

AI DESKTOP VOICE ASSISTANT

A Project Work

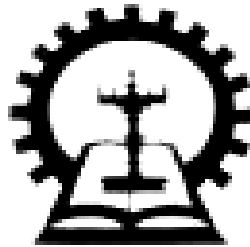
Submitted in Partial fulfillment for the award of

Graduate Degree of Bachelor of Technology (B.Tech.)

In

Computer Science & Engineering

(Session: 2022-23)



Submitted By

Under the Guidance of

Prof. Dr. Ruchi K Patel

ALANKRIT AGRAWAL(0205CS191012)

ANKIT KUMAR (0205CS191017)

ANURAG RAJAK (0205CS191022)

BOBY KUSHWAHA(0205CS191033)

HRISHABH GUPTA(0205CS191056)

Department of Computer Science & Engineering

SHRI RAM INSTITUTE OF TECHNOLOGY, JABALPUR (M.P.)

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL (M.P.)



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(Affiliated to R.G.P.V.V. - University of Technology of Madhya Pradesh)
ISO 9001 : 2000 Certified Institution

Near ITI, MADHOTAL, JABALPUR - 482 002 (M.P.)

Ph. No. : 0761 - 2640291, 94 Fax No. : 2640294 Mobile - 9300104815

CERTIFICATE

This is to certify that

ALANKRIT AGRAWAL(0205CS191012)
ANKIT KUMAR (0205CS191017)
ANURAG RAJAK (0205CS191022)
BOBY KUSHWAHA(0205CS191033)
HRISHABH GUPTA(0205CS191056)

Students of 8th Semester, Computer Science & Engineering. S.R.I.T., Jabalpur have duly completed their final Year project entitled “ **AI DESKTOP VOICE ASSISTANT** ” for the partial fulfilment of the requirement for the completion of 5th Semester examination under the requirement for the degree of Bachelor of Technology as per R.G.P.V., Bhopal.

They have successfully implemented and tested this project, which meets all the requirements specified under my guidance.

Dr. Ruchi. K. Patel
(Project Guide)
Computer Sc &
Engg Deptt, SRIT

Mr. Brajesh Patel.
(H.O.D.)
Computer Sc. &
Engg Deptt., SRIT

Dr. Shailesh Gupta
(Principal)
SRIT, Jabalpur



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(INTERNAL EXAMINER)

(EXTERNAL EXAMINER)

Date:

Date:



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ACKNOWLEDGEMENT

First of all, We thank the *GOD* who is constantly showering his blessing and love on us. As one self can accomplish nothing, this project is also not an exception. I would like to have some space to acknowledge some of them that frequently fade in to the background during the course of our project work; We got help, advices, suggestions and co-operation from many people. Some influenced us, some inspired us, and some helped us in completing our project work.

It is our great privilege; pride and honour in expressing our deepest sense of gratitude to my esteemed inspiring, mentor Prof. Dr. Ruchi K. Patel in presenting this project is entitled “AI DESKTOP VOICE ASSISTANT”, his constant inspiration, memorable guidance, innovative ideas, at various stages and above all her untiring valuable support has brought out this project to an exquisite workmanship and great success.

We express my profound and sincere gratitude to Mr. R. Karsoliya (Chairman) Shri Ram Institute of Technology, Jabalpur (M.P.), affiliated to Rajiv Gandhi Technical University, Bhopal, (M.P.) for providing facilities needed in connection with our project work.

We express our gratitude to Dr. Shailesh Gupta Principal, Mr. Brajesh Patel (HOD CSE), Mr. Deepak S. Rajpoot (A.P), Dr. Ruchi K. Patel (A.P.), Mr. Sandeep Rao for their support and help we received from him throughout this project work and encouragement to carry out this project.

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Ph. No. : 0761 - 2640291, 94 Fax No. : 2640294 Mobile - 9300104815

DECLARATION

I hereby declare that the project work entitled “**AI DESKTOP VOICE ASSISTANT**” submitted to the SRIT Jabalpur, is a record of an original work done by me under the guidance of Prof . Dr. Ruchi k. Patel Dept of Computer Science & Engineering , SRIT , and this project work is submitted in the partial fulfilment of the requirements for the award of the degree of Master of Technology in Computer Science& Engineering. The results embodied in this thesis have not been submitted to any other University or Institute for the award of any degree.

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HRISHABH GUPTA(0205CS191056)



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PREFACE

This is a project report on “**AI DESKTOP VOICE ASSISTANT**”. We know Python is an emerging language so it becomes easy to write a script for Voice Assistant in Python. The instructions for the assistant can be handled as per the requirement of user. Speech recognition is the Alexa, Siri, etc. In Python there is an API called Speech Recognition which allows us to convert speech into text. It was an interesting task to make my own assistant. It became easier to send emails without typing any word, Searching, on Google without opening the browser, and performing many other daily tasks like playing music, opening your favorite IDE with the help of a single voice command. In the current scenario, advancement in technologies are such that they can perform any task with same effectiveness or can say more effectively than us. By making this project, I realized that the concept of AI in every field is decreasing human effort and saving time.

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1. INTRODUCTION

Artificial Intelligence when used with machines, it shows us the capability of thinking like humans. In this, a computer system is designed in such a way that typically requires interaction from human. As we know Python is an emerging language so it becomes easy to write a script for Voice Assistant in Python. The instructions for the assistant can be handled as per the requirement of user. Speech recognition is the Alexa, Siri, etc. In Python there is an API called Speech Recognition which allows us to convert speech into text. It was an interesting task to make my own assistant. It became easier to send emails without typing any word, Searching on Google without opening the browser, and performing many other daily tasks like playing music, opening your favorite IDE with the help of a single voice command. In the current scenario, advancement in technologies are such that they can perform any task with same effectiveness or can say more effectively than us. By making this project, I realized that the concept of AI in every field is decreasing human effort and saving time.

As the voice assistant is using Artificial Intelligence hence the result that it is providing are highly accurate and efficient. The assistant can help to reduce human effort and consumes time while performing any task, they removed the concept of typing completely and behave as another individual to whom we are talking and asking to perform task. The assistant is no less than a human assistant but we can say that this is more effective and efficient to perform any task. The libraries and packages used to make this assistant focuses on the time complexities and reduces time. The functionalities include , It can send emails, It can read PDF, It can send text on WhatsApp, It can open command prompt, your favorite IDE, notepad etc., It can play music, It can do Wikipedia searches for you, It can open websites like Google, YouTube, etc., in a web browser, It can give weather forecast, It can give desktop reminders of your choice. It can have some basic conversation. Tools and technologies used are PyCharm IDE for making this project, and I created all py files in PyCharm. Along with this I used following modules and libraries in my project. pyttsx3, SpeechRecognition, Datetime, Wikipedia, Smtplib, pywhatkit, pyjokes, pyPDF2, pyautogui, PyQt etc. I have created a live GUI for interacting with the JARVIS as it gives a design and interesting look while having the conversation.

2. ANALYSIS

i. Objective of Project

Main objective of building personal assistant software (a virtual assistant) is using semantic data sources available on the web, user generated content and providing knowledge from knowledge databases. The main purpose of an intelligent virtual assistant is to answer questions that users may have. This may be done in a business environment, for example, on the business website, with a chat interface. On the mobile platform, the intelligent virtual assistant is available as a call-button operated service where a voice asks the user “What can I do for you?” and then responds to verbal input.

Virtual assistants can tremendously save you time. We spend hours in online research and then making the report in our terms of understanding. JIA can do that for you. Provide a topic for research and continue with your tasks while JIA does the research. Another difficult task is to remember test dates, birthdates or anniversaries. It comes with a surprise when you enter the class and realize it is class test today. Just tell JIA in advance about your tests and she reminds you well in advance so you can prepare for the test.

One of the main advantages of voice searches is their rapidity. In fact, voice is reputed to be four times faster than a written search: whereas we can write about 40 words per minute, we are capable of speaking around 150 during the same period of time¹⁵. In this respect, the ability of personal assistants to accurately recognize spoken words is a prerequisite for them to be adopted by consumers.

ii. Requirement Gathering

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 AI desktop voice assistant.

iii. Hardware Requirement Specification

Intel Pentium dual core processor or above.

LPDDR3 4GB RAM or above LPDDR4/R5.

100GB Hard Disk or above .

Mic (should be must) if u are using voice command .

iv. Software Requirement Specification

Operating System : Windows (32 – bit,64-bit) 7,8,9,10,11.

Python interpreter latest version .

