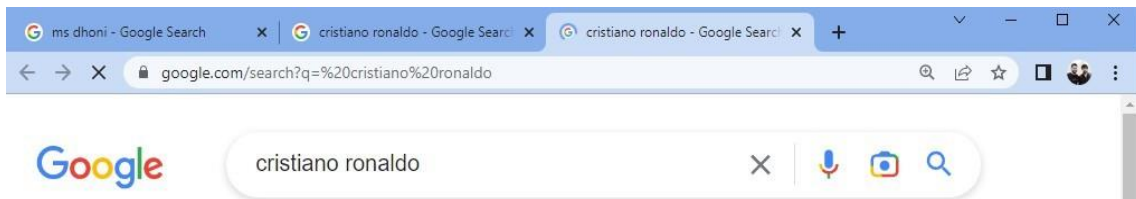

Figure 1

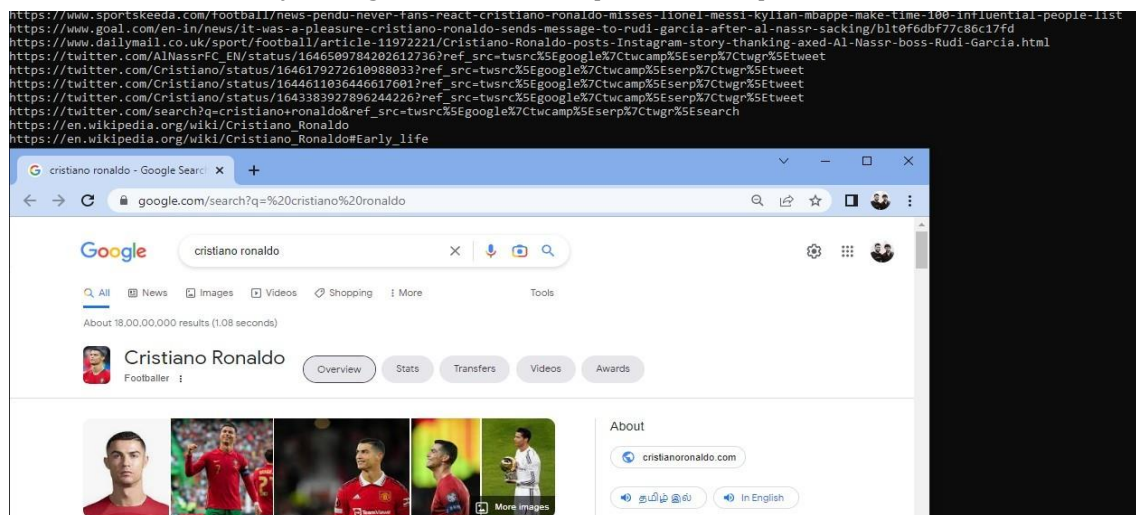Figure 2 is the result of locally testing the audio signal is converted to text command.

Figure 2

Figure 3 is the result of locally testing that the assistant understands the task and executingit.

Figure 3

Figure 4 is the result of locally testing that the assistant provides a response & result for theuser's task.

Figure 4

Integration Testing

The entire project was split into small program; each of these single programs gives a frame as an output. These programs were tested individually; at last all these programs where combined together by creating another program where all these constructors were used. It give a lot of problem by not functioning is an integrated manner. The user interface testing is important since the user has to declare that the arrangements made in frames are convenient and it is satisfied. When the frames where given for the test, the end user gave suggestion. Based on their suggestions theframes where modified and put into practice.

Validation Testing

At the culmination of the black box testing software is completely assembled as a package. Interfacing errors have been uncovered and corrected and a final series off test i.e., Validation succeeds when the software function in a manner that can be reasonably accepted.

Test coverage Analyzer

Records the control paths followed for each test case.

Timing Analyzer

Also called a profiler, reports the time spent in various regions of the code are areas to concentrate on to improve system performance.

3. SYSTEM IMPLEMENTATION

It begins with the following involves various activities performed together. These are the System Development Life Cycle

Recognition of need

It is the first stage of information system development cycle. The preliminary investigation must define the scope of the project and the perceived constrains, opportunities and directives that triggered the project. Most existing projects use only speech recognition using emotional networks. Although their systems are relatively accurate, they are not for real use and are not suitable for any real use.

Feasibility study

The goal of a feasibility study is to evaluate alternative system and to purpose the most feasible and desirable system for development.

It consist of the following:

*   Statement of the problem
*   Summarizing of findings and recommendations
*   Details of findings
*   Recommendations and conclusions

I addressed five types of feasibility study in my research, they include the following.

Operational Feasibility

The system is operationally feasible.

Time Feasibility

Being a s mall system and given the period of three months of development, it is time feasible.

Economic Feasibility:

A network-based system requires a lot of equipment such as cables, hubs etc. This requires a lot of initial capital to install the network. On the other hand, it allows sharing of resources and information and centralized administration hence cheaper.

Technical Feasibility

Since it is not a complex system, we have the technical feasibility of developing the system.

Time Feasibility

The system is a small one and hence the time frame of three months allocated for development is enough hence there is time feasibility. From the above we choose to use a network based database system because as compared to the other strategies, it more feasible. It will contain an interface that is distributed in the network and is connected to a central data-base. Feasibility study involve cost/benefit analysis. In the process , the cost and benefits are estimated with greater accuracy. If cost and benefit should be quantified to make a good system that is affordable.

