A

Project Report

on

Personal AI Voice Assistance using Python

By

Yogendra Kr Bind (1813310244)(**TL**)
Zeba Majrooh (1813310247)
Sooraj Tyagi (1813310213)
Yash Jain (1813310241)

Under the Supervision of

Mr. Surya Prakash Sharma
Assistant Professor

Submitted to the Department of Computer Science and Engineering

For the partial fulfillment of the requirements

for the award of Bachelor of Technology

in

Computer Science and Engineering

Noida Institute of Engineering & Technology Gr. Noida
Dr. A.P.J. Abdul Kalam Technical University, Lucknow, Uttar Pradesh
May, 2021-2022

Certificate

This is to certify that the Project report entitled **"Personal AI Voice Assistance Using Python"** is a record of the work done by the following students:

Student name	Roll No.
Yogendra Kr Bind	1813310244
Zeba Majrooh	1813310247
Yash Jain	1813310241
Sooraj Tyagi	1813310213

This work is done under my/our supervision and guidance during the academic year of 2021-22. This report is submitted to the **Noida Institute of Engineering & Technology, Greater Noida** for partial fulfillment of the degree of **B.TECH. (Computer Science and Engineering)** of **Dr. A P J Abdul Kalam Technical University, Lucknow, Uttar Pradesh, India.**

I/We wish him/her all the best in all their endeavors.

Signature of Guide:
Surya Prakash Sharma
Project Mentor

ACKNOWLEDGEMENT

I would like to place on record my deep sense of gratitude to Mr. Surya Prakash Sharma **, Assistant Professor, Department of Computer Science and Engineering, Noida Institute of Engineering & Technology**, Greater Noida, Gautam Budha Nagar, Uttar Pradesh, India For his generous guidance, help and useful suggestions.

I express my sincere gratitude to **Prof. Chandra Shekhar Yadav, HOD CSE**, Noida Institute of Engineering & Technology, Greater Noida for his stimulating guidance, continuous encouragement and supervision throughout the course of the present work.

Date:
16th April 2022

Student Name:
Yogendra Kr Bind
Zeba Majrooh
Yash Jain
Sooraj Tyagi

ABSTRACT

Virtual Assistant is a technology based on artificial intelligence. It has been developed to assist users with their basic tasks, generally provides the information using natural language. It is a personalized python speech recognition project, which recognizes the user commands, interacts with them, and completes the tasks accordingly. For instance, it greets the user according to the time and event, find location, Search Specific things on internet, opens all the system applications and folders, creates new folders and changes directories, copy and paste and so on.

It also includes a machine learning project. In this, the system is designed in such a way that for instance if the user falls asleep or moves away from the screen for a certain period, the program automatically pauses the video for the user.

AI-based voice assistants can be useful in many areas such as IT Helpdesk, home automation, HR-related tasks, voice-based search, etc, and the voice-based search will be the future of nextgeneration people where users rely heavily on voice assistants for all needs[3]. In this proposal, we create an AI-based voice assistant that can perform all these functions without interruption.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 FOUNDATION

This Project help us to completely control our desktops/laptops/arduino by using voice commands.

In today's era almost all tasks are digitalized. Today we have many smart devices in our hands and it is nothing less than having world at your finger tips. These days we aren't even using fingers.

- To makes our day to day life much easy and save our time while working on our PC we make our personal voice assistance .
- This project is also helpful to the physically challenged people who can not use there hand to type things from keyboard they use there voice to perform any task from there voice commands.
- This system is designed to be used efficiently on desktops. Personal assistant software improves user productivity by managing routine tasks of the user and by providing information from online sources to the user.

1.2 HISTORY

Although the concept of virtual assistants is new to many people, it is quite old. Development started in the early 1960s. The first to introduce elementary voice assistant was the Big Blue company, also known as IBM. IBM's Shoebox device started a long-running development competition between giant IT companies. At that time the Shoebox device was able to understand 16 words and ten digits. The shoebox was operated by speaking into a microphone, which converted voice sounds into electrical impulses and instructed an adding machine to calculate and print answers to simple arithmetic problems. Another breakthrough in the history of virtual assistants, or at that time just speech recognition software, was when Dragon launched the first speech recognition software, available to consumers for a few thousands of dollars.

The next major milestone was Microsoft's introduction of Clippy. Clippy was an intelligent user assistant implemented as a feature of Microsoft Office. Clippy took the form of a cartoon paper clip character, which offered users way more help than was needed. When Clippy first came out there was no option to turn it off and it was more of a distraction than a help. Even after users were able to turn the feature off, it did not live up to its purpose and disappeared in 2001 Near the end of the 2000s, and the start of the next decade, new virtual assistants in the shape as we know it today were introduced.

Apple introduced its Speech Interpretation and Recognition Interface known as Siri followed by Google introducing Google Now Microsoft with its Cortana and Amazon introducing Alexa and Amazon Echo just for users with Prime1 subscription. These virtual assistants were not as we know them when they were introduced, but they advanced to their actual shape by neverending evolution. This evolution started what looks to be the biggest competition of today's largest companies, such as Amazon, Apple and Google. The target is to have the best, most accurate and most powerful AI assistant in the world.

1.3 OBJECTIVE

A voice assistant or intelligent personal assistant is a software that can perform tasks or services for an individual based on verbal commands i.e. by interpreting human speech and respond via synthesized voices.

- Open any website in the browser.
- Send an email to your contacts
- Open or close any application etc with verbal commands
- Media playback via voice like volume and brightness control.
- Change desktop wallpaper
- Help to find location on google map.
- Greetings
- Current date and time
- Help in mood refresing via jokes, playing entertainments Videos .
- Help to read Daily posts and news.
- It will helps you to done most your PC works just by following your voice

1.4 SCOPE

Voice assistants will continue to offer more *individualized* experiences as they get better at differentiating between voices. However, it's not just developers that need to address the complexity of developing for voice as brands also need to understand the capabilities of each device and integration and if it makes sense for their specific brand. They will also need to focus on maintaining a user experience that is consistent within the coming years as complexity becomes more of a concern. This is because the visual interface with voice assistants is missing. Users simply cannot see or touch a voice interface.

1.5 PURPOSE

Purpose of virtual assistant is to being capable of voice interaction, music playback, making to-do lists, setting alarms, streaming podcasts, playing audiobooks, and providing weather, traffic, sports, and other real-time information, such as news. Virtual assistants enable users to speak natural language voice commands in order to operate the device and its apps.

There is an increased overall awareness and a higher level of comfort demonstrated specifically by millennial consumers. In this ever-evolving digital world where speed, efficiency, and convenience are constantly being optimized, it's clear that we are moving towards less screen interaction.

1.6 APPLICABILITY

The mass adoption of artificial intelligence in users' everyday lives is also fueling the shift towards voice. The number of IoT devices such as smart thermostats and speakers are giving voice assistants more utility in a connected user's life. Smart speakers are the number one way we are seeing voice being used. Many industry experts even predict that nearly every application will integrate voice technology in some way in the next 5 years.

The use of virtual assistants can also enhance the system of IoT (Internet of Things). Twenty years from now, Microsoft and its competitors will be offering personal digital assistants that will offer the services of a full-time employee usually reserved for the rich and famous.

CHAPTER 2

LITERATURE SURVEY

This area of digital assistants having speech reputation has visible some primary advancements or inventions. This is especially due to its call for in gadgets like smart watches or health bands, speakers, Bluetooth earphones, cellular telephones, computer or desktop, TV, and so forth.

Almost all the digital gadgets which are coming nowadays with voice assistants, which assist to control the device with speech recognition. A new set of strategies is being evolved constantly to improve the performance of voice computerized seek.

With using voice assistants, we are able to automate the project without difficulty, simply give the center to the machine within the speech shape and all the duties might be accomplished by means of it from changing your speech into textual content shape to putting off keywords from that text and execute the question to provide outcomes to the person. This has been one of the most beneficial improvements in era. Before AI we have been the ones who have been upgrading technology to do a assignment however now the gadget is itself able to counter new responsibilities and clear up it without need to involve the people to conform it.