Pycharm, vs code etc.(select on your choice)

V. Feasible 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.

- **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 JIA, 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.
- **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.
- **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, JIA won't cost too much.
- **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.

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. Decision is taken to proceed with the project.

Vi. Software Model

Agile Model

The meaning of Agile is swift or versatile. "**Agile process model**" refers to a software development approach based on iterative development. Agile methods break tasks into smaller iterations, or parts do not directly involve long term planning. The project scope and requirements are laid down at the beginning of the development process. Plans regarding the number of iterations, the duration and the scope of each iteration are clearly defined in advance.

Each iteration is considered as a short time "frame" in the Agile process model, which typically lasts from one to four weeks. The division of the entire project into smaller parts helps to minimize the project risk and to reduce the overall project delivery time requirements. Each iteration involves a team working through a full software development life cycle including planning, requirements analysis, design, coding, and testing before a working product is demonstrated to the client.

Phases of Agile Model:

Following are the phases in the Agile model are as follows

- Requirements gathering
- Design the requirements
- Construction/ iteration
- Testing/ Quality assurance
- Deployment
- Feedback

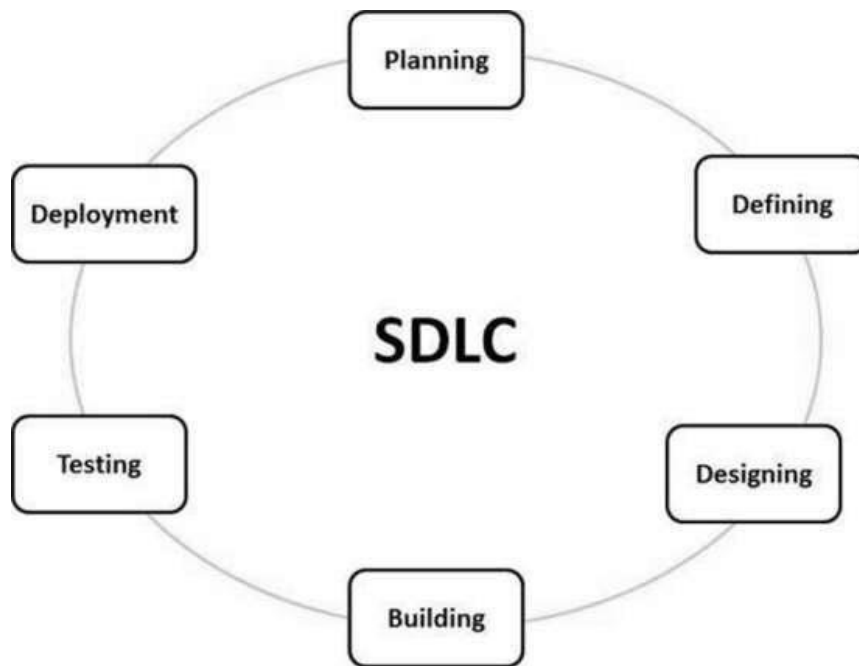


Fig. Agile Model

Vii. Software Development Life Cycle

SDLC is a process followed for a software project, within a software organization. It consists of a detailed plan describing how to develop, maintain, replace and alter or enhance specific software. The life cycle defines a methodology for improving the quality of software and the overall development process.

The following figure is a graphical representation of the various stages of a typical SDLC.



A typical Software Development Life Cycle consists of the following stages –

Stage 1: Planning and Requirement Analysis

Requirement analysis is the most important and fundamental stage in SDLC. It is performed by the senior members of the team with inputs from the customer, the sales department, market surveys and domain experts in the industry. This information is then used to plan the basic project approach and to conduct product feasibility study in the economical, operational and technical areas.

Planning for the quality assurance requirements and identification of the risks associated with the project is also done in the planning stage. The outcome of the technical feasibility study is to define the various technical approaches that can be followed to implement the project successfully with minimum risks.

Stage 2: Defining Requirements

Once the requirement analysis is done the next step is to clearly define and document the product requirements and get them approved from the customer or the market analysts. This is done through an **SRS (Software Requirement Specification)** document which consists of all the product requirements to be designed and developed during the project life cycle.

Stage 3: Designing the Product Architecture

SRS is the reference for product architects to come out with the best architecture for the product to be developed. Based on the requirements specified in SRS, usually more than one design approach for the product architecture is proposed and documented in a DDS - Design Document Specification.

This DDS is reviewed by all the important stakeholders and based on various parameters as risk assessment, product robustness, design modularity, budget and time constraints, the best design approach is selected for the product.

A design approach clearly defines all the architectural modules of the product along with its communication and data flow representation with the external and third party modules (if any). The internal design of all the modules of the proposed architecture should be clearly defined with the minutest of the details in DDS.

Stage 4: Building or Developing the Product

In this stage of SDLC the actual development starts and the product is built. The programming code is generated as per DDS during this stage. If the design is performed in a detailed and organized manner, code generation can be accomplished without much hassle.

Developers must follow the coding guidelines defined by their organization and programming tools like compilers, interpreters, debuggers, etc. are used to generate the code. Different high level programming languages such as C, C++, Pascal, Java and PHP are used for coding. The programming language is chosen with respect to the type of software being developed.

Stage 5: Testing the Product

This stage is usually a subset of all the stages as in the modern SDLC models, the testing activities are mostly involved in all the stages of SDLC. However, this stage refers to the testing only stage of the product where product defects are reported, tracked, fixed and retested, until the product reaches the quality standards defined in the SRS.

Stage 6: Deployment in the Market and Maintenance

Once the product is tested and ready to be deployed it is released formally in the appropriate market. Sometimes product deployment happens in stages as per the business strategy of that organization. The product may first be released in a limited segment and tested in the real business environment (UAT- User acceptance testing).

Then based on the feedback, the product may be released as it is or with suggested enhancements in the targeting market segment. After the product is released in the market, its maintenance is done for the existing customer base.

Viii. Cost Estimation

Software cost comprises a small percentage of overall computer based system cost. There are a number of factors, which are considered , that can affect the ultimate cost of the software such as –human, technical, hardware and software availability etc.

The main point that was considered during the cost estimation of project was its sizing. In spite of the complete software sizing , function point and approximate lines of code were also used to “size” each element of the Software and their costing.

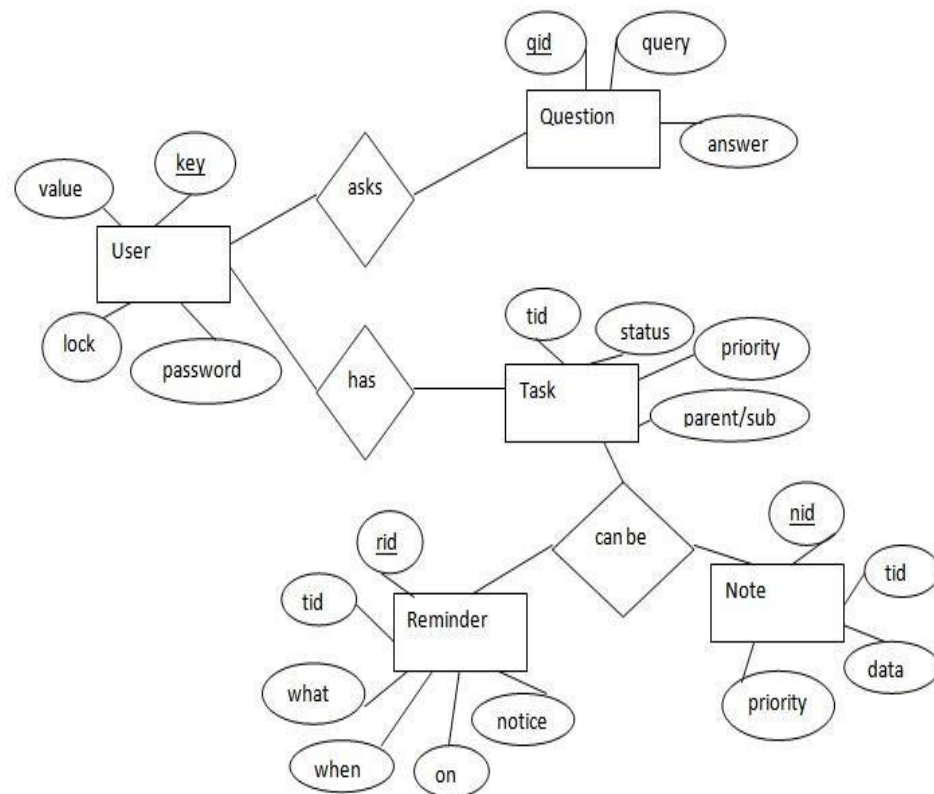
The cost estimation done by me for Project also depend upon the baseline metrics collected from past projects and these were used in conjunction with estimation variables to develop cost and effort projections.