III.   MODELING AND ANALYSIS

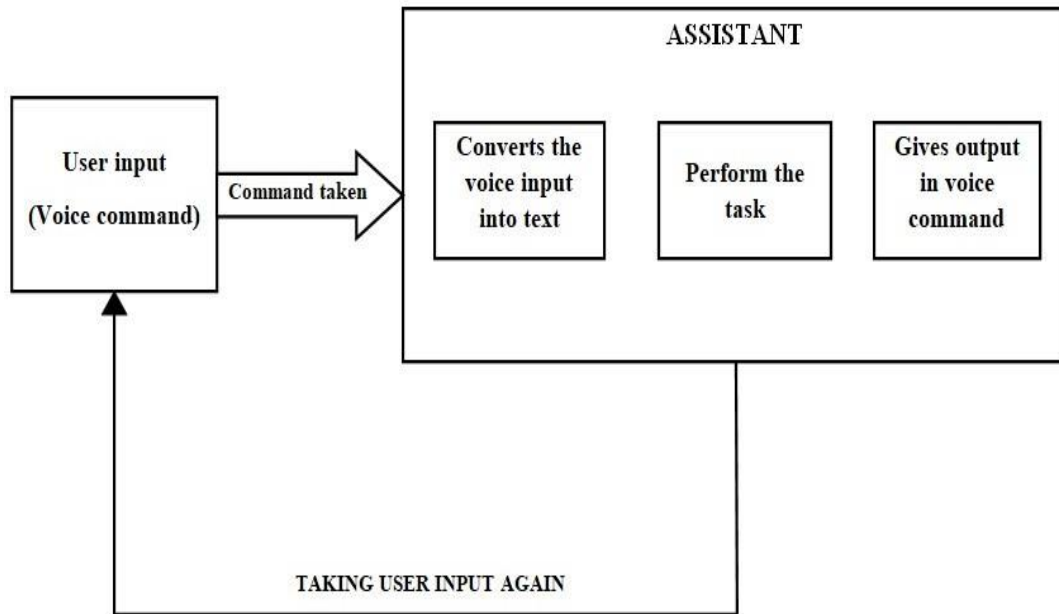Model and Material which are used is presented in this section. Table and model should be in prescribed format.

Figure 5: Architectural Diagram

1. SYSTEM STUDY

1. EXISTING SYSTEM

Most existing projects use only speech recognition using emotional networks. Although their systems are they are not for real use and are not suitable for any real use.

There are a few basic methods they use:

Context-aware computing: Context-aware computing is a category of programs that can sense their physical location and adapt accordingly. These can be used to identify words spoken by people with different characteristics. It may also spell out words that may have been mispronounced.

MFCC: MFCC refers to Mel-Frequency Cepstral Coefficients. MFC (Mel-frequency Cepstrum) is a collection of this coefficient. It is equal to the short-term energy spectrum of sound. These can be used to hear sound variations to detect the various variables needed for voice recognition.

NLP: Natural Language Programming is a branch of Artificial Intelligence responsible for computer interactions and human languages. It focuses on programming computers so that they can process large amounts of data in native languages. This concept is used to familiarize a computer with a variety of words in a given language and to recognize them when spoken.

DISADVANTAGES

They are not for real use and are not suitable for any real use.

Personal assistants are useful but it costs more.

Keeps all the user data anonymous and safe.

All our data is recorded.

2. PROPOSED SYSTEM

Technological developments have led to voice assistant systems assisting in completing various day-to-day activities with ease. In this proposed concept effective way of implementing a Personal voice assistant, Speech Recognition library has many in-built functions, that will let the assistant understand the command given by user and the response will be sent back to user in voice, with Text to Speech functions. When assistant captures the voice command given by user, the under lying algorithms will convert the voice into text.And

according to the keywords present in the text (command given by user), respective action will be performed by the assistant. This is made possible with the functions present in different libraries. Also, the assistant was able to achieve all the functionalities with help of some API's. We had used these APIs for functionalities like performing calculations, extracting news from web sources, and for some other things. We will be sending a request, and through the API, we're getting the respective output. API's like WOLFRAMALPHA are very helpful in performing things like calculations, making small web searches. In this way, we are able to extract news from the web sources, and send them as input to a function for further purposes. Also, we have libraries like Random and many other libraries, each corresponding to a different technology. We used the library OS to implement Operating System related functionalities like Shutting down a system, or restarting a system. pyautoguiis a library that is implemented for functionalities like, capturing a screenshot. psutil is a library, and is used for functionalities like checking battery status.

ADVANTAGES

Data is not recorded.

A Personal assistant at no cost.

Suitable for our real use.

Easy to use and user friendly.

2. SYSTEM DESIGN

System design is the process of planning a new system to complement or altogether replace the old system. The purpose of the design phase is the first step in moving from the problem domain to the solution domain. The design of the system is the critical aspect that affects the quality of the application. System design is also called top-level design. The design phase translates the logical aspects of the system into physical aspects of the system.

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INPUT DESIGN:

Input design is converting user-originated input format to a computer-based format. This computer-based format is called as input form or source document. In an information system, input is the raw data that is processed to produce output.

In this input design a GUI window is created using PyQt5 with run and exit buttons.In the project, the input is a speech from the user.

OBJECTIVES OF INPUT DESIGN

❖ Input design must be complete & accurate.

❖ There should be not any inconsistency of data in input design.

❖ Input forms should be user friendly to the user.

❖ Assuring input meets the intended purpose.

SCREENSHOTS

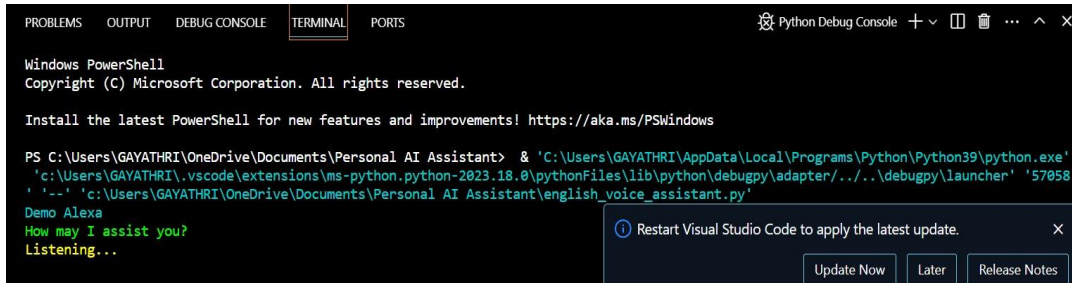Figure 6 is system listening the voice input & recording the input from the user .

Figure 6

Figure 7 is the assistant listening for the user's voice input.
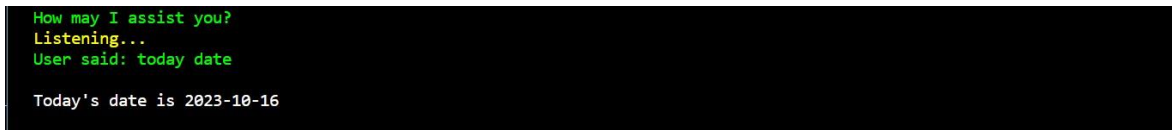

Figure 7

OUTPUT DESIGN

Computer output is the most important & direct source of information to the user. The system is accepted by the user only by the quality of its output. If the output is not of decent quality, the user is likely to reject the system. Therefore, an effective output design is the major criteria for deciding the overall quality of the system. The design of output is the most important task of any system. In this project the output is the speech by the assistant on executing user commands. In this project the output is the information requested by the user in the console or the system task executed by the assistant or information in the web browser.

