Personal Virtual Assistant

Final Year Project

Session 2019-2023

A project submitted in partial fulfillment of the degree of

BS in Information Technology

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Faculty of Computer Science & Information Technology

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Type (Nature of project)	[✓] **D**evelopment [ ] **R**esearch [ ] **R&D**
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*The candidates confirm that the work submitted is their own and appropriate credit has been given where reference has been made to work of others

Plagiarism Free Certificate

This is to certify that, I **Evan Eric** S/D of **Eric Anthony,** group leader of FYP under registration no BITM-F19-007 at Information Technology Department, The Superior University, Lahore. I declare that my FYP report is checked by my supervisor.

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Personal Virtual Assistant

Change Record

Author(s)	Version	Date	Notes	Supervisor's Signature
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APPROVAL

PROJECT SUPERVISOR

Comments: _____

_____

Name:_____

Date:_____ Signature:_____

PROJECT MANAGER

Comments: _____

_____

Date:_____ Signature:_____

HEAD OF THE DEPARTMENT

Comments: _____

_____

Date:_____ Signature:_____

Dedication

It is our genuine gratefulness and warmest regard that we dedicate this work to our respected teachers and beloved parents

Acknowledgements

In the name of Allah, the most gracious and the most merciful, praises to Allah for the strengths and His blessings for the completion of this project.

First we would like to thanks to our beloved parents for their endless love, prayers and encouragement throughout the degree program.

We would like to express our profound gratitude to Mr. Asad (HOD) of Information Technology Department and Mr. Irfan Jaffar (Dean) of Superior Gold Campus for their contributions to the completion of our project titled "Personal Virtual Assistant".

We would like to express our special thanks to our mentor Mr. Javaid Iqbal for his time and efforts he provided throughout the year. Your useful advice and suggestions were really helpful to us during the project's completion. In this aspect, we are eternally grateful to you

Executive Summary

The projected resolution is largely for that square measure with some quite disabilities and in that condition during which cannot use their mobile phones or laptops. This project support AI and can work expeditiously. This will support emerging new technologies and can further move towards IOT based assistance. The purpose to work on this project is to support those people having disabilities however, it will be very helpful in emergency situations.

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Chapter 1

Introduction

Chapter 1: Introduction

The proposed solution is basically for those people who are with some kind of disabilities and in that condition in which the cannot use their mobile phones or laptops. This project will based on artificial intelligence and will work efficiently. There are so many functions we will add in our assistance and further we can add more functionalities. Some functions will work offline and some online.

SIRI is personal assistant software that interfaces with the user thru voice interface, recognizes commands and acts on them. It learns to adapt to user's speech and thus improves voice recognition over time. It also tries to converse with the user when it does not identify the user request.

1.1. Background

There already exist a number of computing device digital assistants. A few examples of modern-day virtual assistants available in market are discussed on this segment in conjunction with the tasks they are able to offer and their drawbacks.

SIRI From APPLE:

SIRI is non-public assistant software that interfaces with the person through voice interface, recognizes instructions and acts on them. It learns to conform to user's speech and consequently improves voice reputation over time. It additionally tries to communicate with the user when it does not perceive the consumer request. It integrates with calendar, contacts and song library packages on the tool and also integrates with GPS and digital camera on the device. It uses location, temporal, social and challenge based contexts, to customize the agent conduct mainly to the person at a given factor of time.

Supported Task:

- Call someone from my contacts list
- Launch an application on my iPhone
- Send a text message to someone
- Set up a meeting on my calendar for 9am tomorrow

- Set an alarm for 5am tomorrow morning
- Play a specific song in my iTunes library
- Enter a new note

Drawback:

SIRI does no longer keep a know-how database of its personal and its knowledge comes from the statistics captured in area models and information models.

Re-Qall:

Re- Qall is non-public assistant software program that runs on smartphones going for walks Apple iOS or Google Android operating machine. It facilitates consumer to bear in mind notes as well as tasks within a location and time context. It records consumer inputs and converts them into commands, and video display units modern stack of person obligations to proactively advise actions even as considering any adjustments inside the surroundings. It additionally affords records based totally on the context of the consumer, as well as filter out information to the user primarily based on its discovered information of the concern of that information

Supported Tasks

- Reminders
- Email
- Calendar, Google Calendar
- Outlook
- Evernote
- Facebook, LinkedIn
- News Feeds

Draw Back:

Will try to place all the to-do objects in – you can spend more time setting the entries in than without a doubt doing the revision

1.2. Motivations and Challenges

The motivation and challenges are following:

- **Google Assistant by Google**
- **Siri by Apple**
- **Cortana by Microsoft**
- **Bixby by Samsung**

Above these are our motivation and challenges but all apps are run by wi-fi /data usage. **Siri** is a Ios device but our app is for android user. Now we starting only target android mobiles. Our device is used for all mobiles(android) like China mobiles (**infix and Huawei mobile etc**).

All apps of your mobile phones are executed/ runed for this app. **Bixby** app only use for Samsung mobiles phone not anyone. This is the main difference between other app and our app. Our app are working on both path **offline app** (built-in or without use wi-fi) like clock, camera, calculator, notepad and command prompt etc , **online app** (use wi-fi) like WhatsApp, google, email, you tube and so on. This is the main reason or difference between other device and our device.

1.3. Goals and Objectives

Main goal of building non-public assistant software program (a digital assistant) is using semantic records assets available at the net, person generated content and supplying expertise from know-how databases. The essential motive of an intelligent digital assistant is to reply questions that customers may also have. This may be accomplished in a commercial enterprise surroundings, for instance, on the commercial enterprise internet site, with a chat interface. On the mobile platform, the wise digital assistant is available as a call-button operated service wherein a voice asks the consumer “What can I do for you?” after which responds to verbal enter.

Virtual assistants can notably save your time. We spend hours in on line research and then making the report in our terms of knowledge. JIA can do that for you. Provide a subject for research and continue with your duties while JIA does the studies. Another hard challenge is to

consider test dates, birthdates or anniversaries. It comes with a marvel whilst you input the elegance and comprehend it is class test these days. Just tell JIA earlier about your tests and she or he reminds you nicely earlier so you can put together 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.

1.4. Literature Review/Existing Solutions

Siri is a Ios tool however our device android person. Now we beginning handiest target android mobiles. Our tool is used for all mobiles(android) like China mobiles (infix and Huawei cellular and so forth).