We have basically estimated this project mainly of two bases-

- 1) Effort Estimation – This refer to the total man hours required for the development of the project. It even includes the time required for doing documentation and user manual.
- 2) Hardware Required Estimation – This includes the cost of the PCs and the Hardware cost required for development of this project.

1. DESIGN

i. ER Diagram



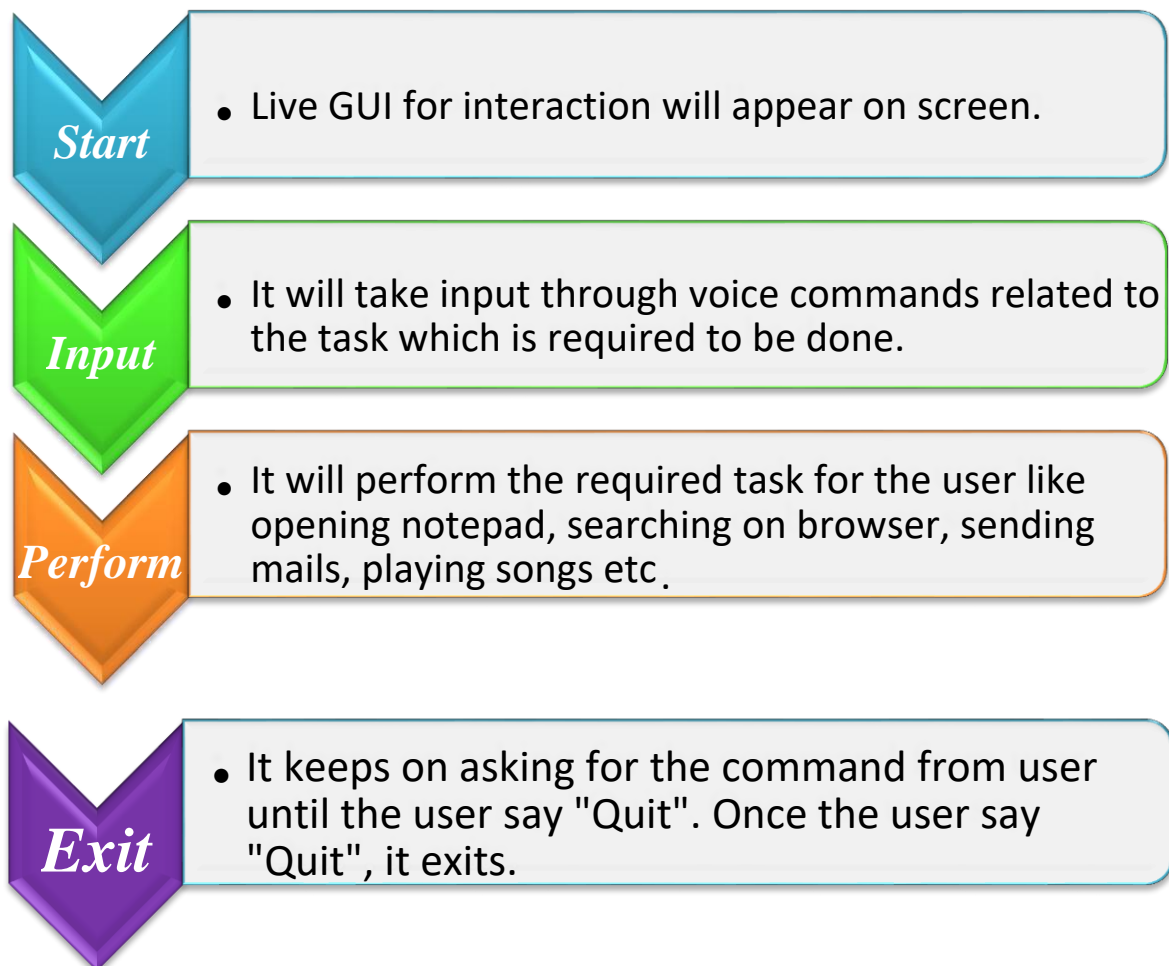
The above diagram shows entities and their relationship for a virtual assistant system. We have a user of a system who can have their keys and values. It can be used to store any information about the user. Say, for key “name” value can be “Jim”. For some keys user might like to keep secure. There he can enable lock and set a password (voice clip).

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. A task should also have a priority value and its category whether it is a parent task or child task of an older task.

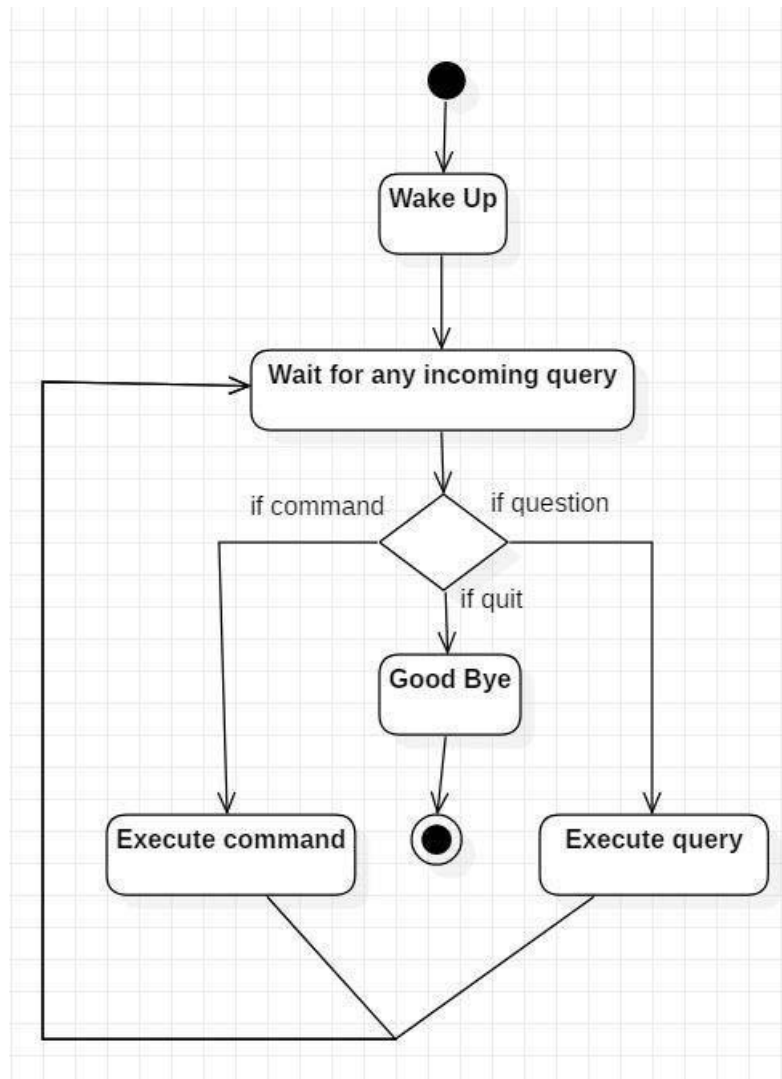
ii. Data Flow Diagram / Object Diagram

A data flow diagram show the logical flow of the system For a system it describes the input(source), output (destination), database (data stores) and procedures (data flows)all in a format that meets the user's requirement . When analysis prepares the logical system design, they specify the user needs at a level of details that virtually determines the information flow into an out of the system and the required data resources. The logical design also specifies input forms and screen layouts.

The activities following logical design are the procedure followed in the physical design e.g. producing programs, software, file and a working system. Design specifications instruct the user about what the system should do.