OBJECTIVES OF OUTPUT DESIGN

❖ Designing output to serve the intended purpose.
❖ Making sure the output is where it is needed.
❖ Providing the output on time.
❖ Choosing the right output method.

SCREENSHOTS

Figure 8 is the output picture of the assistant capturing a photo on the user's command.
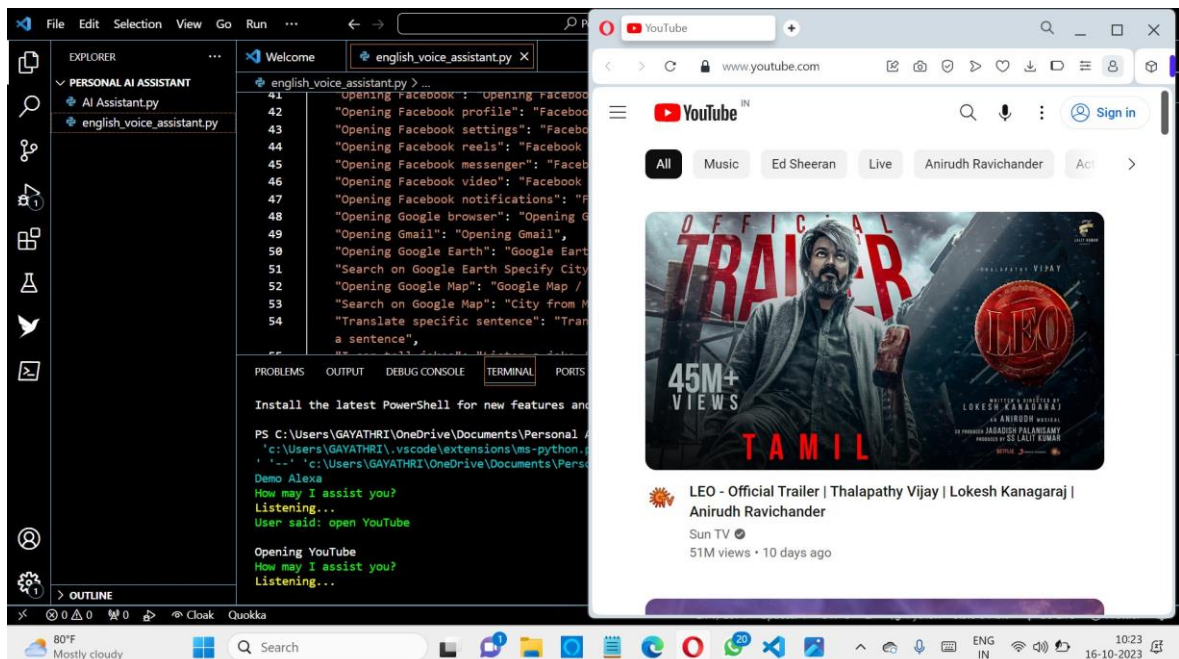
Figure 8

Figure 9 is the output picture of the assistant opening a Gmail
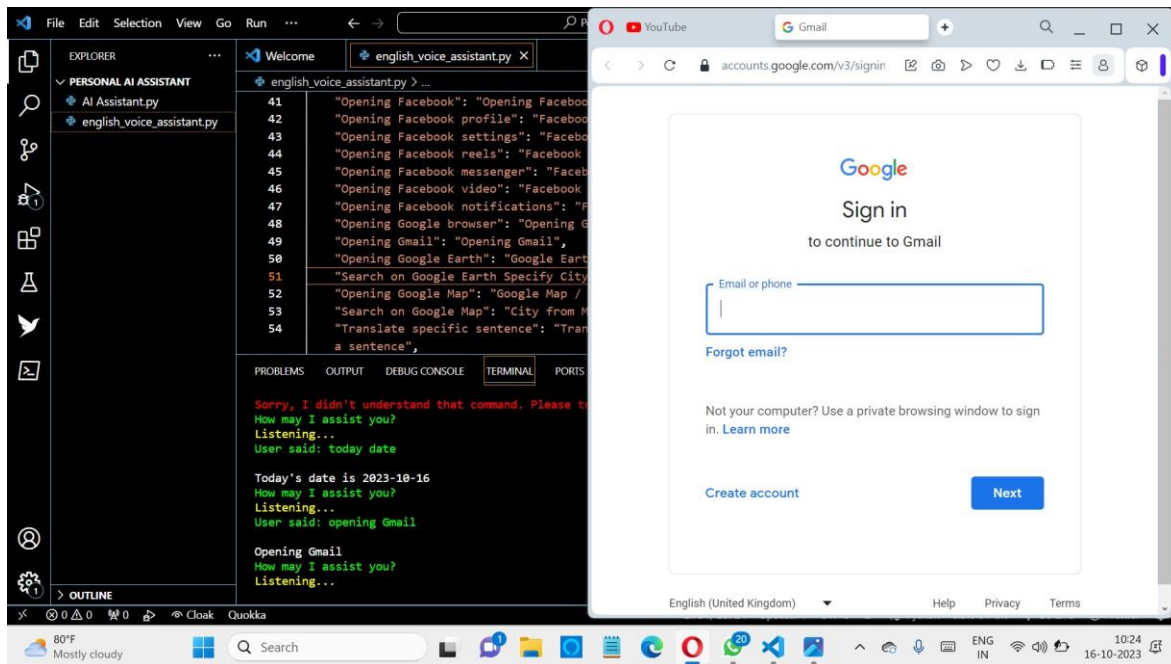
Figure 9