All apps of your mobile telephones are achieved/ runed for this app. Bixby app most effective use for Samsung mobiles phone now not all and sundry. This is the primary distinction between different app and our app. Our app are operating on each course offline app (built-in or with out use wi-fi) like clock, sim message, calls and remainder and many others , on-line app (use wi-fi) like WhatsApp, face e book, you tube and so on. This is the principle cause or distinction between other tool and our device.

1.5. Gap Analysis

All apps (Siri, Bixby etc.) are run with the aid of wi-fi /statistics usage. Siri is a Ios tool but our device android user. Now we starting handiest goal android mobiles. Our device is used for all mobiles(android) like China mobiles (infix and Huawei cell etc).

All apps of your cellular telephones are performed/ runed for this app. Bixby app simplest use for Samsung mobiles phone not all and sundry. This is the principle distinction between different app and our app. Our app are operating on both path offline app (integrated or with out use wireless) like clock, sim message, calls and remainder and many others, online app (use

wi-fi) like WhatsApp, face e book, you tube and so forth. This is the main cause or difference among different tool and our tool.

1.6. Proposed Solution

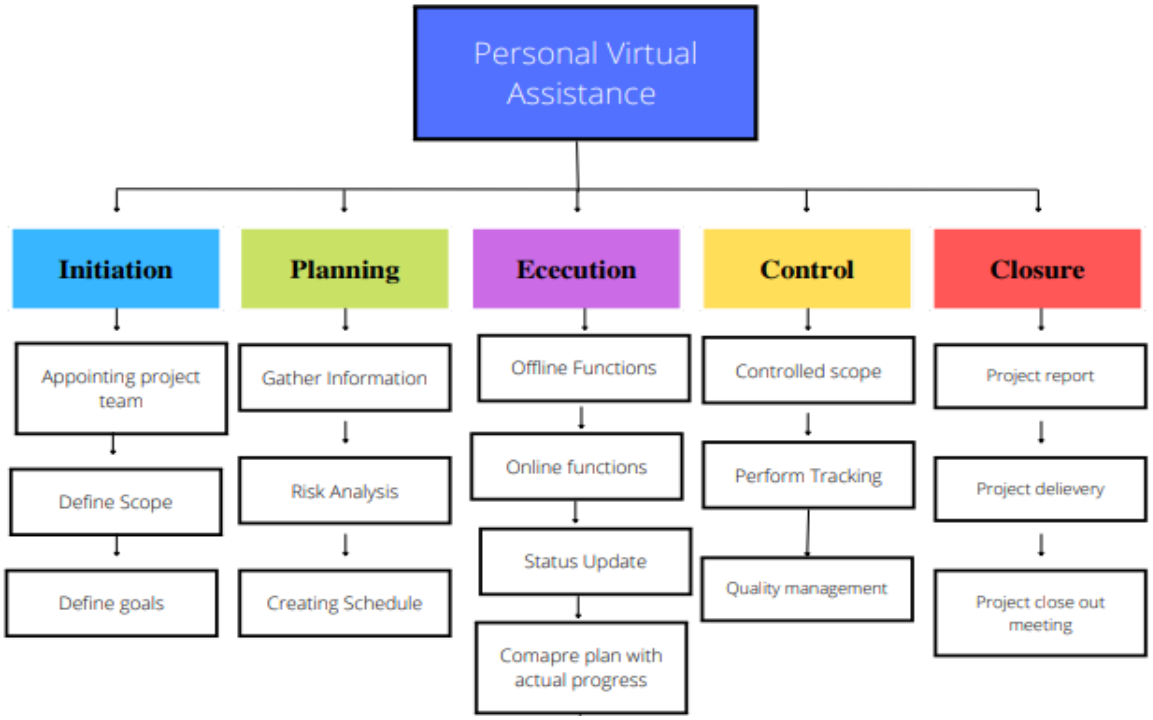
We have observed a major problem for those who are disable such as blind people can't see and it is difficult for them to use their mobile phones or laptops. People with no hands are unable to operate their mobile phones. It is very dangerous to use a mobile phone while driving. Major number of car accidents takes place because of using mobile phones during driving. We want to develop a virtual assistant to avoid all these problems and help the humanity to save their precious lives.

As we have discussed the problem statement so we want to develop a personal virtual assistant using python language and this project will support artificial intelligence. As IOS have their own assistant "Siri", Google have their assistant "Google assistant" and Samsung have their assistant named as "Bixby" but many android phones can't support this feature so we want to develop a Personal Virtual Assistance for those phones which can work without the discrimination of brands. In our assistance there are some online functions as well as offline functions.

1.7. Project Plan

As we have discussed the problem statement so we want to develop a personal virtual assistant using python language and this project will support artificial intelligence. As IOS have their own assistant "Siri", Google have their assistant "Google assistant" and Samsung have their assistant named as "Bixby" but many android phones can't support this feature so we want to develop a Personal Virtual Assistance for those phones which can work without the discrimination of brands. In our assistance there are some online functions as well as offline functions.

1.7.1. Work Breakdown Structure



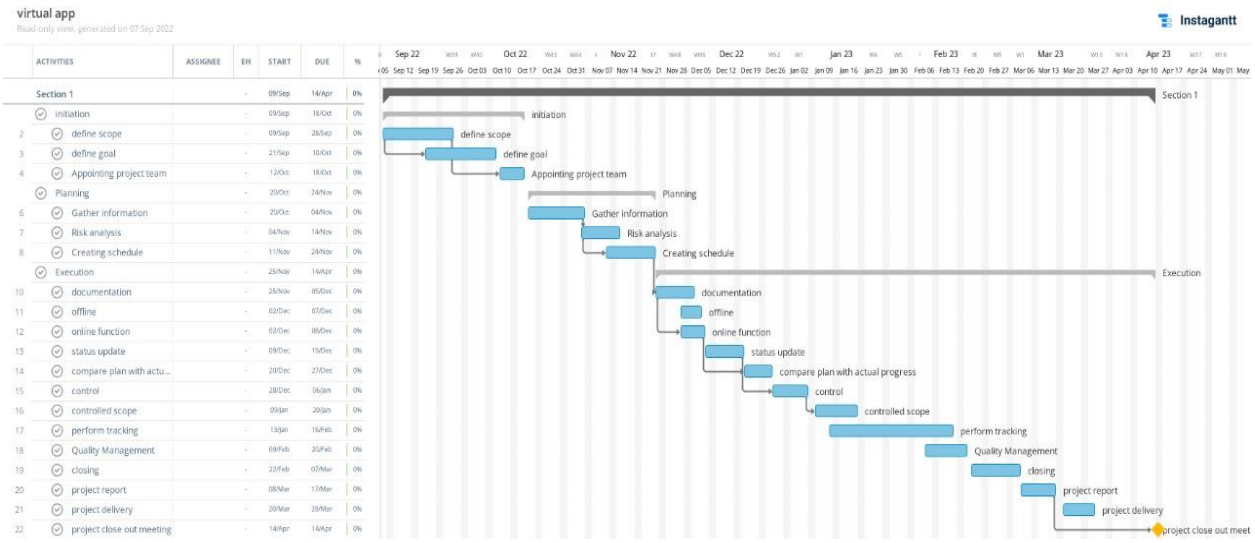
1.7.2. Roles & Responsibility Matrix

The purpose of roles & responsibility matrix is to identify who will do what.