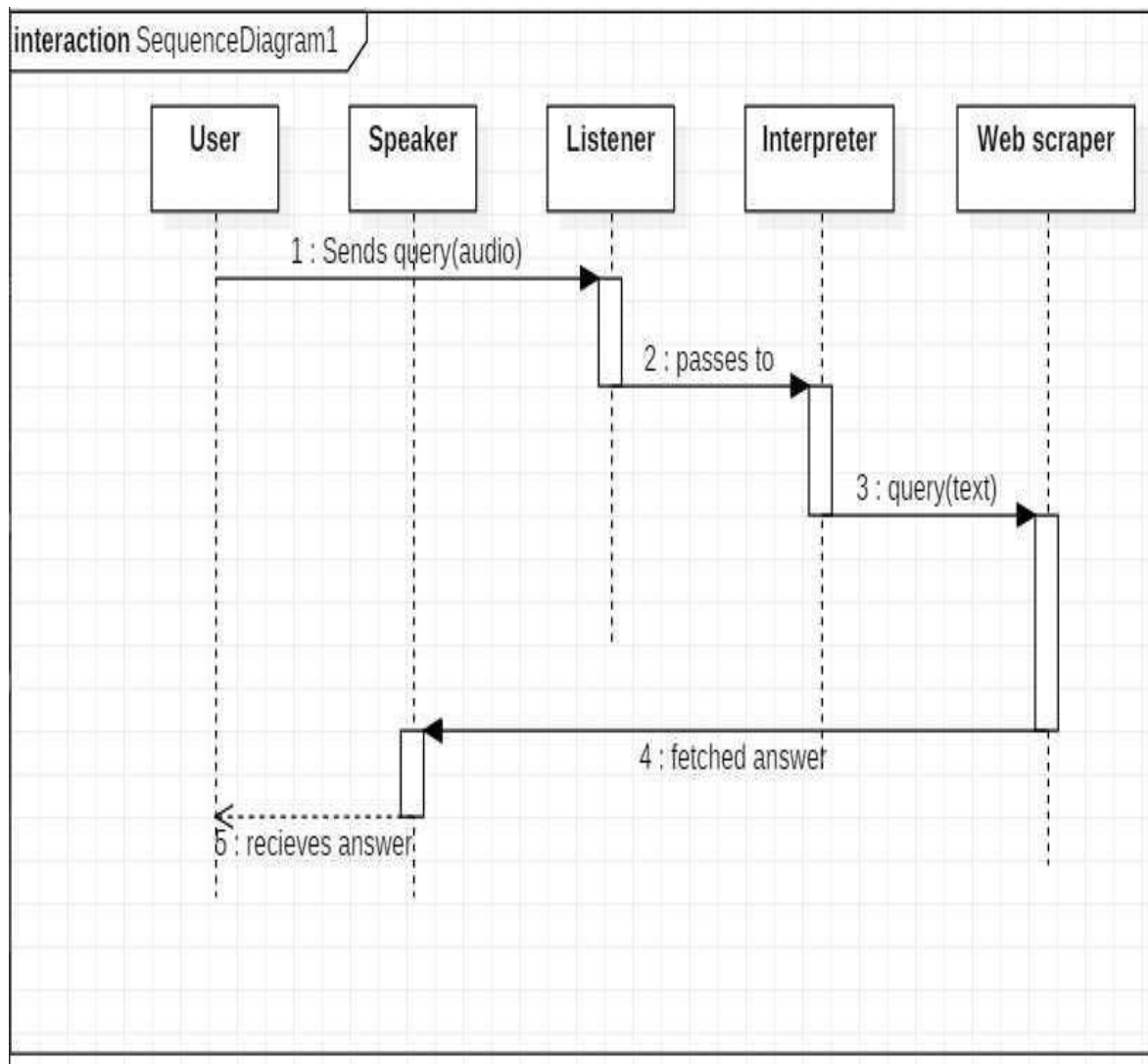
iii. Activity Diagram



Initially, the system is in idle mode. As it receives any wake up call 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.