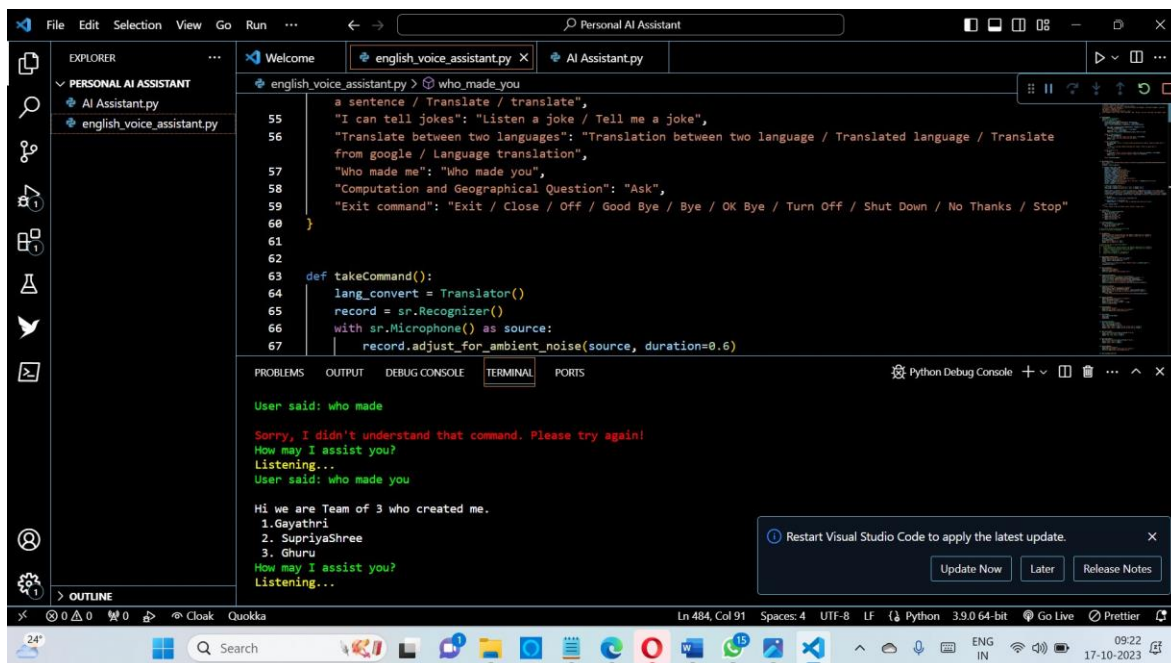Figure 10 is the output picture of the assistant providing information about the system.

Figure 10

3. SOFTWARE FEATURES

BACK-END TECHNOLOGY PYTHON

Python is OOPs (Object Oriented Programming) based, high level, interpreted programming language. It is a robust, highly useful language focused on rapid application development (RAD). Python helps in easy writing and execution of codes. Python can implement the same logic with as much as 1/5th code as compared to other OOPs languages. Python provides a huge list of benefits to all. The usage of Python is such that it cannot be limited to only one activity. Its growing popularity has allowed it to enter into some of the most popular and complex processes like Artificial Intelligence (AI), Machine Learning (ML), natural language processing, data science etc. Python has a lot of libraries for every need of this project. For this project, libraries used

are Speech Recognition to recognize voice, Pyttsx for text to speech, selenium for web automation etc. Python is reasonably efficient. Efficiency is usually not a problem for small examples. If your Python code is not efficient enough, a general procedure to improve it is to find out what is taking most the time, and implement just that part more efficiently in some lower-level language. This will result in much less programming and more efficient code (because you will have more time to optimize) than writing everything in a low-level language.

PYTHON PACKAGES REQUIRED

❖ **Speech Recognition** — Speech recognition is an important feature used in house automation and in artificial intelligence devices. The main function of this library is it tries to understand whatever the humans speak and converts the speech to text.

❖ **pyttsx3** — pyttxs3 is a text to speech conversion library in python. This package supports text to speech engines on Mac os x, Windows and on Linux.

❖ **Wiki pedia** — Wikipedia is a multilingual online encyclopedia used by many people from academic community ranging from freshmen to students to professors who wants to gain information over a particular topic. This package in python extracts data'srequired from Wikipedia.

❖ **E capture** — This module is used to capture images from your camera

❖ **Date time** — This is an inbuilt module in python and it works on date and time

❖ **OS** — This module is a standard library in python and it provides the function tointeract with operating system

❖ **time** — The time module helps us to display time

❖ **web browser** — This is an in-built package in python. It extracts data from the web

❖ **sub process** — This is a standard library use to process various system commands like to log off or to restart your PC.

❖ **request** — The request module is used to send all types of HTTP request. It accepts URL as parameters and gives access to the given URL'S.

❖ **wolframalpha** — Wolfram Alpha is an API which can compute expert-level answers using Wolfram's algorithms, knowledge base and AI technology. It is made possibleby the Wolfram Language.

❖ **PyQt5** — This is used to design a GUI.

IV.   RESULTS AND DISCUSSION

GUI window

Figure 11 is the picture of system litening to user input
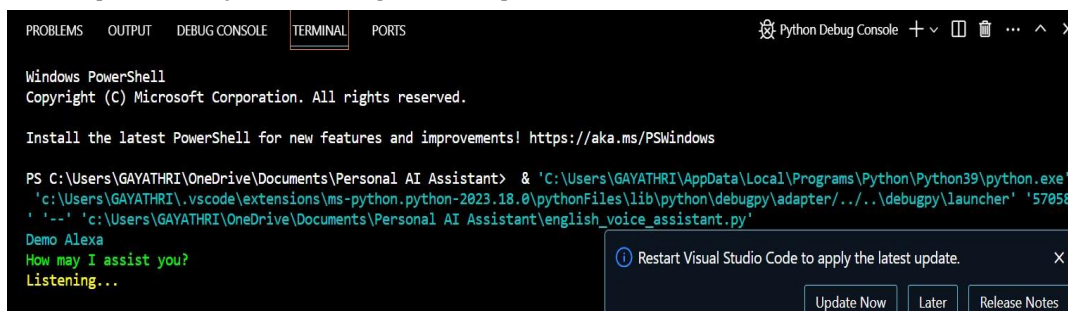
Figure 11

Recognizing sound and converts to text

Figure 12 is the picture of locally testing the audio signal is converted to text command and command execution .

Figure 12

Date & Time

Figure 13 is the picture of the assistant tells the current time and date.