WBS #	WBS Deliverable	Activity #	Activity to Complete the Deliverable	Duration (# of Days)	Responsible Team Member(s) & Role(s)
1.	**Initiation**	1	Submit Proposal	3 day	Evan Eric
1.2	Define scope	3	research	1 day	Hassan Aslam
1.3	Define goals	4	Research and proposal	2 days	Talha
2.	**Planning**	5	Surveys and meetings	10 days	Hassan and Evan
2.1	Gather information	6	Research and surveys	2 days	Evan
2.2	Risk Analysis	7	Testing	5 days	Hassan and Talha
2.3	Creating schedule	8	Making report	3 days	Evan
3.	**Execution**	9	Coding, testing and execution	1 month	Whole team

3.1	Offline functions	10	Coding and execute	15 days	Whole Team
3.2	Online functions	11	Coding and execute	15 days	Whole team
3.3	Compare with actual progress	14	Analysis and testing	5 days	Talha
4.	**Control**	16	Perform tracking	20 days	Talha , Hassan
4.3	Quality management	17	Testing and analyzing	3 days	Evan
5.	**Closure**	19	Testing and delivery	1 month	Whole team
5.1	Project report	20	reporting	5 days	Evan
5.2	Project delivery	21	Testing and delivery	3 days	Whole team

1.8. Gantt Chart



1.9. Report Outline

The projected resolution is largely for that square measure with some quite disabilities and in that condition during which cannot use their mobile phones or laptops. This project support AI and can work expeditiously. This will support emerging new technologies and can further move towards **IOT based assistance**. The purpose to work on this project is to support those people having disabilities however, it will be very helpful in **emergency** situations.

The proposed solution is basically for those people who are with some kind of disabilities and in that condition in which the cannot use their mobile phones or laptops. This project will based on artificial intelligence and will work efficiently. There are so many functions we will add in our assistance and further we can add more functionalities. Some functions will work offline and some online.

The proposed solution is basically for those people who are with some kind of disabilities and in that condition in which the cannot use their mobile phones or laptops. This project will based on artificial intelligence and will work efficiently. There are so many functions we will add in our assistance and further we can add more functionalities. Some functions will work offline and some online.

Chapter 2

Software Requirement Specifications

Chapter 2: Software Requirement Specifications

2.1. Introduction

The Software specification and Requirements of Personal Virtual Assistant for the successful deployment are.

- Downloading proper platform for the development of assistant
- Installing python extension
- Installing an interpreter for python
- Installing the specific libraries
- Defining the Model
- Transfer Learning
- Training the Model
- Deploying the Model
- Model Performance
- Deploying the Assistant
- Defining the Assistant
- Running the Assistant Locally

1.1.1. Purpose

Develop a laptops or mobile personal virtual assistant perform the users task on voice commands. It listens the task recognize it and then perform it however it also prints the results onto the screen for the user convenience.

1.1.2. Document Conventions

This file follows the font Calibri, the line spacing is **1.5** and the font size is **12** for paragraph text. The bold-confronted textual content has been used to emphasize sections and italicized text is used to label and **apprehend diagrams**. And the all-textual content is **Justified**.

1.1.3. Intended Audience and Reading Suggestions

The record is specially created for the approval of our Final Year Project of Information Technology and hence the main intended target market is the approval panel of the **Superior University** with a view to declare the fame of our project.

Our Other Audience are Following:

1. Dean
2. HoD
3. Project Manager
4. Supervisor
5. All teachers
6. Bach members
7. Market person

1.1.4. Product Scope

The basic scope of creating this personal virtual assistant is to providing help to many helpless people who are not able to use mobiles and there laptops it provides them assistant to do many tasks offline as well as online. However, it can be used to save time as well.

- Import the libraries.
- Import the virtual environment.
- Import the code.
- Testing
- Deployment stage

1.1.5. References

Basically, we merge all the mandatory functions and information in one assistant. We reference the other assistants to give us more information and guidance to complete this whole project.

These are the following reference assistants:

- **Google Assistant by Google**
- **Siri by Apple**
- **Cortana by Microsoft**

- **Bixby by Samsung**

2.2. Overall Description

2.2.1. Product Perspective

A personal assistant works on human voice recognize the command given by the user and perform the task according to the given command.

USER NAME

BOTNAME

GREET THE USER

ASK THE USER TO PERFORM THE TASK

OFFLINE FUNCTIONS

ONLINE FUNCTIONS

IF EXIT

OR STOP

GREET THE USER

EXIT THE ASSISTANT

2.2.2. User Classes and Characteristics

There can be multiple users those who want to use the assistant the assistant will act as a admin as well. Assistant itself controls all the queries of the user.

CHARACTERISTICS:

- Here the key here is voice. A voice assistant is a digital assistant that uses voice recognition, speech synthesis, and natural language processing (NLP) to provide a service through a particular application.
- For the purpose of this discussion, the term voice assistant will be used interchangeably with the following related terms: intelligent personal assistant, automated personal assistant, smart assistant, and virtual digital assistant.