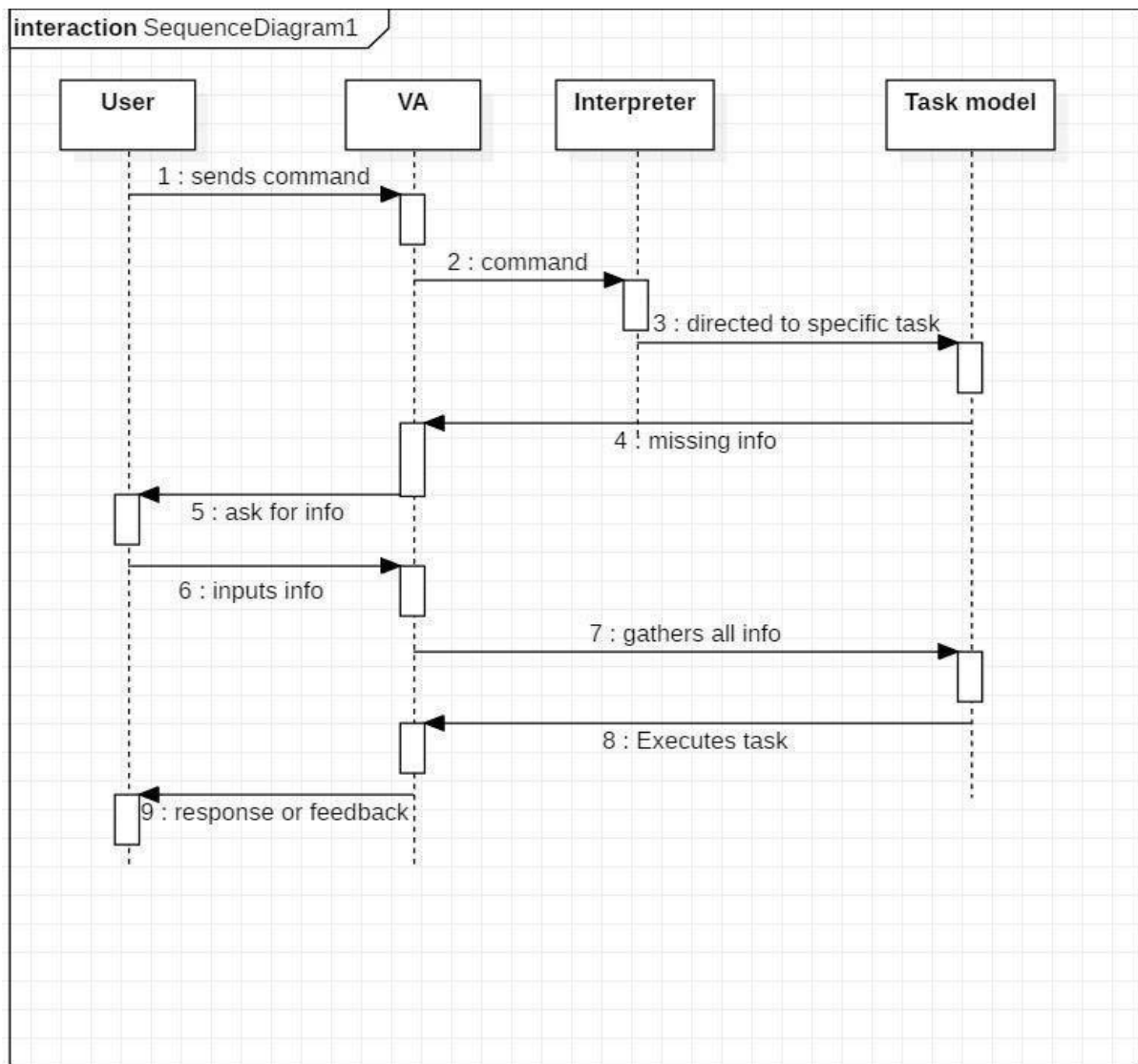
iv. Sequence Diagram

Sequence diagram for Query-Response-



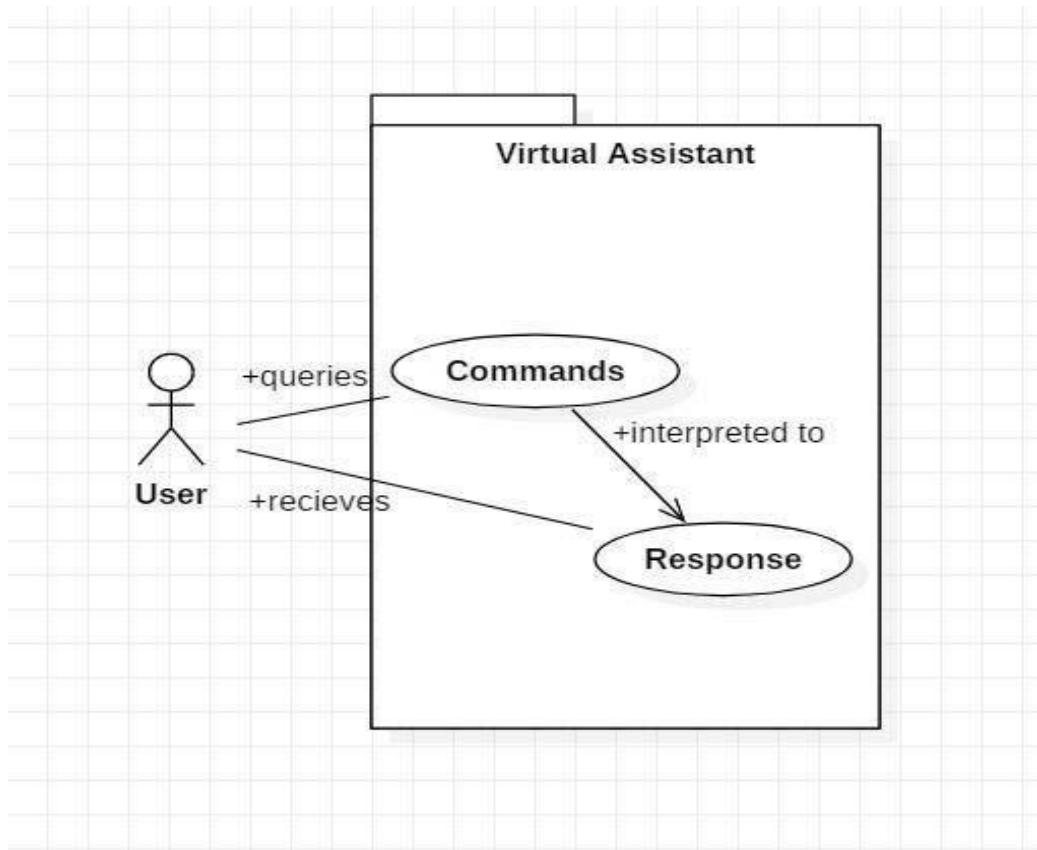
The above sequence diagram shows how an answer asked by the user is being fetched from internet. The audio query is interpreted and sent to Web scraper. The web scraper searches and finds the answer. It is then sent back to speaker, where it speaks the answer to user.

Sequence diagram for Task Execution -



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.

v. Use Case Diagram



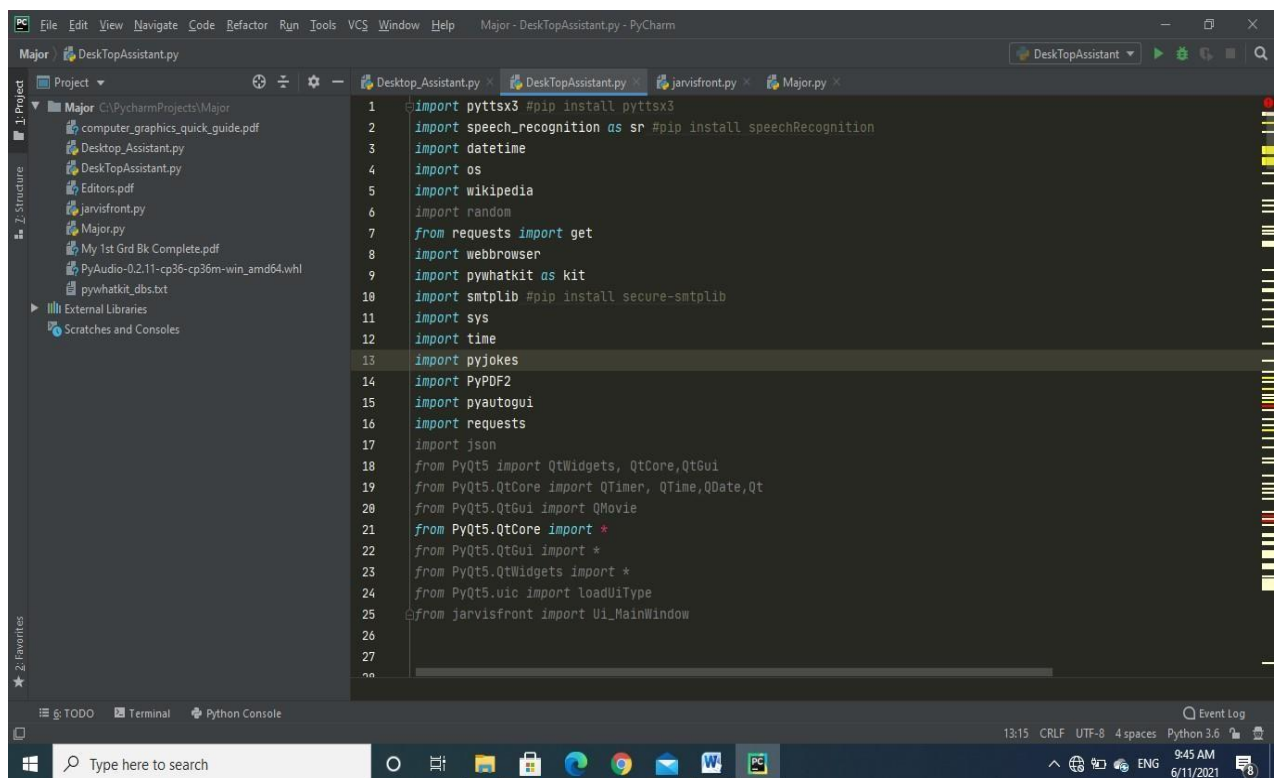
In this project there is only one user. The user queries command to the system. System then interprets it and fetches answer. The response is sent back to the user.

5 TECHNOLOGIES AND TOOLS USED

The IDE used in this project is PyCharm. All the python files were created in PyCharm and all the necessary packages were easily installable in this IDE. For this project following modules and libraries were used i.e. pyttsx3, SpeechRecognition, Datetime, Wikipedia, Smtplib, pywhatkit, pyjokes, pyPDF2, pyautogui, PyQt etc. I have created a live GUI for interacting with the JARVIS as it gives a design and interesting look while having the conversation.

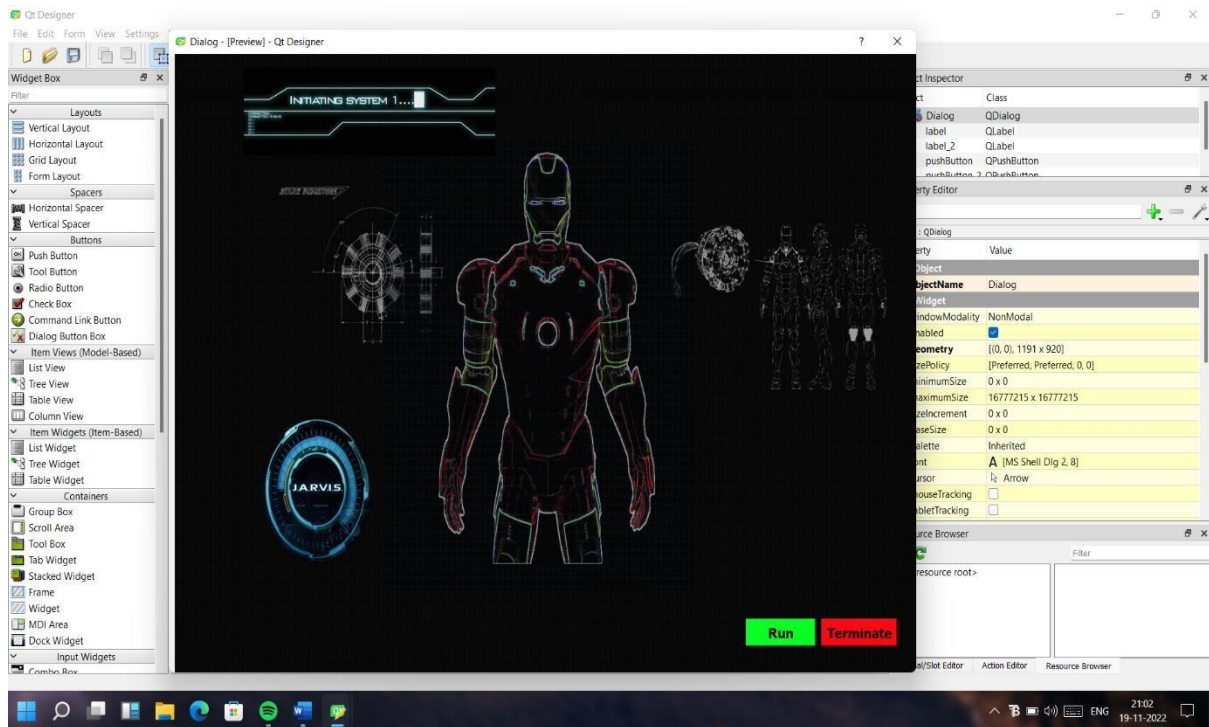
PYCHARM

It is an IDE i.e. Integrated Development Environment which has many features like it supports scientific tools(like matplotlib, numpy, scipy etc) web frameworks (example Django,web2py and Flask) refactoring in Python, integrated python debugger, code completion, code and project navigation etc. It also provides Data Science when used with Anaconda.