Figure 13

Translate to specific Languages

Figure 14 is the picture of the assistant Translate between 2 Language specified by the user.
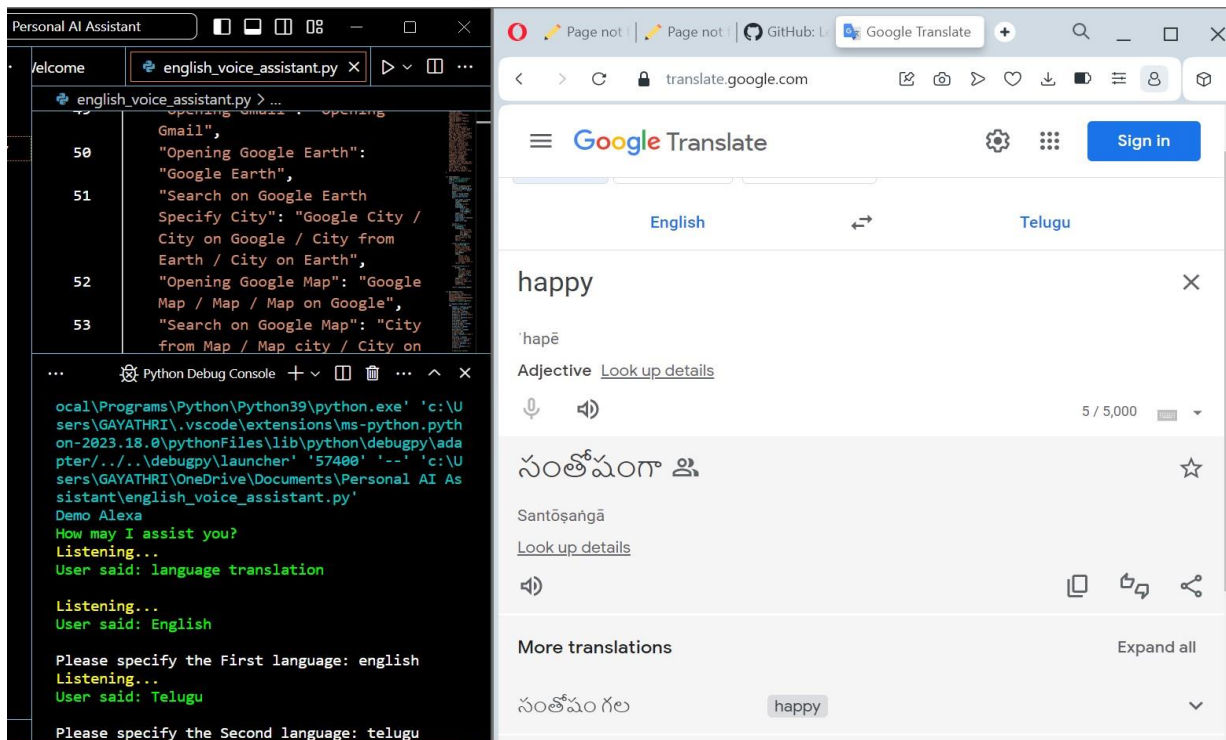

Figure 14

Searching on Google Earth

Figure 15 is the picture of the assistant searching a city in Google Earth .
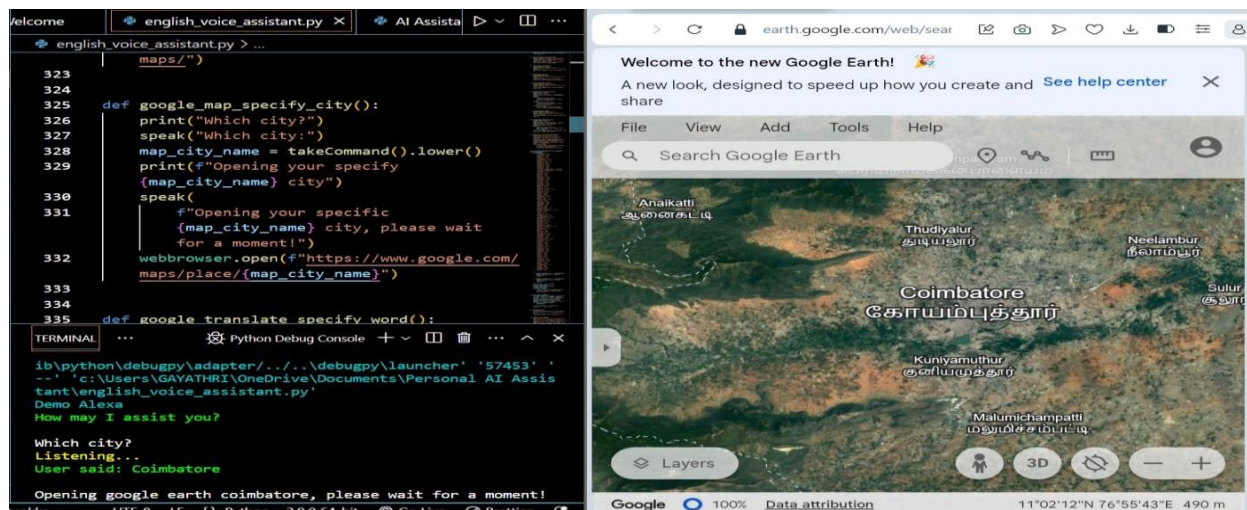

Figure 15

Weather report

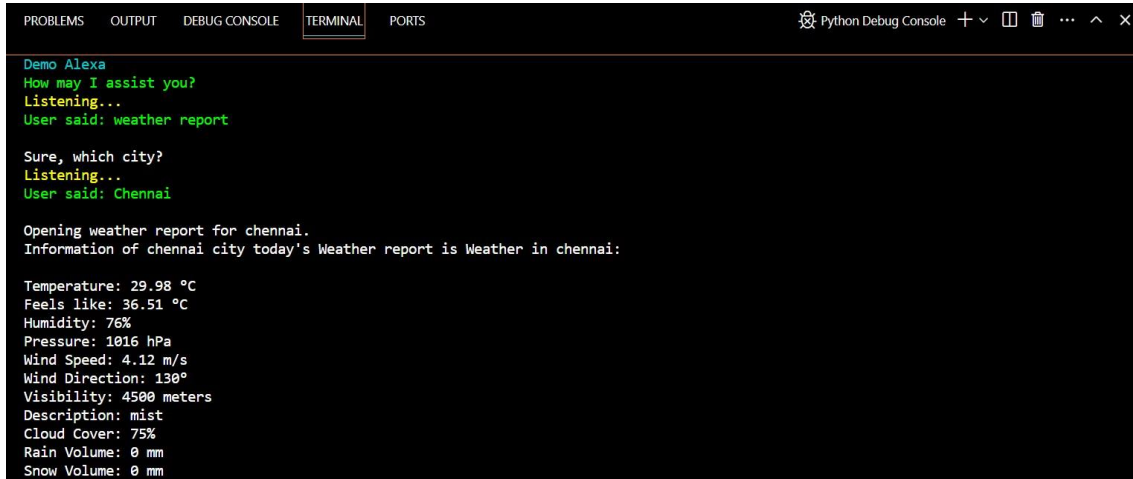Figure 16 is the picture of the assistant tells the weather of Chennai city.