2.2.3. Operating Environment

Operating environment for the personal virtual assistant is as follow:

- Speech recognition
- Virtual environment
- Operating system: Windows or whether android
- Text to speech
- Speech to text

2.2.4. Design and Implementation Constraints

There are 3 major constraints for design and implementations are as follow:

- **Budget/Cost**

Right now, we have not invested any cost on this project but further if we will work on it the cost for the quality management and team management will be decided

- **Time**

The time to design and implement the personal virtual assistant is total 3 months through which all the task has been performed

- **Scope**

It will further develop the work process, consumer loyalty, and deals and develop your suggestions to your customers. Artificial intelligence-fueled Virtual Assistants can likewise make customized Emails - email automation for every one of your customers and take notes of significant central issues during a gathering. Also facilitates the user to perform there daily tasks in just one command through there voice

2.2.5. Assumptions and Dependencies

Let us assume if user want to do some online functions and the internet connection lost the function or task can't be performed. The user have to give proper information

2.3. External Interface Requirements

2.3.1. User Interfaces

- **Front-End Software:** Terminal of Visual Studio Code
- **Back-end Software:** Visual studio code, python interpreter and virtual environment

2.3.2. Hardware Interfaces

The hardware interface of this project includes the following:

- Pentium pro-processor or later
- RAM 512 MB or more
- Connectivity of internet (for online functions)

2.3.3. Software Interfaces

The software interfaces include the following:

- Windows 7(32 bit) or more
- Visual Studio Code
- Python Extension
- Python interpreter
- Python 3.10
- Speech Recognition library
- Pyttsx3 (text to speech) library
- Python-Decouple library
- Pywhatkit library
- Request library
- Youtube app
- Google app
- Email app

- Whatsapp app
- Wikipedia

2.3.4. Communications Interfaces

The communication interface of app is too easy and simple. People can message easily to each other with the help of our voice. Every type of message like

- Text Message
- Online Chat
- Whatsapp Message
- E-mail

Virtual assistants use **natural language processing (NLP)** to match user text or voice input to executable commands. Many continually learn using artificial intelligence techniques including machine learning and ambient intelligence.

2.4. System Features

The system feature of Jarvis (Virtual Assistant) Are following:

- Off-line functions
- WhatsApp message
- E-mail sending
- Google searching
- Wikipedia

2.4.1. Off-line function:

This feature is about the running of offline function like camera, calculator, note pad etc.

2.4.1.1. Description and Priority:

In this function user can call throw your voice those app which internet not use. When the user call camera open to click the picture jarvis listen and then they perform your task and open mobile or laptop camera same as it is other offline task performing.

2.4.1.2. Stimulus/Response Sequences

Firstly user speak to perform the task then jarvis listen and they recognize. After that jarvis display on screen in text form then they open app. This feature is highly priority because these features are most commonly used in our daily life.

2.4.1.3. Functional Requirements

The functional requirement are follow:

REQ-SF1-1: Running off-line apps in your device.

REQ-SF1-2: user can call your device app

REQ-SF1-3:

2.4.2. WhatsApp Message:

WhatsApp is a online feature. Online feature are those features in which mobile data and wi-fi are used.

2.4.2.1. Description and Priority:

In this feature (WhatsApp) internet and mobile data are use. Today WhatsApp are most important commonly used app. In our daily life chat or call mostly on WhatsApp that why this feature 2 high priority. A user can speak and our voice convert into text form. When you completed your message you send the command our app and they send.

2.4.2.2. Stimulus/Response Sequences:

In online feature user speak to our app to send a message then this app open your device WhatsApp. Firstly, jarivs asked a number to send message then jarivs convert your voice into

message. Is also display on screen. When you completed your message you send the command our app and they send. Second highly priority app feature.

2.4.2.3. Functional Requirements:

The functional requirements are following:

REQ-SF2-1: Internet connection

REQ-SF2-2: sender number

REQ-SF2-3: message

REQ-SF2-4: send command

2.4.3. Google searching:

It is also an online feature. In which you can search on google also you play movie and song.

2.4.3.1. Description and Priority:

Google searching are 3rd highly feature. In this feature user can search on google any type of information. Now a days google are very important part of student life or well-educated person. A user can speak and our voice convert into text form.

Stimulus/Response Sequences:

In this feature user command to jarvis open the google. The javis firstly listen then recognize the command, secondly then open the google. When open the google user can search and as well as display on user screen.

Functional Requirements:

The functional requirements are following:

REQ-SF2-1: Internet connection

REQ-SF2-2: user command

REQ-SF2-3: website name

REQ-SF2-4: song or movie name

1.1. Nonfunctional Requirements

1.1.1. Performance Requirements

The performance requirement of our assistant depends on the following factors:

- Good Microphone

- Speaker
- Display terminal

1.1.2. Safety Requirements

The assistant is completely environment friendly and does not cause any safety violations. The menu will have a human voice recognition through which no wastage of time in hovering and texting. The user no need to share any personal information and passwords.

1.1.3. Security Requirements

It is totally secure because the user no need to share any kind of personal information, their email details and passwords etc. It does not violate any kind of security boundaries and rules

1.1.4. Reliability Requirements

Our project is totally consistently good in quality or performance and able to be trusted. Our personal virtual assistant contains the probability of a piece of software operating without failure while in a specified environment over a set duration of time.

1.1.5. Software Quality Attributes

The software quality attributes of our application include the timely performance of the task given by the user. Provide the user easiness to do their task just on a voice command.

1.2. Other Requirements

As of right now, we have no additional needs. If any further requirement or adjustments are necessary with the passage of time, it will be added.