CHAPTER 3

ANALYSIS

3.1 PROBLEM STATEMENT

We already have multiple virtual assistants. But we hardly use it. There are number of people who have issues in voice recognition. These systems can understand English phrases but they fail to recognize in our accent. Our way of pronunciation is way distinct from theirs. Also, they are easy to use on mobile devices than desktop systems. There is need of a virtual assistant that can understand English in Indian accent and work on desktop system.

When a virtual assistant is not able to answer questions accurately, it's because it lacks the proper context or doesn't understand the intent of the question. Its ability to answer questions relevantly only happens with rigorous optimization, involving both humans and machine learning. Continuously ensuring solid quality control strategies will also help manage the risk of the virtual assistant learning undesired bad behaviors. They require large amount of information to be fed in order for it to work efficiently.

Virtual assistant should be able to model complex task dependencies and use these models to recommend optimized plans for the user. It needs to be tested for finding optimum paths when a task has multiple sub-tasks and each sub-task can have its own sub-tasks. In such a case there can be multiple solutions to paths, and the it should be able to consider user preferences, other active tasks, priorities in order to recommend a particular plan.

3.2 METHODOLOGY

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. 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. pyautogui is a library that is implemented for functionalities like, capturing a screenshot. psutil is a library, and is used for functionalities like checking battery status.

CHAPTER 4

TECHNOLOGIES USED

4.1 PYTHON

Python is an 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 $1/5^{th}$ 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 Proton, libraries used are speechrecognition 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.

4.2 TTS & STT

The input voice is first converted to text by using speech recognition module. The text is then processed to result of the voice by the user. The most time ingesting a number of the STT because the gadget first has to concentrate to the user and unique users have distinctive, a few are smooth to apprehend whilst a few are not without difficulty audible. Once the speech is converted to text executing commands and giving the consequences lower back to the user isn't always a time-eating.

4.3 PYTTSX3

To convert text into speech in python the pyttsx3 module is used. This is an offline module. The module provides run and wait functionality. It is used to allow how much time the system will wait for another input of user. This is a module available in the python community for free that can be installed using the pip command.

4.4 DATETIME

The Date-Time module is imported to support the date and time. For example, the consumer wants to recognize the modern- day date and time or the person desires to time table a venture at a sure time. In brief this module helps instructions to manipulate date and time and carry out operations according to it handiest. This is a critical module, mainly in tasks in which we need to keep a track of time. This module could be very small in length and allows controlling the dimensions of our program. If the modules are too large or heavy then the system will lag and provide gradual responses.

4.5 WEBBROWSER:

Web-browser module is imported to display information from web to users. If the user wants to open browser and gives input as “Open Google”. Then input is processed using this module and the Google browser is opened. The browser which is set in code will open.

4.6 WIKIPEDIA

Wikipedia is an online library in python which it possible for the virtual assistant to process the queries on Wikipedia and display it to the users. This library needs an internet connection. The number of lines that the user wants to get as a result can be set manually.

4.7 SPEECH RECOGNITION

This is a library for performing speech recognition, with support for several engines and APIs, online and offline. It supports APIs like Google Cloud Speech API, IBM Speech to Text, Microsoft Bing Voice Recognition etc.

CHAPTER 5

SYSTEM DESIGN

5.1 ER DIAGRAM

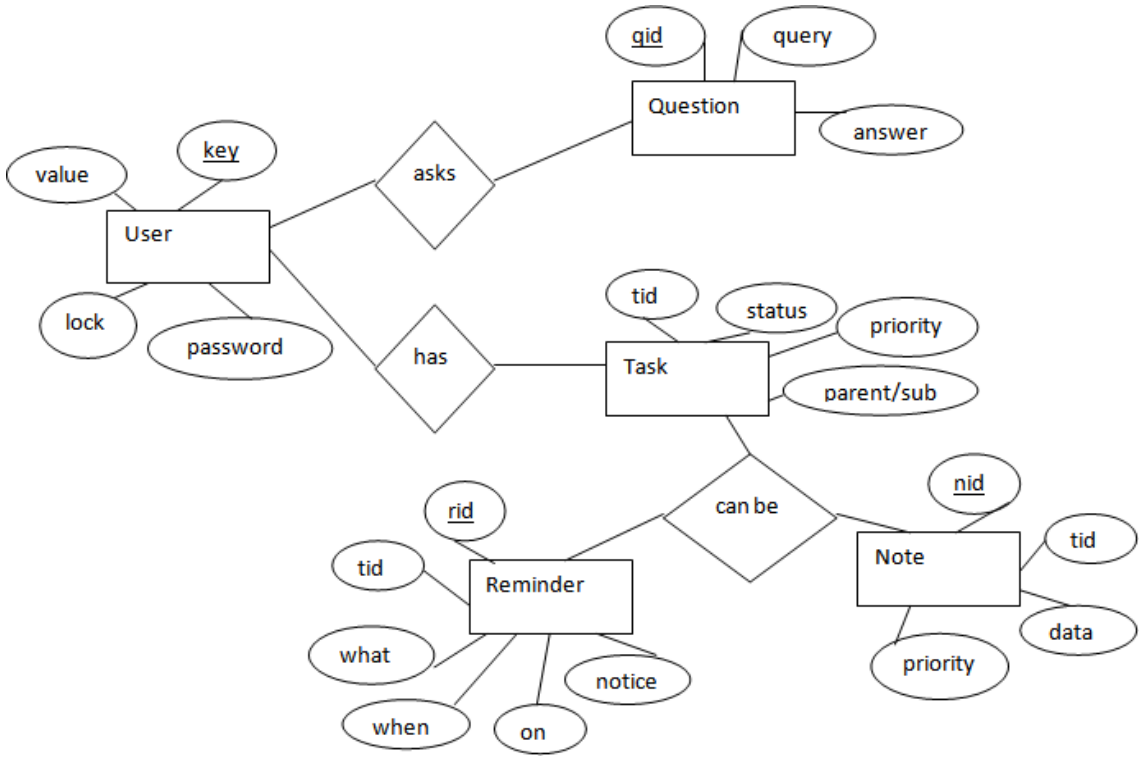

Fig. 5.1 ER Diagram of Voice Assistance

The above diagram shows entities and their relationship for a virtual assistant system. Single user can ask multiple questions. Each question will be given ID to get recognized along with the query and its corresponding answer. User can also be having n number of tasks. These should have their own unique id and status i.e. their current state