Figure 16

Location

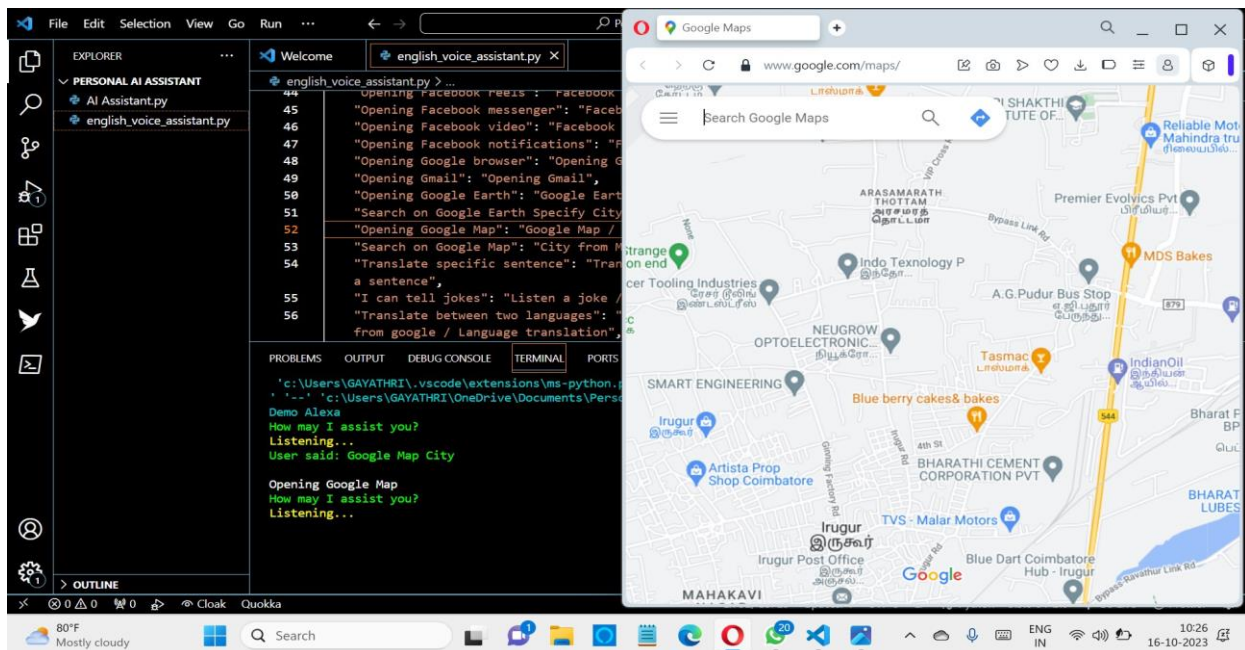Figure 17 is the picture of the assistant opens location and tells the distance.

Figure 17

System Status

Figure 18 is the picture of the assistant tells the Internet Protocol Address.
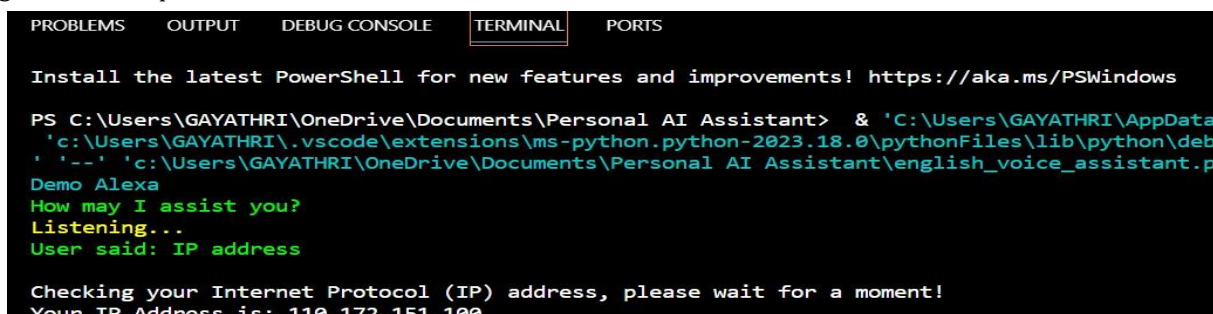

Figure 18

Answering for Questions

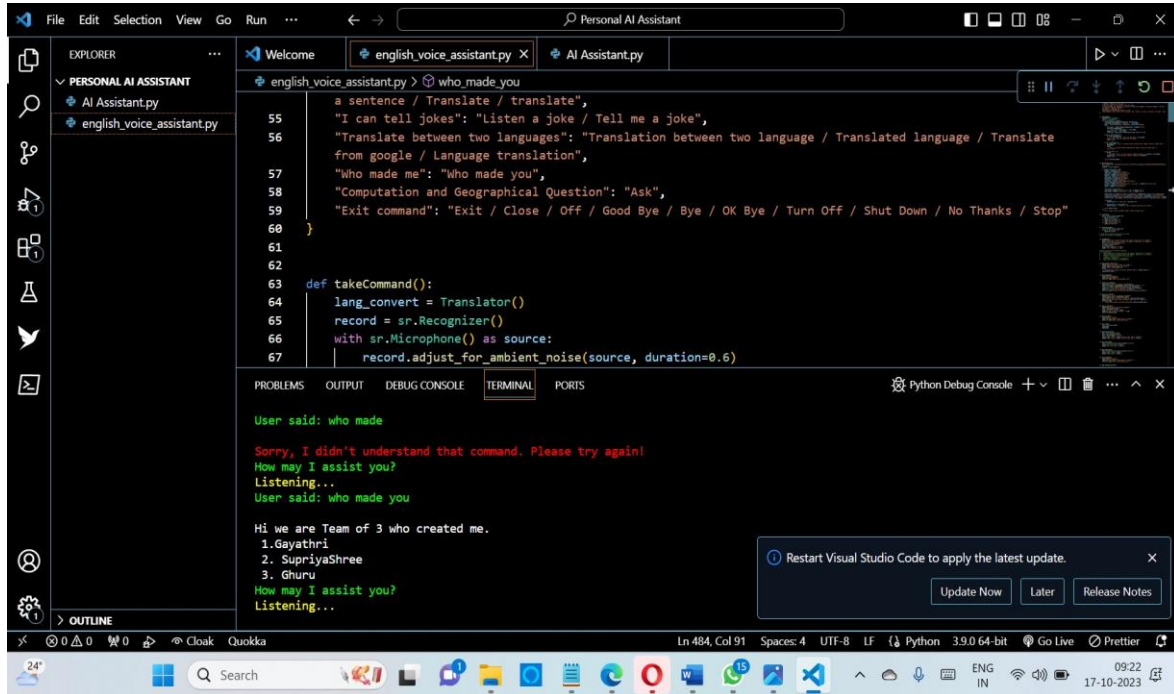Figure 19 is the picture of the assistant tells who made it .