Chapter 3

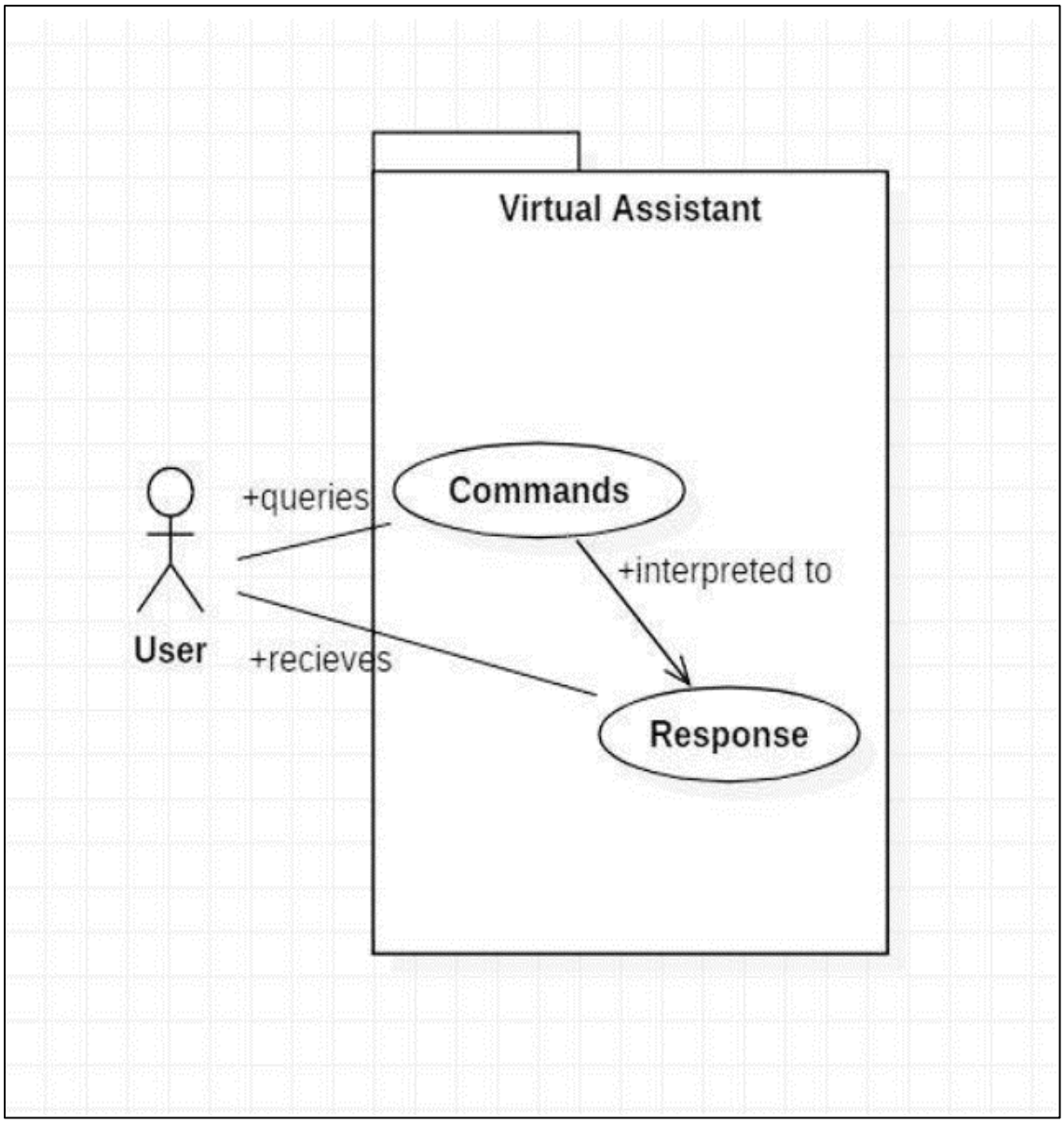
Use Case Analysis

Chapter 3: Use Case Analysis

In this session, we create use case model and create a description for every case to analysis the Personal Virtual Assistant.

It will define the user cases, actors and subsystems used in this project

3.1. Use Case Model



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.

3.2. Use Cases Description

Use Cases:

A use case describes a function that a system performs to achieve the user's goal. A use case must yield an observable result that is of value to the user of the system.

Actor:

An actor represents a role of a user that interacts with the system that you are modeling. The user can be a human user, an organization, a machine, or another external system. Our actor is defined as a user that is using the assistant.

Subsystem:

A subsystem is **a single, predefined operating environment through which the system coordinates the work flow and resource use**. The system can contain several subsystems, all operating independently of each other. Subsystems manage resources. All jobs, with the exception of system jobs, run within subsystems.