5.2 ACTIVITY DIAGRAM

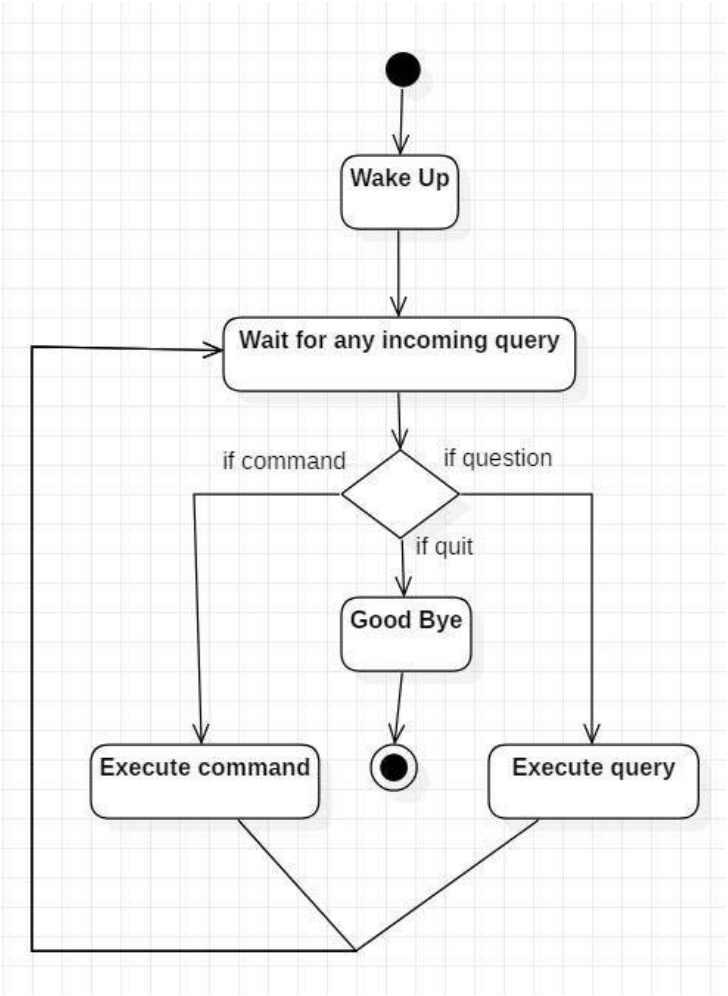

Fig. 5.2 Activity Diagram

Initially, the system is in idle mode. As it receives any wake up cal it begins execution. The received command is identified whether it is a questionnaire or a task to be performed. Specific action is taken accordingly. After the Question is being answered or the task is being performed, the system waits for another command. This loop continues unless it receives quit command. At that moment, it goes back to sleep.

5.3 CLASS DIAGRAM

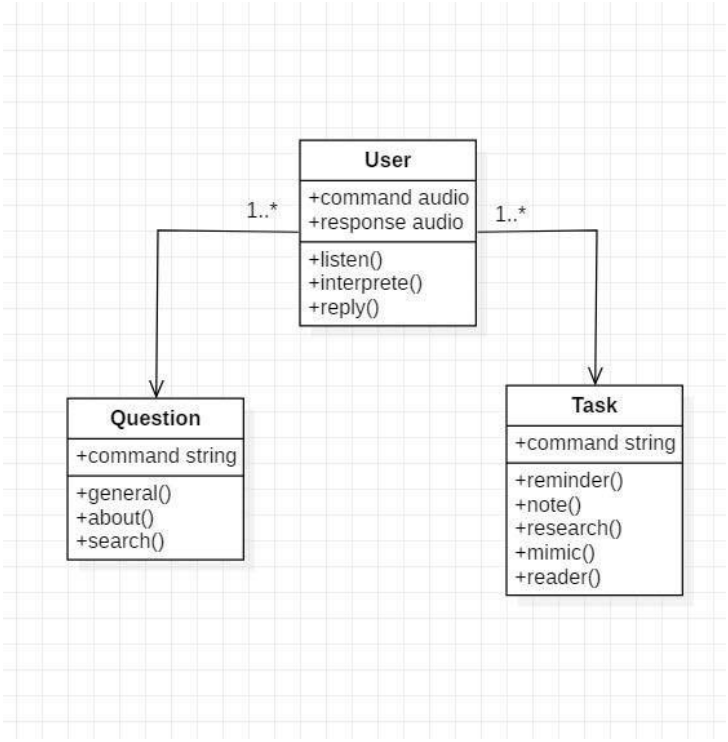

Fig. 5.3 Class Diagram

The class user has 2 attributes command that it sends in audio and the response it receives which is also audio. It performs function to listen the user command. Interpret it and then reply or sends back response accordingly. Question class has the command in string form as it is interpreted by interpret class. It sends it to general or about or search function based on its identification.

The task class also has interpreted command in string format. It has various functions like reminder, note, mimic, research and reader.

5.4 USE CASE DIAGRAM

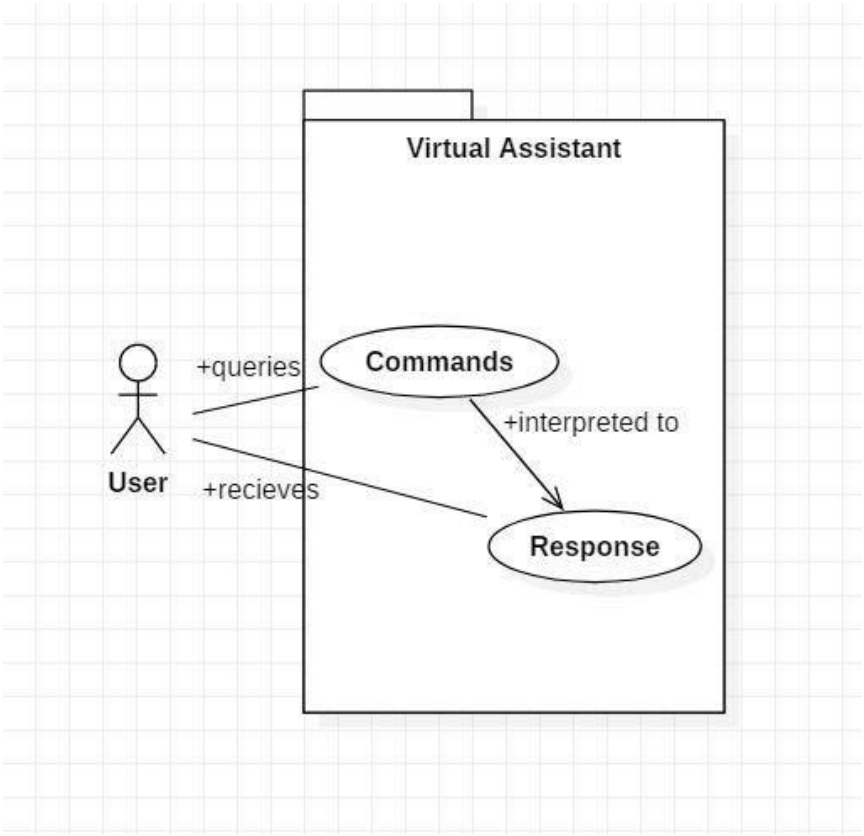

Fig. 5.4 Use Case Diagram

In this project there is only one user. The user queries command to the system. System then interprets it and fetches answer. The response is sent back to the user.