Figure 19

Google Search

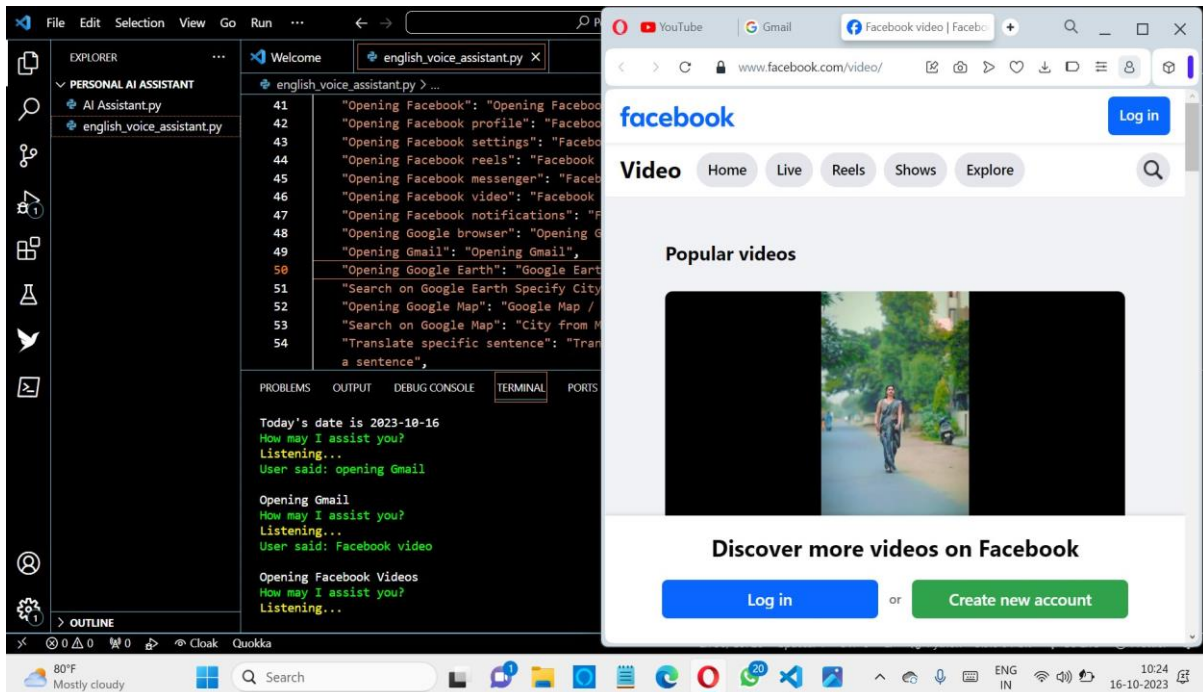Figure 20 is the picture of the assistant opening Facebook..

Figure 20

YouTube Search

Figure 21 is the picture of the assistant playing Shape of You song on YouTube.
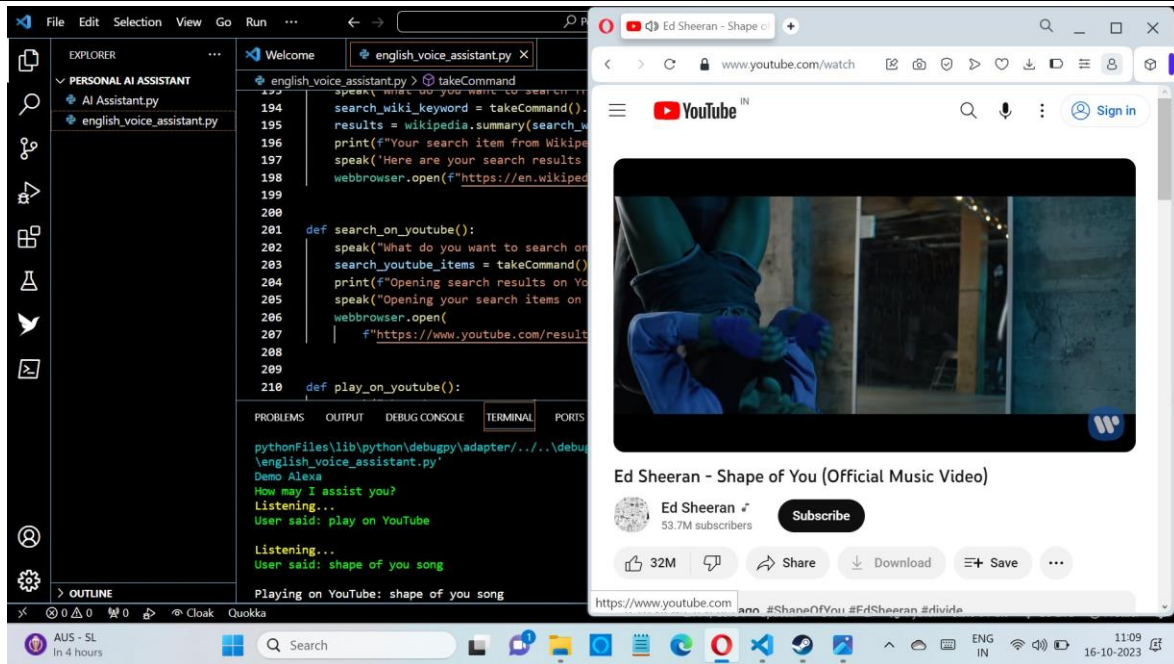
Figure 21

Figure 22 is the picture of the answering the Computation and Geographical Questions.