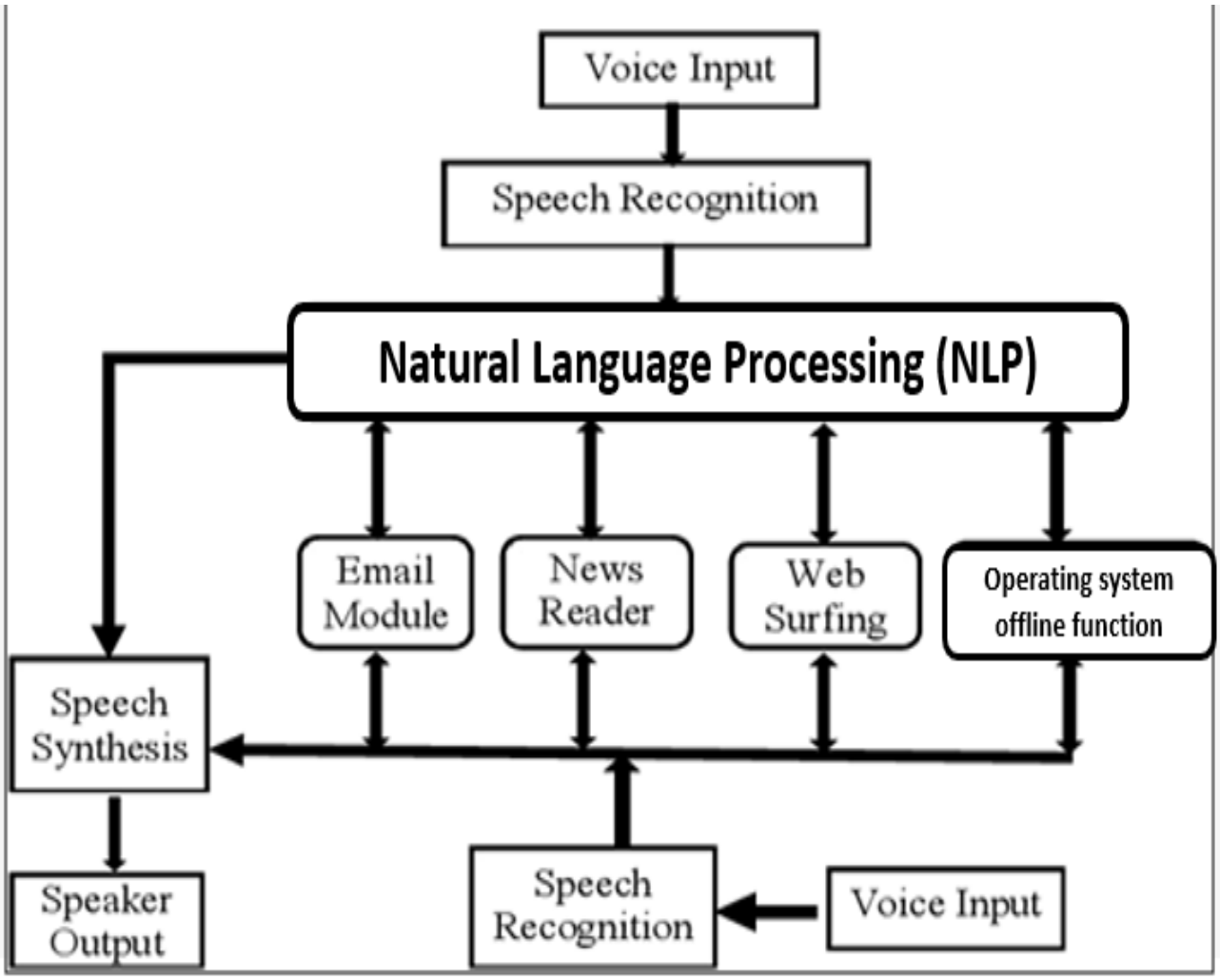
Chapter 4

System Design

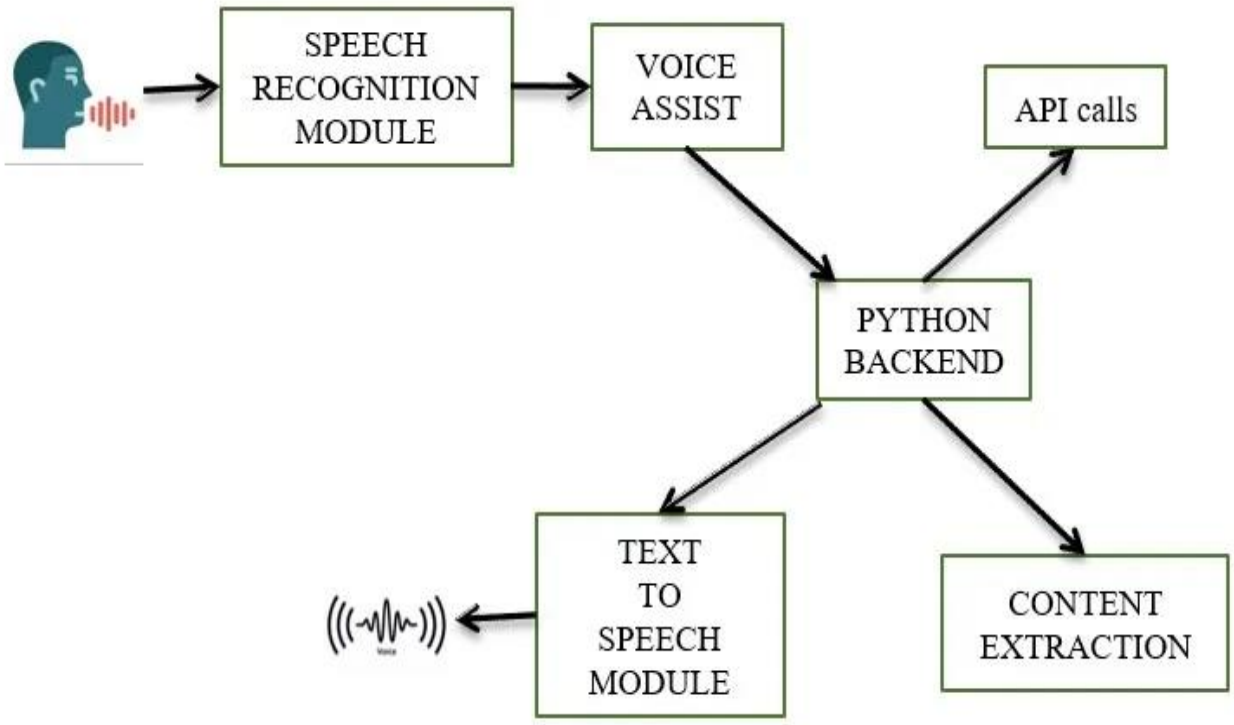
Chapter 4: System Design

This chapter will thoroughly explain the architecture of the assistant that we have created. This chapter defines the elements of a system such as the architecture, modules and components, the different interfaces of those components and the data that goes through the Personal Virtual Assistant. It is meant to satisfy specific needs and requirements of our application through the engineering of a coherent and well-running system