5.5 SEQUENCE DIAGRAM

Sequence diagram for Query-Response

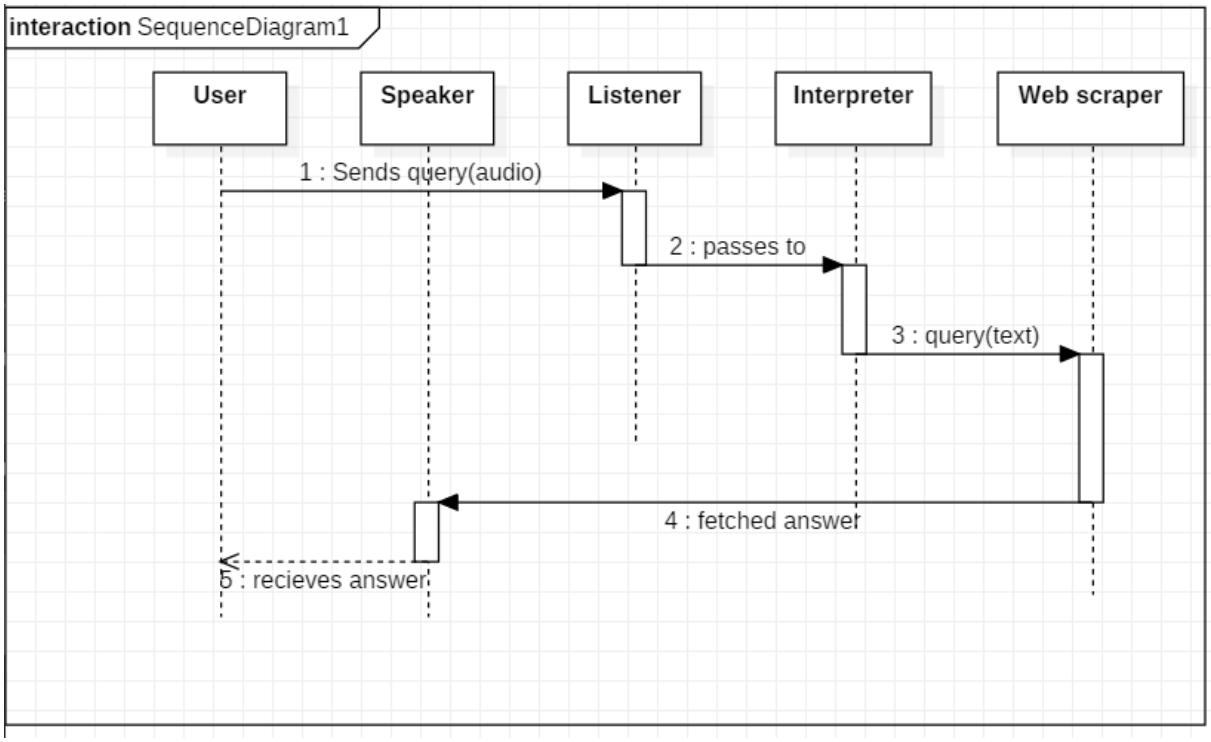

Fig. 5.5 Sequence Diagram for Query-Response

The above sequence diagram shows how an answer asked by the user is being fetched from internet. The audio query is interpreted and sent to Web scraper. The web scraper searches and finds the answer. It is then sent back to speaker, where it speaks the answer to user.

Sequence diagram for Task Execution

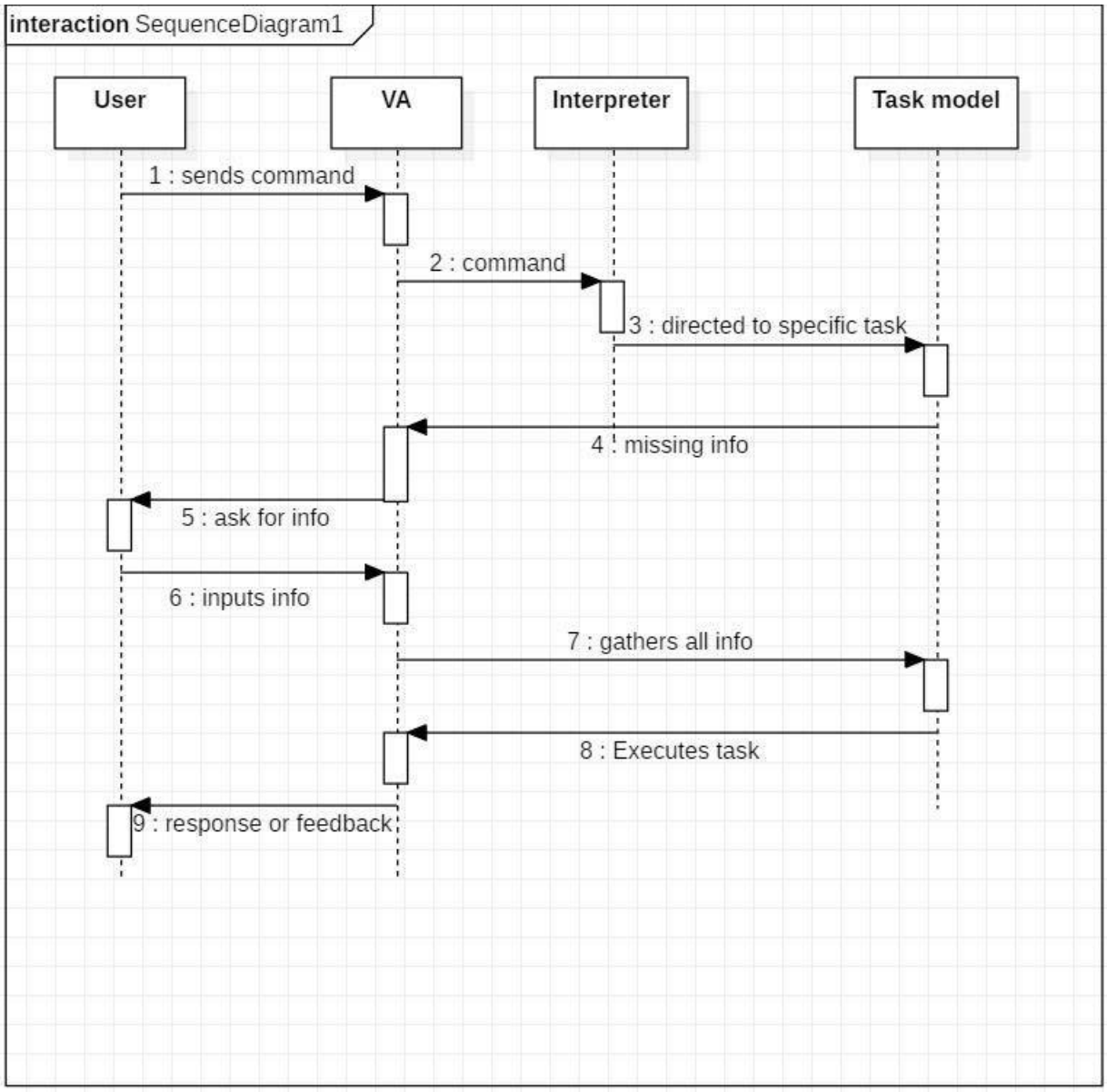

Fig. 5.6 Sequence diagram for Task Execution

The user sends command to virtual assistant in audio form. The command is passed to the interpreter. It identifies what the user has asked and directs it to task executer. If the task is missing some info, the virtual assistant asks user back about it. The received information is sent back to task and it is accomplished. After execution feedback is sent back to user.

5.6 DATA FLOW DIAGRAM

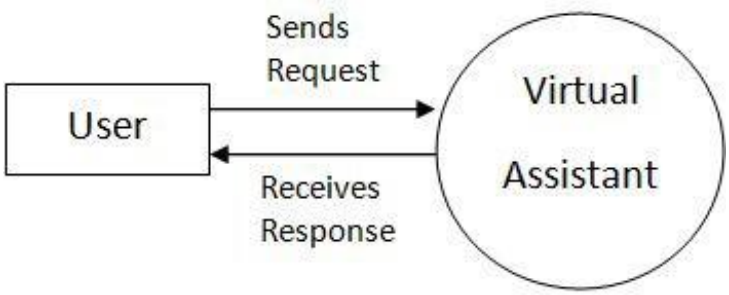

Fig. 5.7 Data Flow Diagram

5.7 COMPONENT DIAGRAM

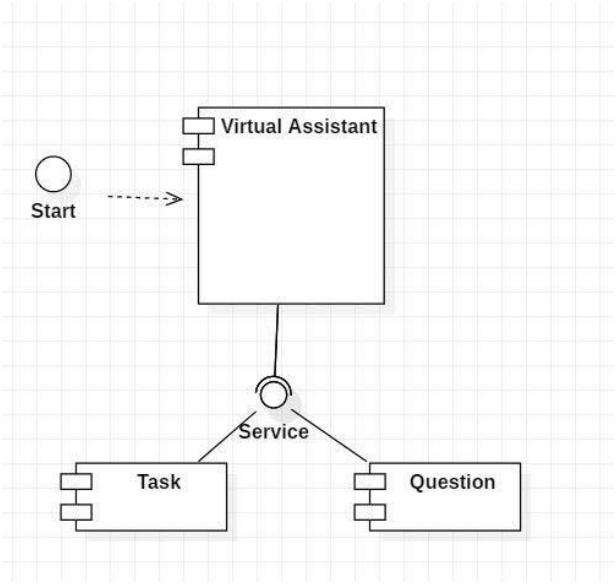

Fig. 5.8 Component Diagram

The main component here is the Virtual Assistant. It provides two specific service, executing Task or Answering your question

CHAPTER 6

REQUIREMENT AND ANALYSIS

System Analysis is about complete understanding of existing systems and finding where the existing system fails. The solution is determined to resolve issues in the proposed system. It defines the system. The system is divided into smaller parts. Their functions and inter relation of these modules are studied in system analysis. The complete analysis is followed below.