Figure 22

Translate Words

Figure 23 is the picture of the assistant tells top news headlines.

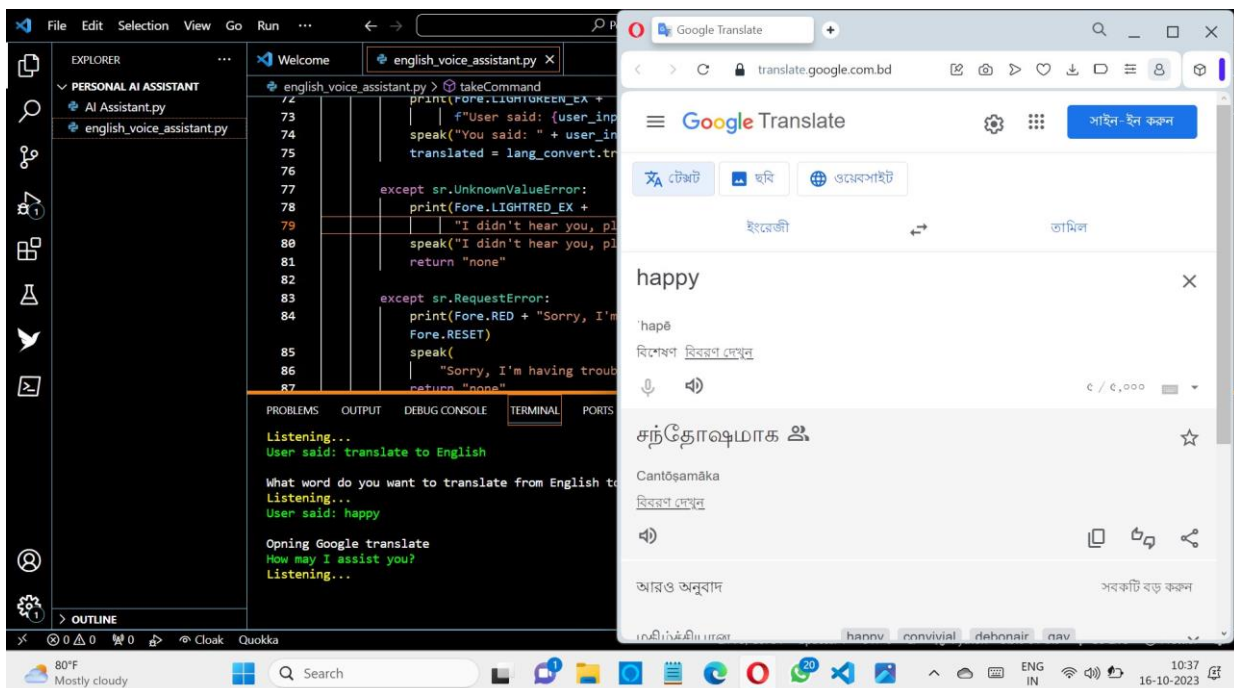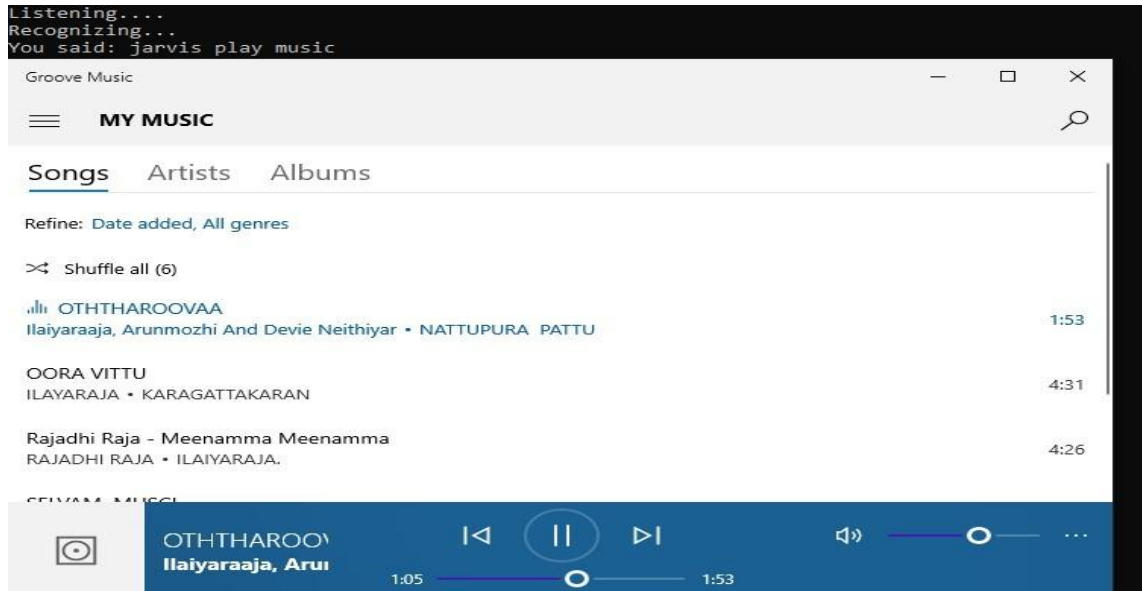**Figure 23**

Music

Figure 24 is the picture of the assistant plays the music.

Figure 24

V.   CONCLUSION

The building block of this Major Project "**Personal Voice Assistant**" was one of the opportunities. It gave us the requisite practical knowledge to supplement the already known theoretical concepts thus making us more competent as a computer science student. This project presents the design and development of a Voice enabled personal assistant for pc using Python programming language. This Voice enabled personal assistant,in today's life style will be more effective in case of saving time, compared to that of previous days. This Personal Assistant has been designed with ease of use as the main feature. The Assistant works properly to perform some tasks given by user. It can be designed to minimize the human efforts to interact with many other subsystems, which would otherwise have to be performed manually. By achieving this, the system will make human life comfortable. More specifically, this system is designed to interact with other subsystems intelligently. Overall we can come to a conclusion that these intelligent agents are the need of the day that can make human life more efficient after some advanced enhancements. The project also provided me the opportunity of interacting with our teachers and to gain from their best experience.

VI.   REFERENCES

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