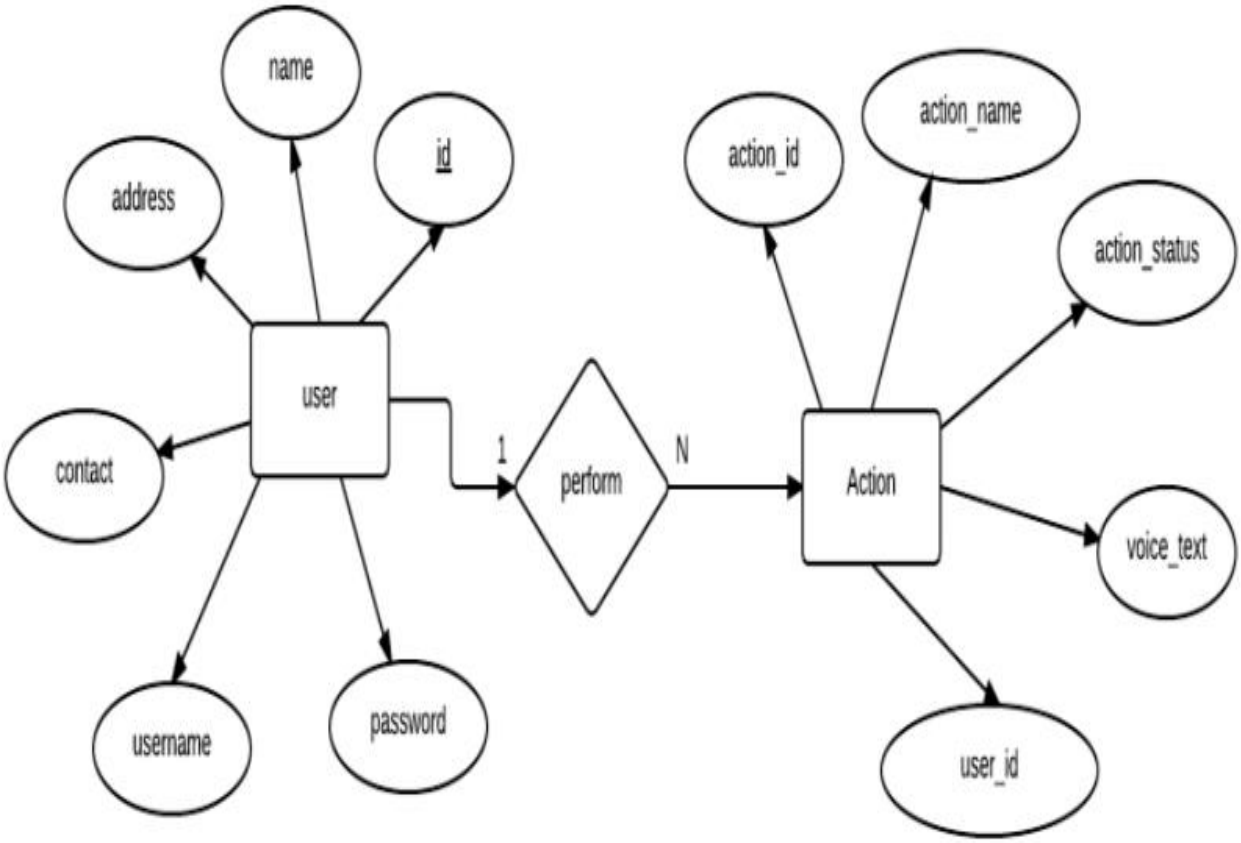
4.1. Architecture Diagram



4.2. Domain Model

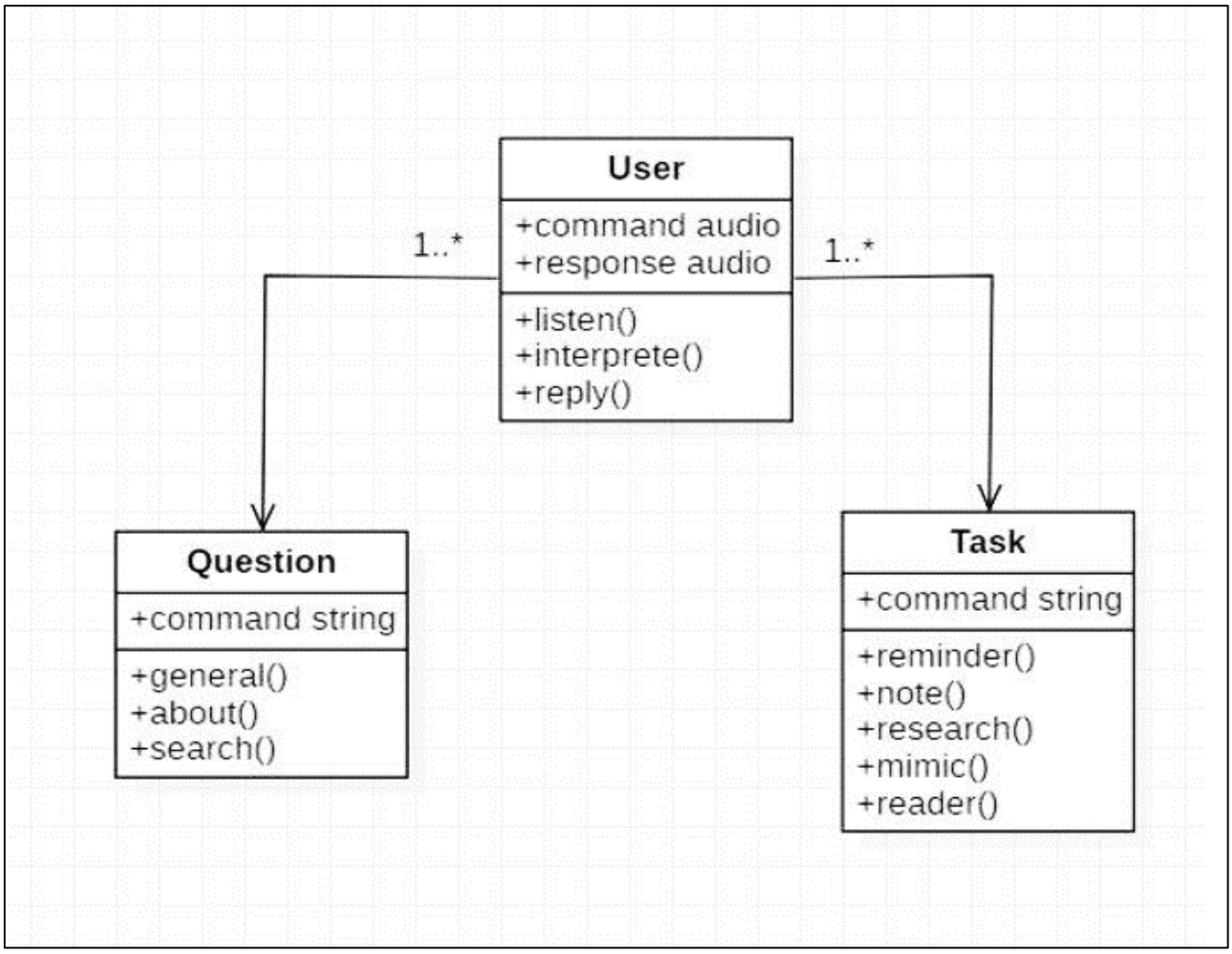


4.3. Entity Relationship Diagram with data dictionary



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.