6.1 REQUIREMENT SPECIFICATION

Personal assistant software is required to act as an interface into the digital world by understanding user requests or commands and then translating into actions or recommendations based on agent's understanding of the world.

Proton focuses on relieving the user of entering text input and using voice as primary means of user input. Agent then applies voice recognition algorithms to this input and records the input. It then use this input to call one of the personal information management applications such as task list or calendar to record a new entry or to search about it on search engines like Google, Bing or Yahoo etc. Focus is on capturing the user input through voice, recognizing the input and then executing the tasks if the agent understands the task. Software takes this input in natural language, and so makes it easier for the user to input what he or she desires to be done.

Voice recognition software enables hands free use of the applications, lets users to query or command the agent through voice interface. This helps users to have access to the agent while performing other tasks and thus enhances value of the system itself. Proton also have ubiquitous connectivity through Wi-Fi or LAN connection, enabling distributed applications that can leverage other APIs exposed on the web without a need to store them locally.

Virtual assistants must provide a wide variety of services. These include:

- Providing information such as weather, facts from e.g. Wikipedia etc.
- Set an alarm or make to-do lists and shopping lists.

- Remind you of birthdays and meetings.
- Play music from streaming services such as Saavn and Gaana.
- Play videos, TV shows or movies on televisions, streaming from e.g. Netflix or Hotstar.
- Book tickets for shows, travel and movies.

6.2 HARDWARE AND SOFTWARE REQUIREMENTS

The software is designed to be light-weighted so that it doesn't be a burden on the machine running it. This system is being build keeping in mind the generally available hardware and software compatibility. Here are the minimum hardware and software requirement for virtual assistant.

Hardware:

- Pentium-pro processor or later.
- RAM 512MB or more.

Software:

- Windows 7(32-bit) or above.
- Python 2.7 or later
- Chrome Driver
- VS Code Editor

CHAPTER 7

WORKING MODEL

The assistant, on starting, will first of all await the enter to accept from person. If the person offers enter command, through voice, the assistant will seize it, and searches for the key-word gift within side the enter command. If the assistant become capable of discover a key word, then it'll carry out the project accordingly, and returns the output again to person, in voice. If not, the assistant will once more begin looking ahead to the person to provide enter. Each of those functionalities are having their personal significance within side the complete machine working.

7.1 GREETING

The assistant will watch for the person to offer voice command for in addition processing.

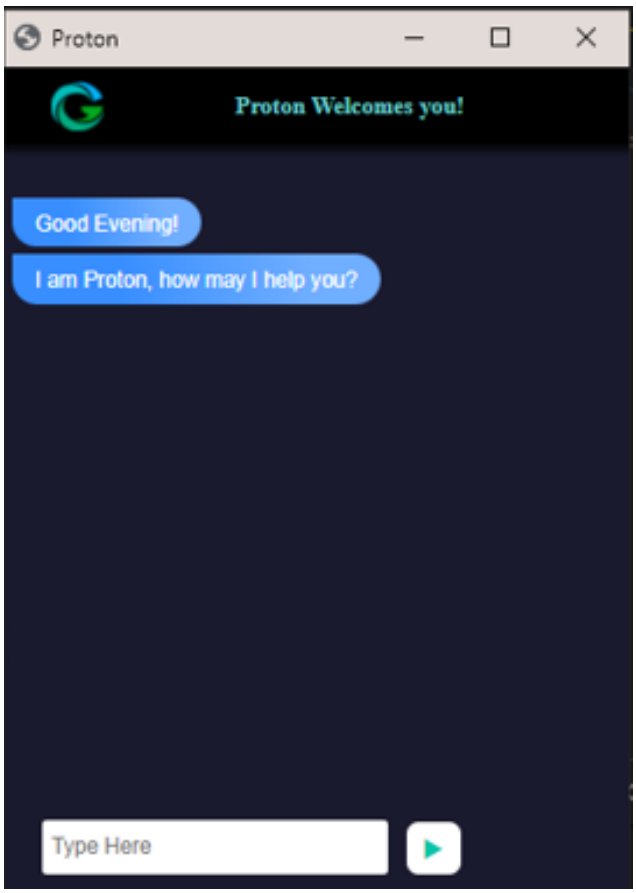

Fig. 7.1 Welcome Greeting

7.2 CURRENT DATE AND TIME

The person who's asking assistant for date and time, will show the following.

Command:

1. **Proton what is today's date / Proton date**
2. **Proton what is the time / Proton time**

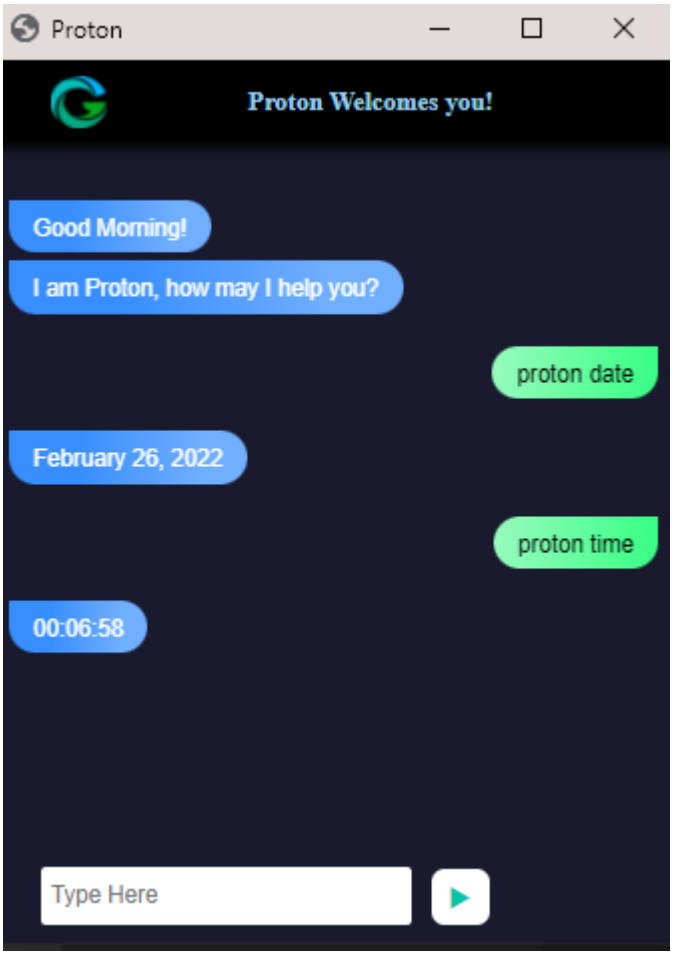

Fig. 7.2 Current Date and Time

7.3 LOCATING PLACE

If the person asks the assistant to find a place, the assistant will open the Google Map with thatlocation.

Command:

1. **Proton Find a Location**
   Will ask the user for the location to be searched.

2. **{Location_you_wish_to_find}**
   Will find the required location on Google Maps in a new Chrome tab.