PYQT5 FOR LIVE GUI

PyQt5 is the most important python binding. It contains set of GUI widgets. PyQt5 has some important python modules like QTWidgets, QtCore, QtGui, and QtDesigner etc.



PYTHON LIBRARIES

- **pyttsx3:** It is a python library which converts text to speech.
- **SpeechRecognition:** It is a python module which converts speech to text.
- **pywhatkit:** It is python library to send WhatsApp message at a particular time with some additional features.
- **Datetime:** This library provides us the actual date and time.
- **Wikipedia:** It is a python module for searching anything on Wikipedia.
- **Smtplib:** Simple mail transfer protocol that allows us to send mails and to route mails between mail servers.
- **pyPDF2:** It is a python module which can read, split, merge any PDF.
- **Pyjokes:** It is a python libraries which contains lots of interesting jokes in it.
- **Webbrowser:** It provides interface for displaying web-based documents to users.
- **Pyautogui:** It is a python libraries for graphical user interface.
- **os:** It represents Operating System related functionality.
- **sys:** It allows operating on the interpreter as it provides access to the variables and functions that usually interact strongly with the interpreter.

```

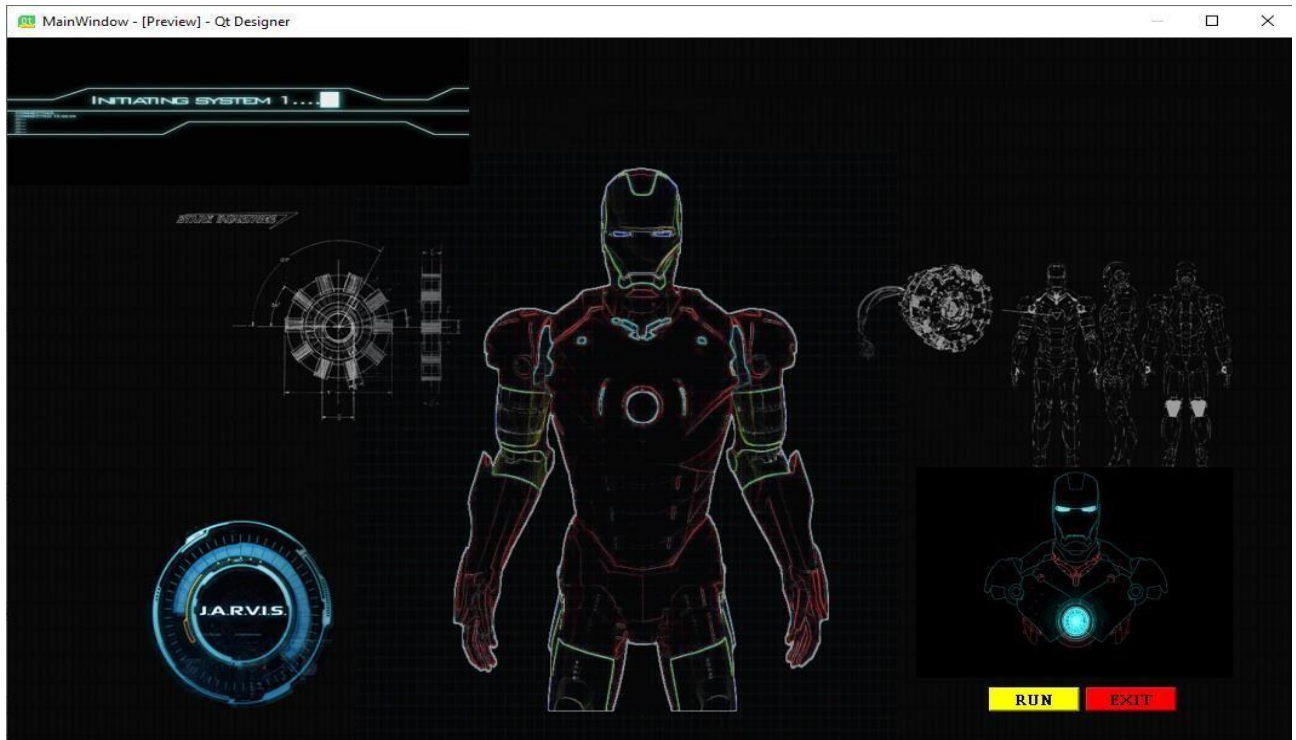
1 import pyttsx3 #pip install pyttsx3
2 import speech_recognition as sr #pip install speechRecognition
3 import datetime
4 import os
5 import wikipedia
6 import random
7 from requests import get
8 import webbrowser
9 import pywhatkit as kit
10 import smtplib #pip install secure-smtplib
11 import sys
12 import time
13 import pyjokes
14 import PyPDF2
15 import pyautogui
16 import requests
17 import json
18 from PyQt5 import QtWidgets, QtCore, QtGui
19 from PyQt5.QtCore import QTimer, QTime, QDate, Qt
20 from PyQt5.QtGui import QMovie
21 from PyQt5.QtCore import *
22 from PyQt5.QtGui import *
23 from PyQt5.QtWidgets import *
24 from PyQt5.uic import loadUiType
25 from jarvisfront import Ui_MainWindow