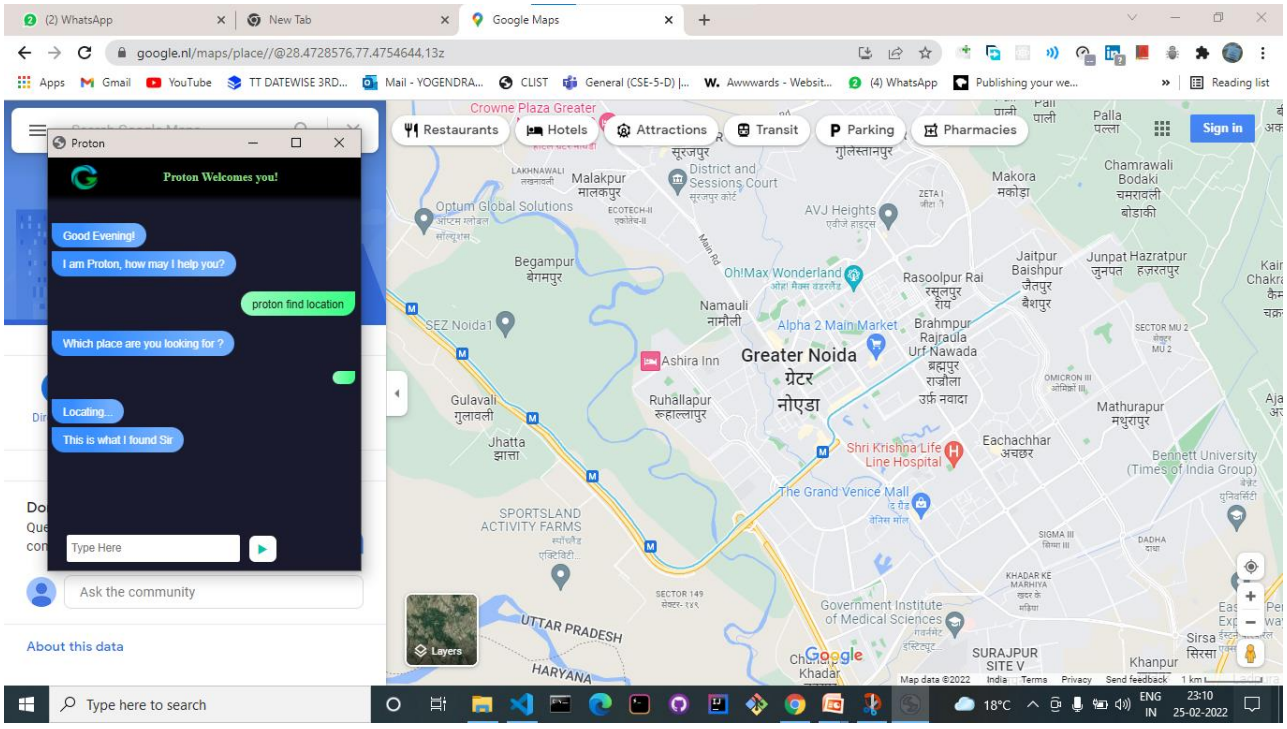

Fig. 7.3 Locating a place

7.4 WEB SEARCHING

If the consumer asks the assistant to perform a little net search, the assistant may even do that. It will ask the consumer to look for what, and it's going to open the google seek in a brand new tab of browser.

Command:

Proton search {text_you_wish_to_search}

Opens a new tab on Chrome Browser if it is running, else opens a new window. Search the given text on Google.

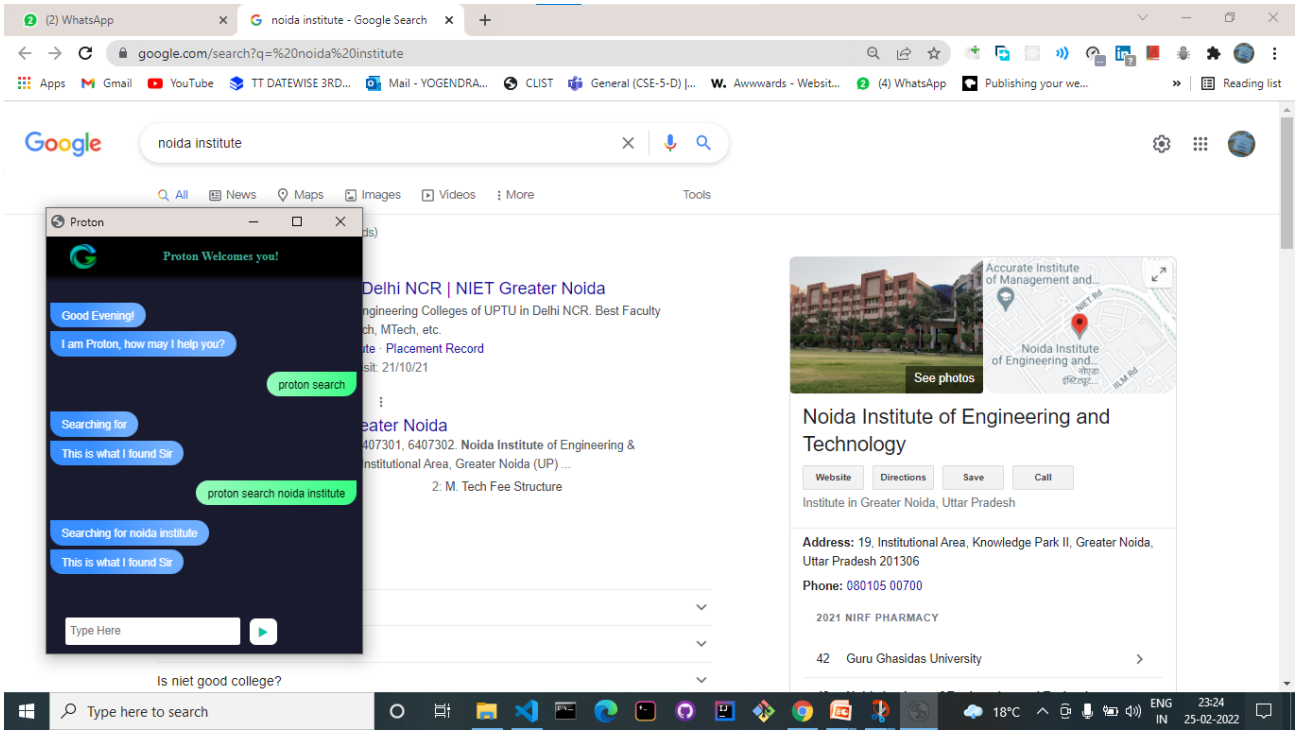

Fig. 7.4 Web Search

7.5 OPENING FILES

If the consumer asks the assistant to open an application, like C directories files , or any other, the assistant will achieve this immediately. And also, it'll communicate that it opens the application.

Command:

1. **Proton list files/Proton list**
   Will list the files and files numbers in your Current Directory (by defaultC:).

2. **Proton open {file number}**
   Opens the file / directory corresponding tospecified file number.

3. **Proton go back/Proton back**
   Change the Current Directory to Parent Directory and lists the files.

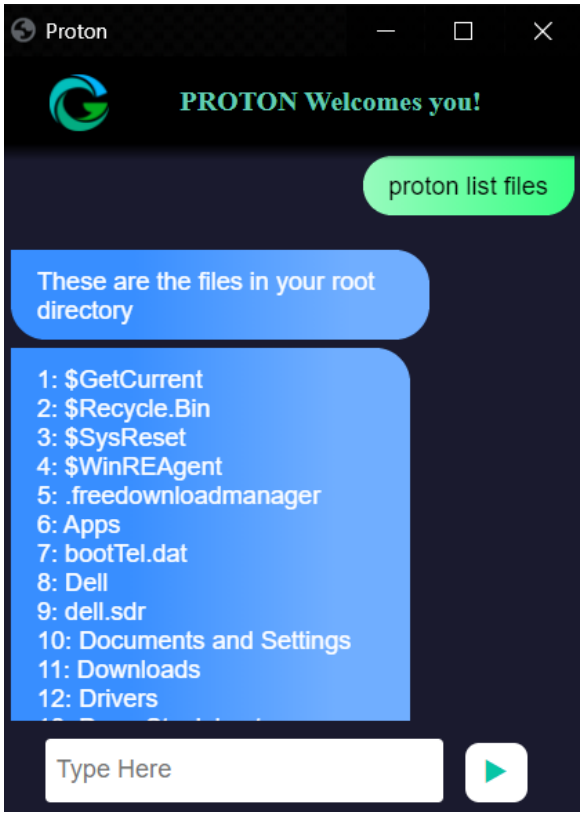

Fig. 7.5 List Files

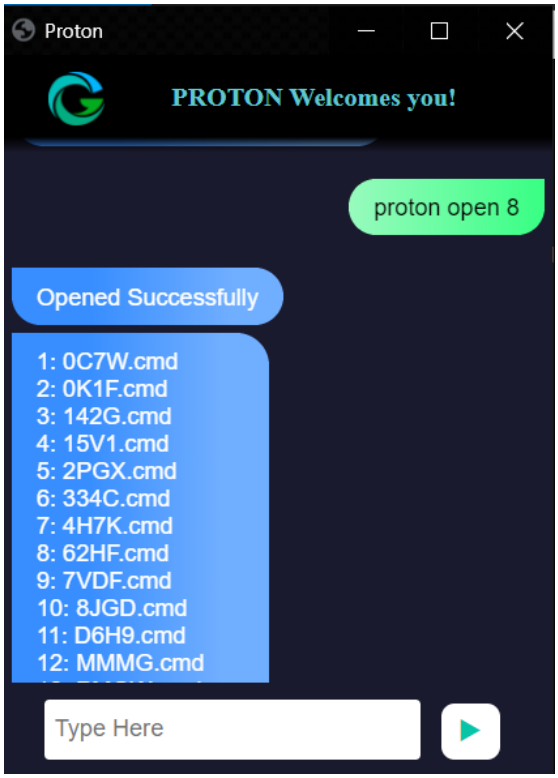

Fig. 7.6 Open File

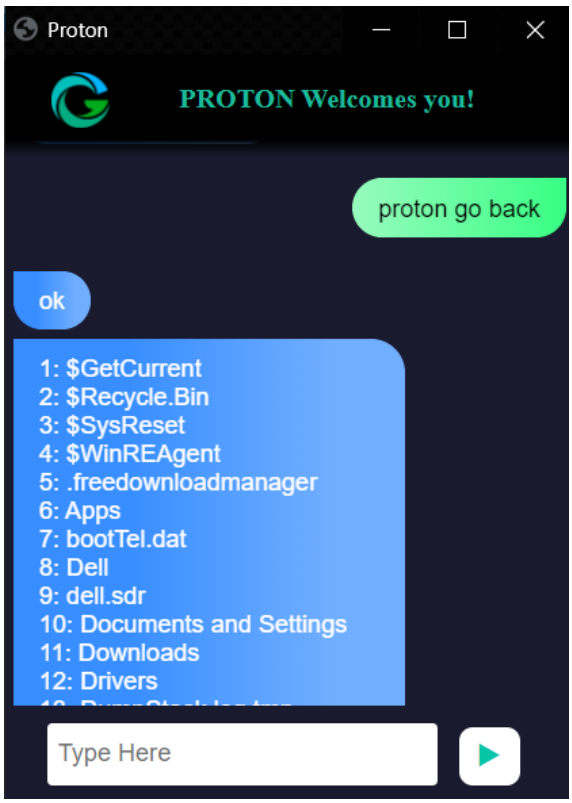

Fig. 7.7 Return Back

7.6 COPY AND PASTE

If the consumer has a to copy something in there desktop they can do this by simply passing below commands.

.**Command**:

1. **Proton Copy**

   Copy the text selected text.

2. **Proton Paste**

   Paste the selected text.

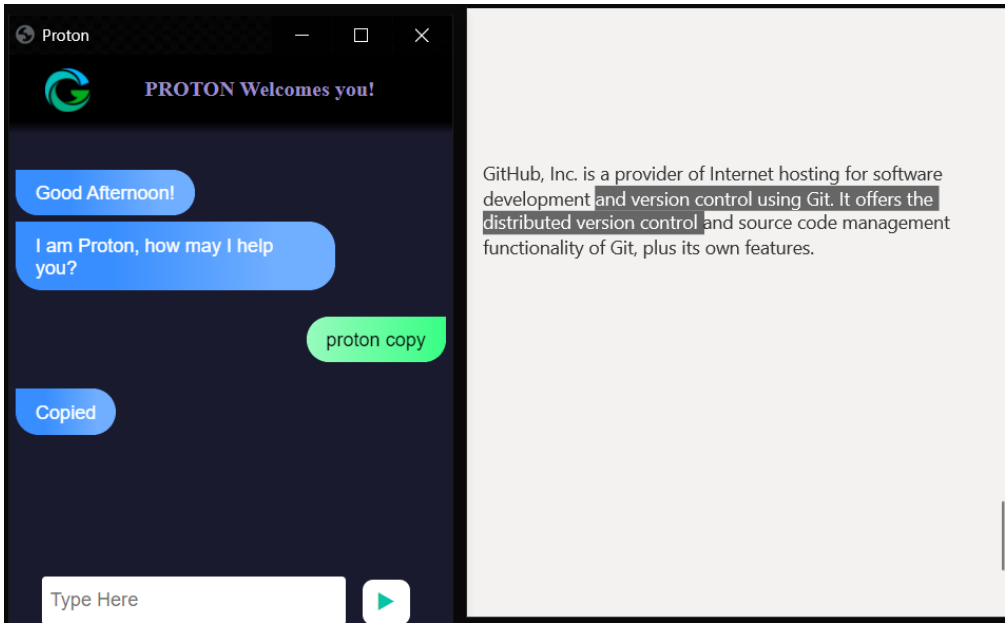

Fig. 7.8 Copy Text

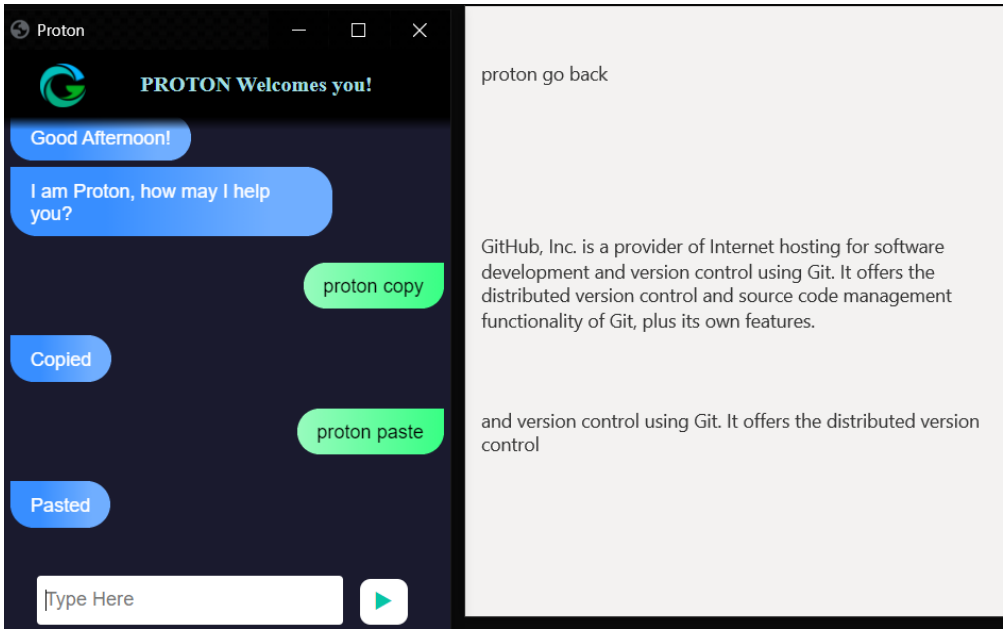

Fig. 7.9 Paste Text

7.7 SLEEP AND WAKE UP

Sleep command is used to stop proton taking commands. Wake-up command is used to wake-up the proton after going in sleep mode.

Command:

1. **Proton Bye**

   Proton taking commands.

2. **Proton wake up**

   Wakeup the proton` and proton start taking commands again.