```

Imported Modules

6 IMPLEMENTATION & RESULT

i. Screen shot of your projects

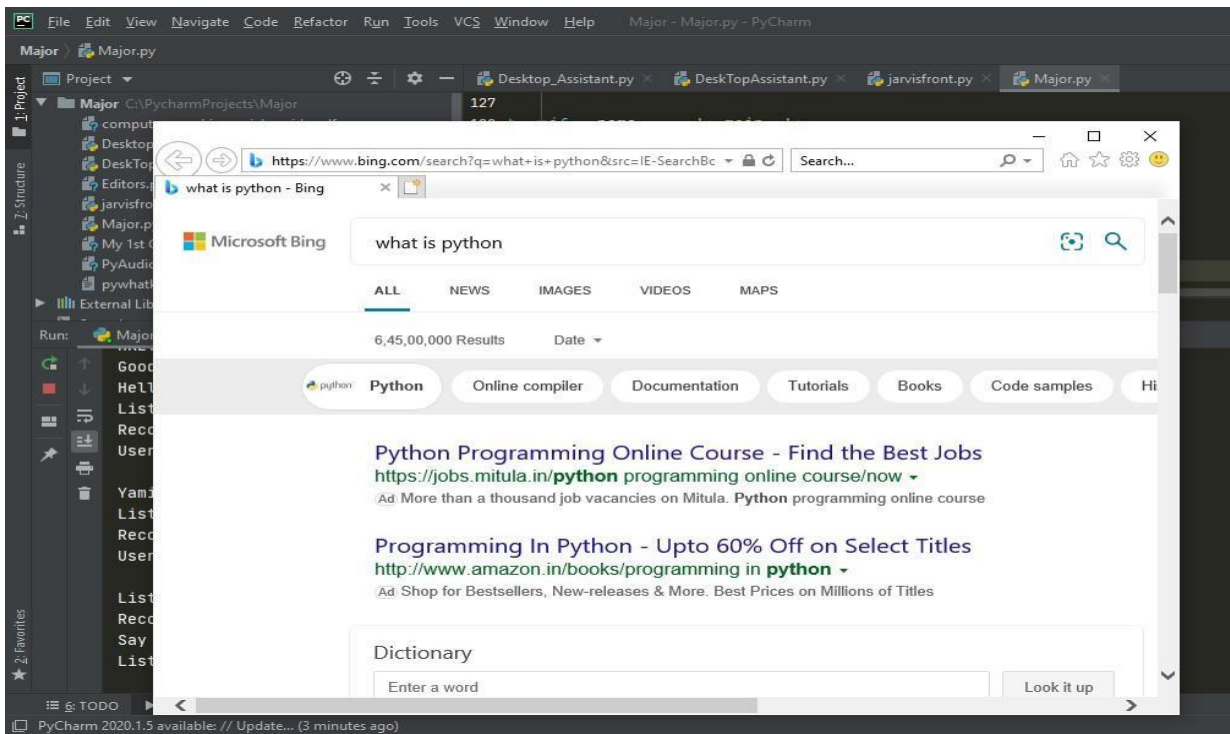


LIVE GUI OF THIS PROJECT

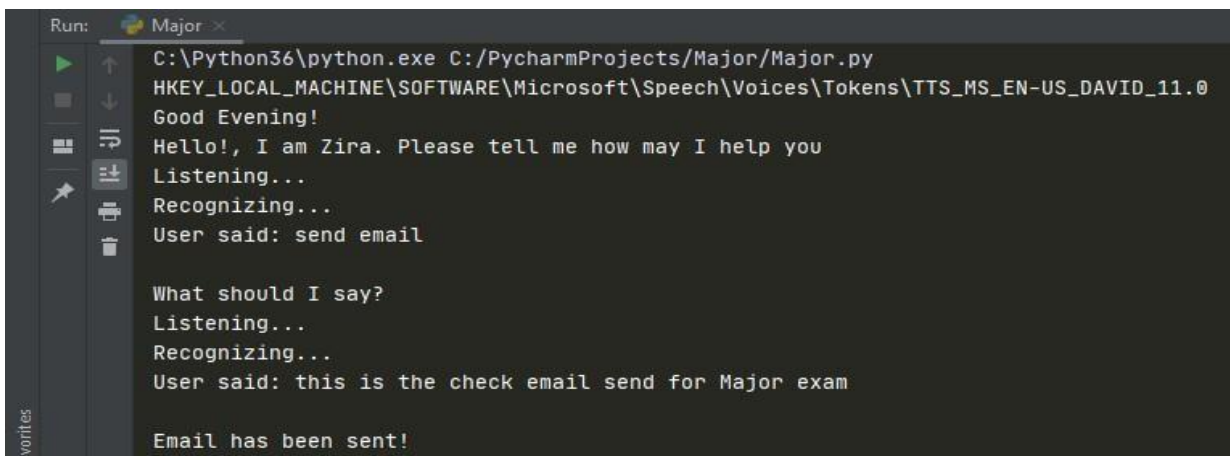
```
Run: Major x
C:\Python36\python.exe C:/PycharmProjects/Major/Major.py
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Speech\Voices\Tokens\TTS_MS_EN-US_DAVID_11.0
Good Morning!
Hello!, I am Zira. Please tell me how may I help you
Listening...
Recognizing...
User said: open Google

Yamini, what should I search on google?
Listening...
Recognizing...
User said: what is python
```

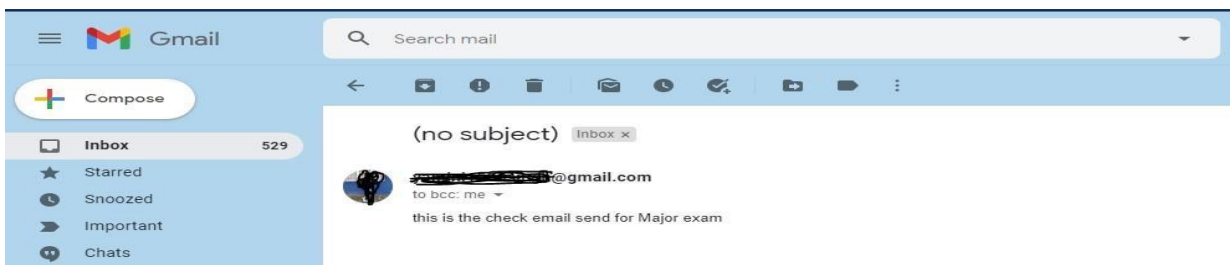
Input for Google Search



Output for Google search



Input to send Email

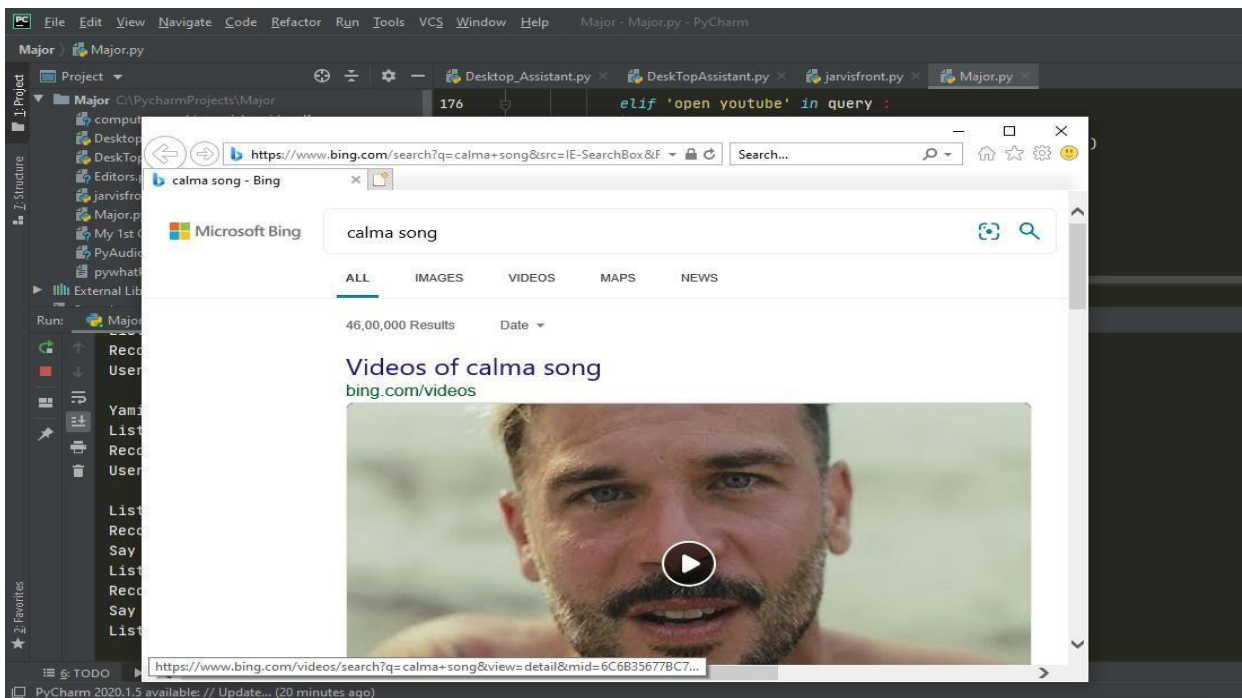


Output to send Email

```
Run: Major x
C:\Python36\python.exe C:/PycharmProjects/Major/Major.py
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Speech\Voices\Tokens\TTS_MS_EN-US_DAVID_11.0
Good Evening!
Hello!, I am Zira. Please tell me how may I help you
Listening...
Recognizing...
User said: open YouTube

Yamini, what should I search on YouTube?
Listening...
Recognizing...
User said: calma song
```