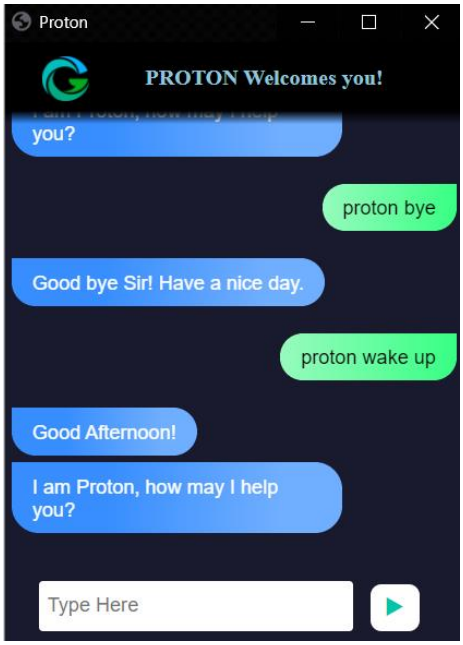

Fig. 7.10 Wake Up

7.8 EXIT

This command is used to exit proton.

Command: **Proton Exit**

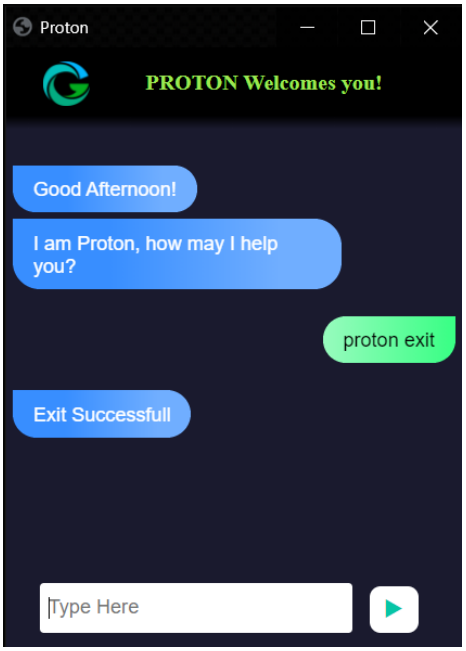

Fig. 7.11 Exit

CHAPTER 8

FEASIBILITY STUDY

Feasibility study can help you determine whether or not you should proceed with your project. It is essential to evaluate cost and benefit. It is essential to evaluate cost and benefit of the proposed system. Five types of feasibility study are taken into consideration.

1. **Technical feasibility:** It includes finding out technologies for the project, both hardware and software. For virtual assistant, user must have microphone to convey their message and a speaker to listen when system speaks. These are very cheap now a days and everyone generally possess them. Besides, system needs internet connection. While using Proton, make sure you have a steady internet connection. It is also not an issue in this era where almost every home or office has Wi-Fi.
2. **Operational feasibility:** It is the ease and simplicity of operation of proposed system. System does not require any special skill set for users to operate it. In fact, it is designed to be used by almost everyone. Kids who still don't know to write can read out problems for system and get answers.
3. **Economical feasibility:** Here, we find the total cost and benefit of the proposed system over current system. For this project, the main cost is documentation cost. User also would have to pay for microphone and speakers. Again, they are cheap and available. As far as maintenance is concerned, Proton won't cost too much.
4. **Organizational feasibility:** This shows the management and organizational structure of the project. This project is not built by a team. The management tasks are all to be carried out by a single person. That won't create any management issues and will increase the feasibility of the project.
5. **Cultural feasibility:** It deals with compatibility of the project with cultural environment. Virtual assistant is built in accordance with the general culture. The project is named proton so as to represent Indian culture without undermining local beliefs.

This project is technically feasible with no external hardware requirements. Also it is simple in operation and does not cost training or repairs. Overall feasibility study of the project reveals that the goals of the proposed system are achievable.

CHAPTER 9

REVIEW

9.1 SUMMARY

Controlled Devices uses Natural Language Processing to process the language spoken by the human and understand the query and process the query and respond to the human with the result. The understanding of the device means Artificial Intelligence needs to be integrated with the device so that the device can work in a smart way and can also control IoT applications and devices and can also respond to query which will search the web for results and process it. It is designed to minimize the human efforts and control the device with just human Voice. The device can also be designed to interact with other intelligent voice-controlled devices like IoT applications and devices, weather reports of a city from the Internet, send an email to a client, add events on the calendar, etc. The accuracy of the devices can be increased using machine learning and categorizing the queries in particular result sets and using them in further queries. The accuracy of the devices is increasing exponentially in the last decade. The devices can also be designed to accept commands in bilingual language and respond back in the same language queried by the user. The device can also be designed to help visually impaired people.

9.2 CONCLUSION

Voice Controlled Personal Assistant System will use the Natural language processing and can be integrated with artificial intelligence techniques to achieve a smart assistant that can control the computer and applications and even solve user queries using web searches.. 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.

CHAPTER 10

REFERENCES

1. C.K.Gomathy And Dr.S.Rajalakshmi.(2014),"A Business Intelligence Network Design For Service Oriented Architecture", International Journal Of Engineering Trends And Technology (IJETT) ,Volume IX, Issue III, March 2014, P.No:151-154, ISSN:2231-5381.
2. "Virtual Personal Assistant (Vpa) For Mobile Users"
3. D. Someshwar, Dharmik Bhanushali, Swati Nadkarni, "Implementation Of Virtual Assistant With Sign Language Using Deep Learning And Tensorflow"
4. C.K.Gomathy.(2010),"Cloud Computing: Business Management For Effective Service Oriented Architecture" International Journal Of Power Control Signal And Computation (IJPCSC), Volume 1, Issue IV, Oct - Dec 2010, P.No:22-27, ISSN: 0976-268X.
5. Dr.C K Gomathy, Article: A Semantic Quality Of Web Service Information Retrieval Techniques Using Bin Rank, International Journal Of Scientific Research In Computer Science Engineering And Information Technology (IJSRCSEIT) Volume 3 | Issue 1 | ISSN : 2456-3307, P.No:1563-1578, February-2018
6. Dr.C K Gomathy, Article: A Scheme Of ADHOC Communication Using Mobile Device Networks, International Journal Of Emerging Technologies And Innovative Research (JETIR) Volume 5 | Issue 11 | ISSN : 2349-5162, P.No:320-326, Nov-2018.
7. Dr.C K Gomathy, Article: Supply Chain-Impact Of Importance And Technology In Software Release Management, International Journal Of Scientific Research In Computer Science Engineering And Information Technology (IJSRCSEIT) Volume 3 | Issue 6 | ISSN : 2456-3307, P.No:1-4, July-2018
8. Hemalatha. C.Kand N. Ahmed Nisar (2011)., Explored Teachers' Commitment In Self Financing Engineering Colleges, International Journal Of Enterprise Innovation Management Studies (IJEIMS), Vol2. No2. July-Dec 2011 ISSN: 0976-2698 Retrieved From Www.Ijcns.Com
9. Dr.C K Gomathy, Article: The Efficient Automatic Water Control Level Management Using Ultrasonic Sensor, International Journal Of Computer Applications (0975 – 8887) Volume 176 – No. 39, July 2020.
10. C K Gomathy And V Geetha. Article: A Real Time Analysis Of Service Based Using Mobile Phone Controlled Vehicle Using DTMF For Accident Prevention. International Journal Of Computer Applications 138(2):11-13, March 2016. Published By Foundation Of Computer Science (FCS), NY, USA,ISSN No: 0975-8887

- **Websites referred**
    - www.stackoverflow.com
    - www.pythonprogramming.net
    - www.codecademy.com
    - www.tutorialspoint.com
    - www.google.co.in

- **Books referred**
    - Python Programming - Kiran Gurbani
    - Learning Python - Mark Lutz

- **YouTube Channels referred**
    - CS Dojo
    - edureka!

- **Documents referred**
    - Designing Personal Assistant Software for Task Management using Semantic Web Technologies and Knowledge Databases
      - Purushotham Botla
    - Python code for Artificial Intelligence: Foundations of Computational Agents
      - David L. Poole and Alan K. Mackworth