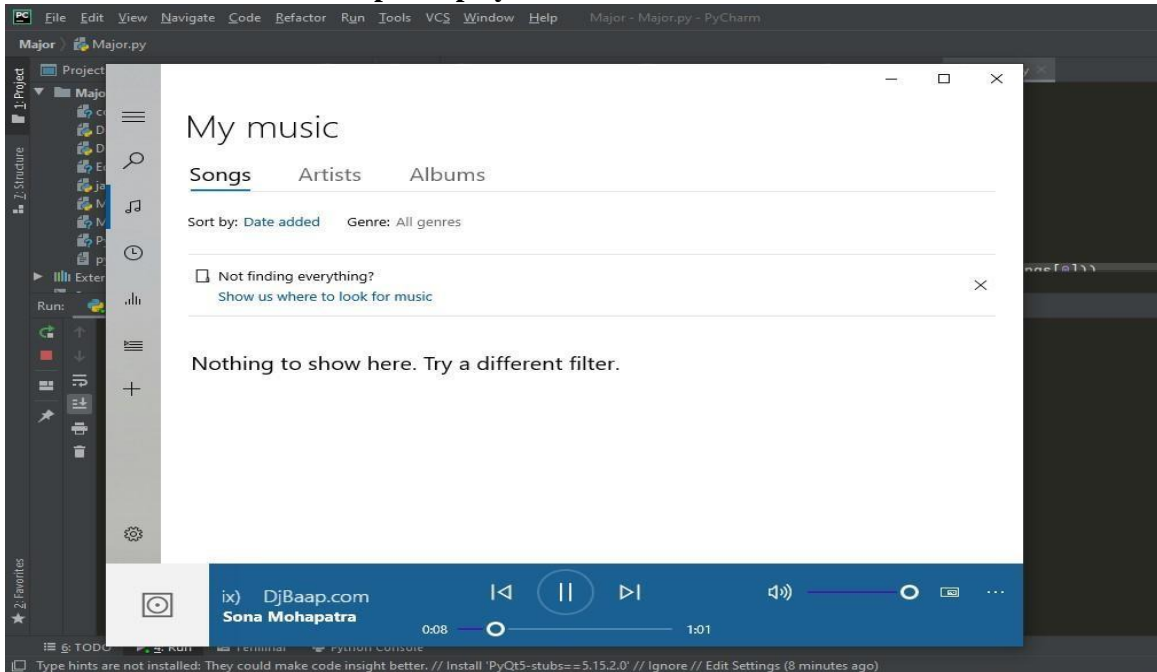
Input for YouTube search



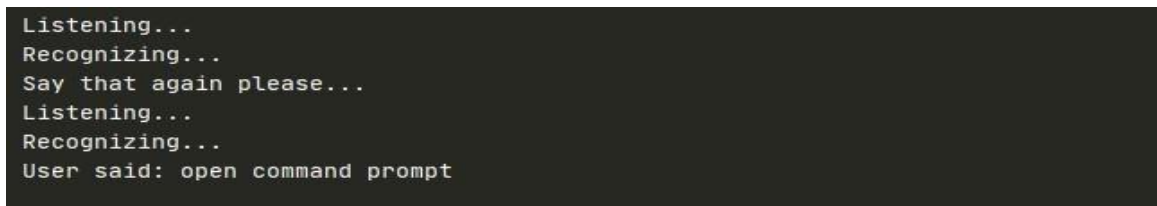
Output for YouTube search

```
Run: Major x
C:\Python36\python.exe C:/PycharmProjects/Major/Major.py
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Speech\Voices\Tokens\TTS_MS_EN-US_DAVID_11.0
Good Evening!
Hello!, I am Zira. Please tell me how may I help you
Listening...
Recognizing...
User said: play music
```

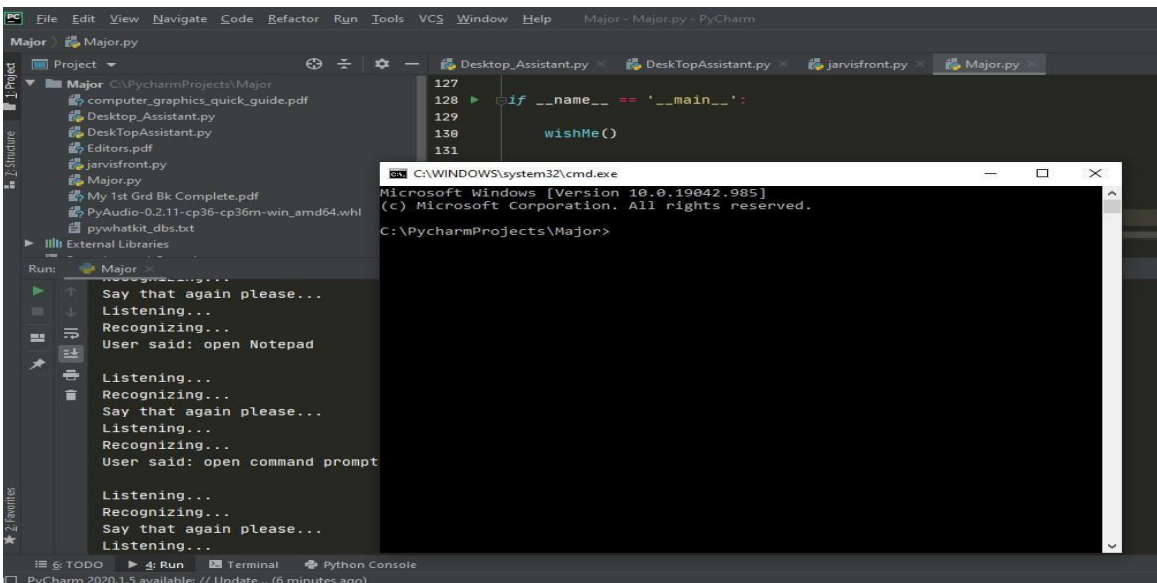
Input to play music



Output to play music



Input to open cmd



Output to open cmd

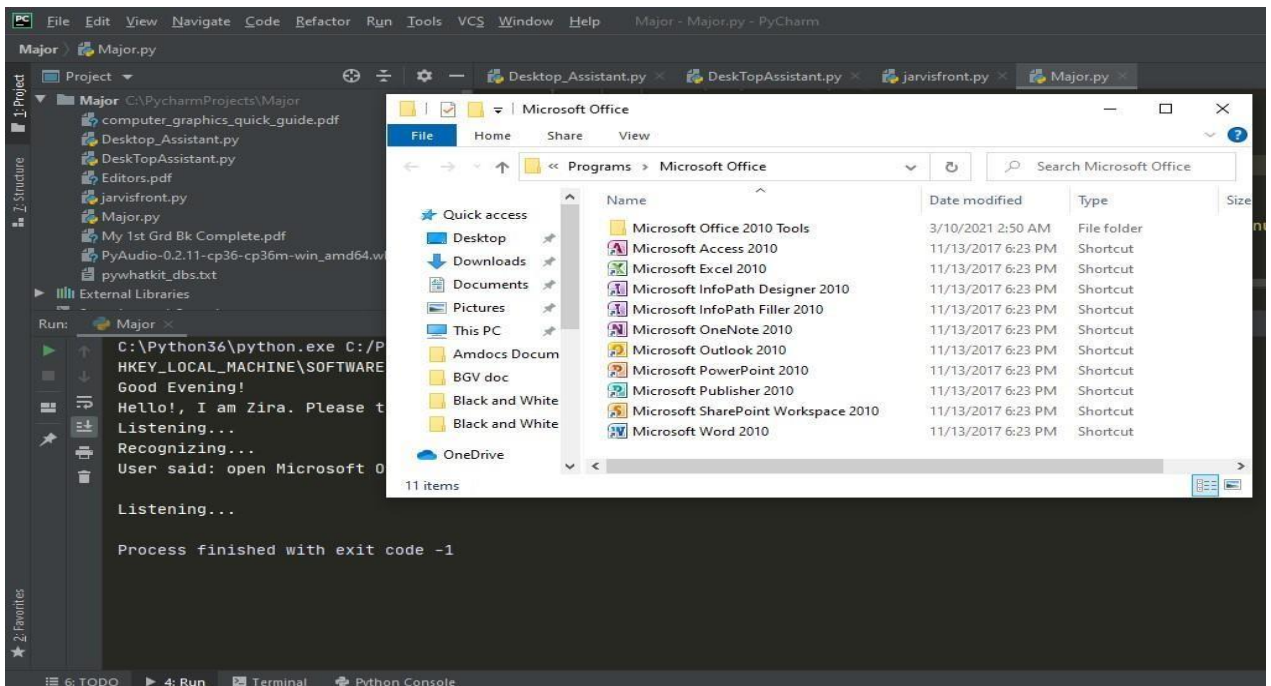
```
Run: Major x
C:\Python36\python.exe C:/PycharmProjects/Major/Major.py
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Speech\Voices\Tokens\TTS_MS_EN-US_DAVID_11.0
Good Evening!
Hello!, I am Zira. Please tell me how may I help you
Listening...
Recognizing...
User said: search Python on Wikipedia

Searching Wikipedia...
Yamini, According to Wikipedia.....
Python is an interpreted high-level general-purpose programming language. Python's design philosophy
```

Input and output for Wikipedia search

```
Run: Major x
C:\Python36\python.exe C:/PycharmProjects/Major/Major.py
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Speech\Voices\Tokens\TTS_
Good Evening!
Hello!, I am Zira. Please tell me how may I help you
Listening...
Recognizing...
User said: open Microsoft Office
```

Input to open Microsoft Office



Output to open Microsoft

6. CONCLUSION

JARVIS is a very helpful voice assistant without any doubt as it saves time of the user by conversational interactions, its effectiveness and efficiency. But while working on this project, there were some limitations encountered and also realized some scope of enhancement in the future which are mentioned below:

LIMITATIONS

- Security is somewhere an issue, there is no voice command encryption in this project.
- Background voice can interfere
- Misinterpretation because of accents and may cause inaccurate results.
- JARVIS cannot be called externally anytime like other traditional assistants like Google Assistant can be called just by saying, “Ok Google!”

SCOPE FOR FUTURE WORK

- Make JARVIS to learn more on its own and develop a new skill in it.
- JARVIS android app can also be developed.
- Make more Jarvis voice terminals.
- Voice commands can be encrypted to maintain security

7. REFERENCE

1. Various open sources materials from internet
2. Training notes.
3. Discussion among the group and with guide
4. Some requirements are gathered through various books from library.

8. GITHUB LINK (FOR PROJECT REPORT AND PROJECT CODE)

<https://github.com/ankumar-1234/AI-DESKTOP-VOICE-ASSISTANT->