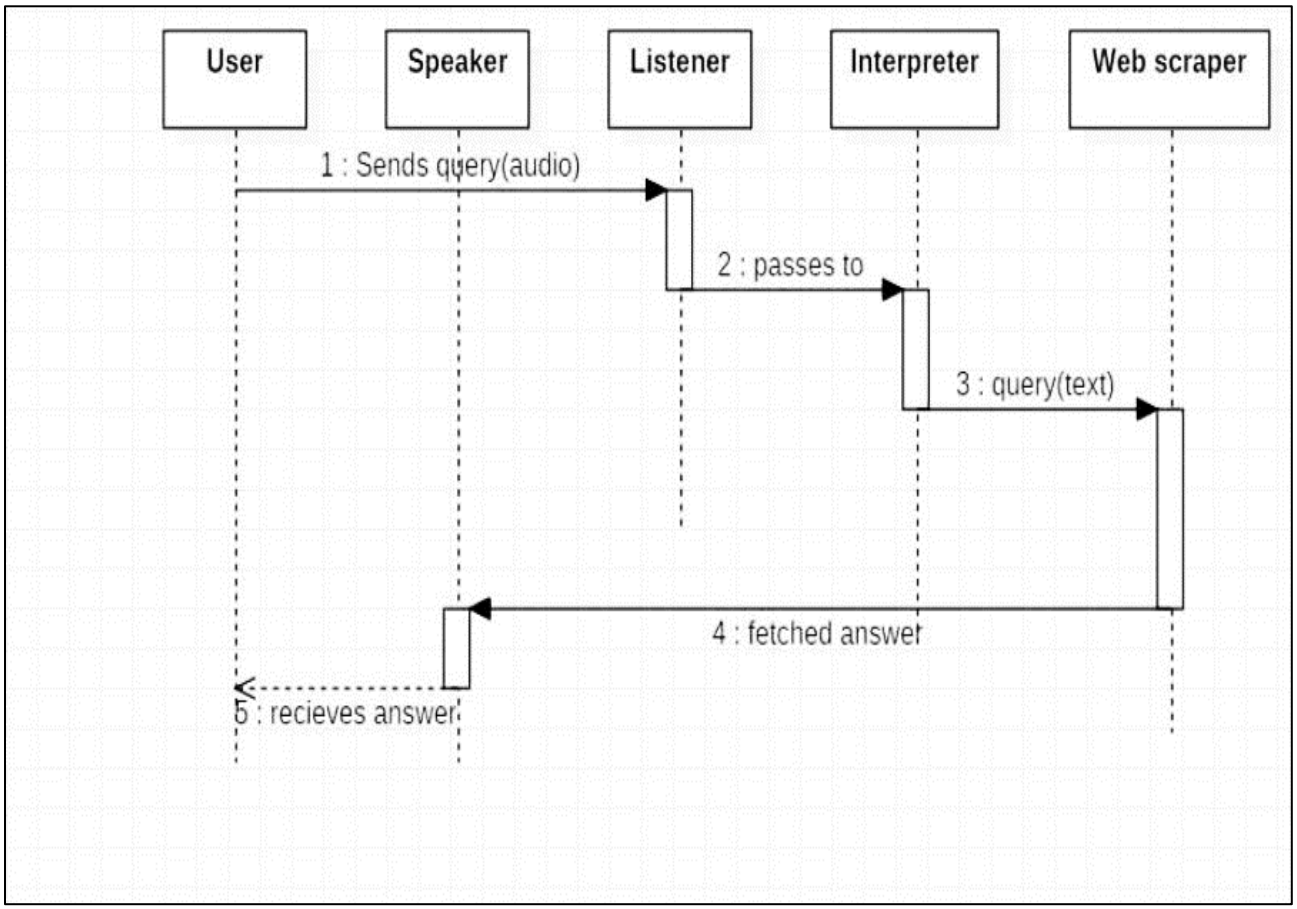
4.4. Class Diagram:



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.

4.5. Sequence / Collaboration Diagram

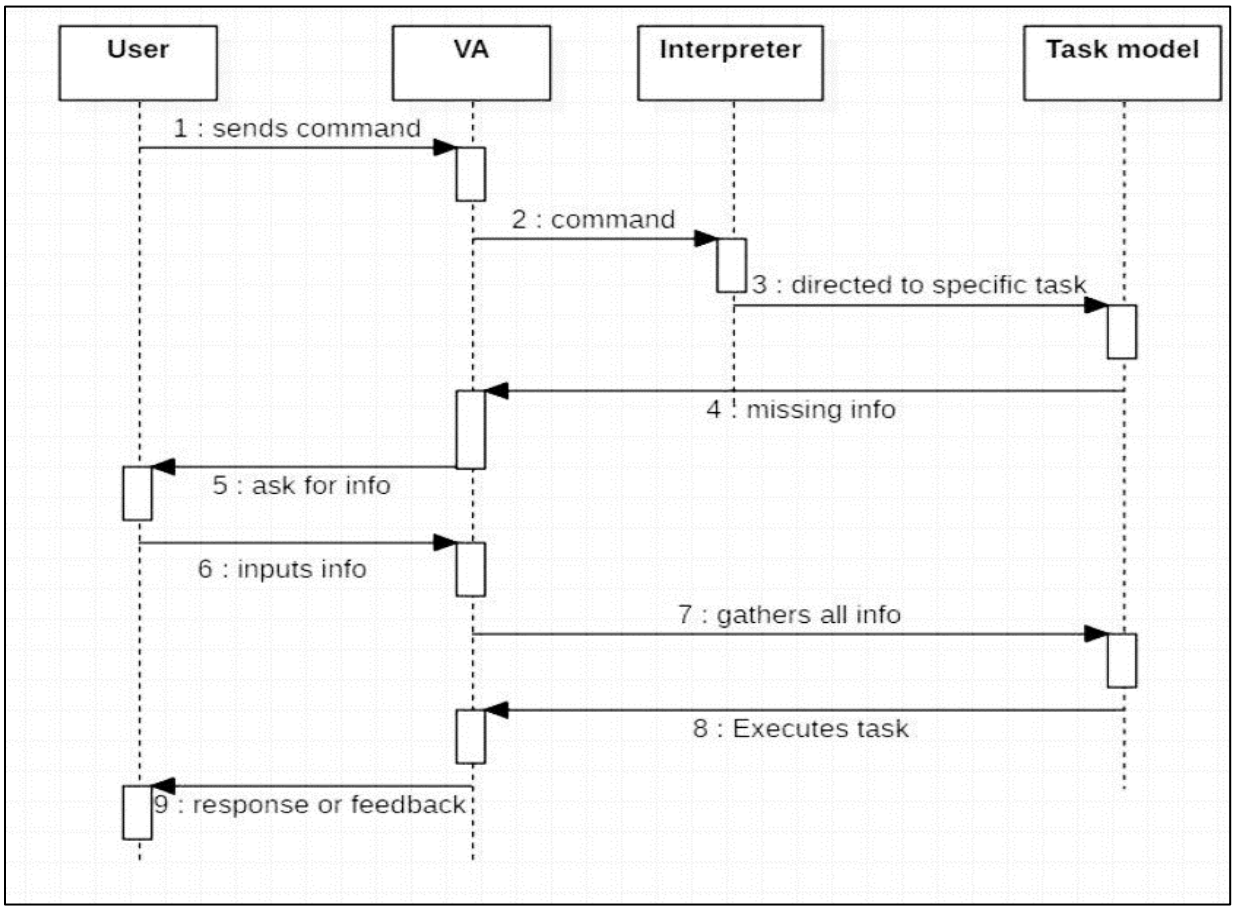
Sequence diagram for Query-Response:



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.

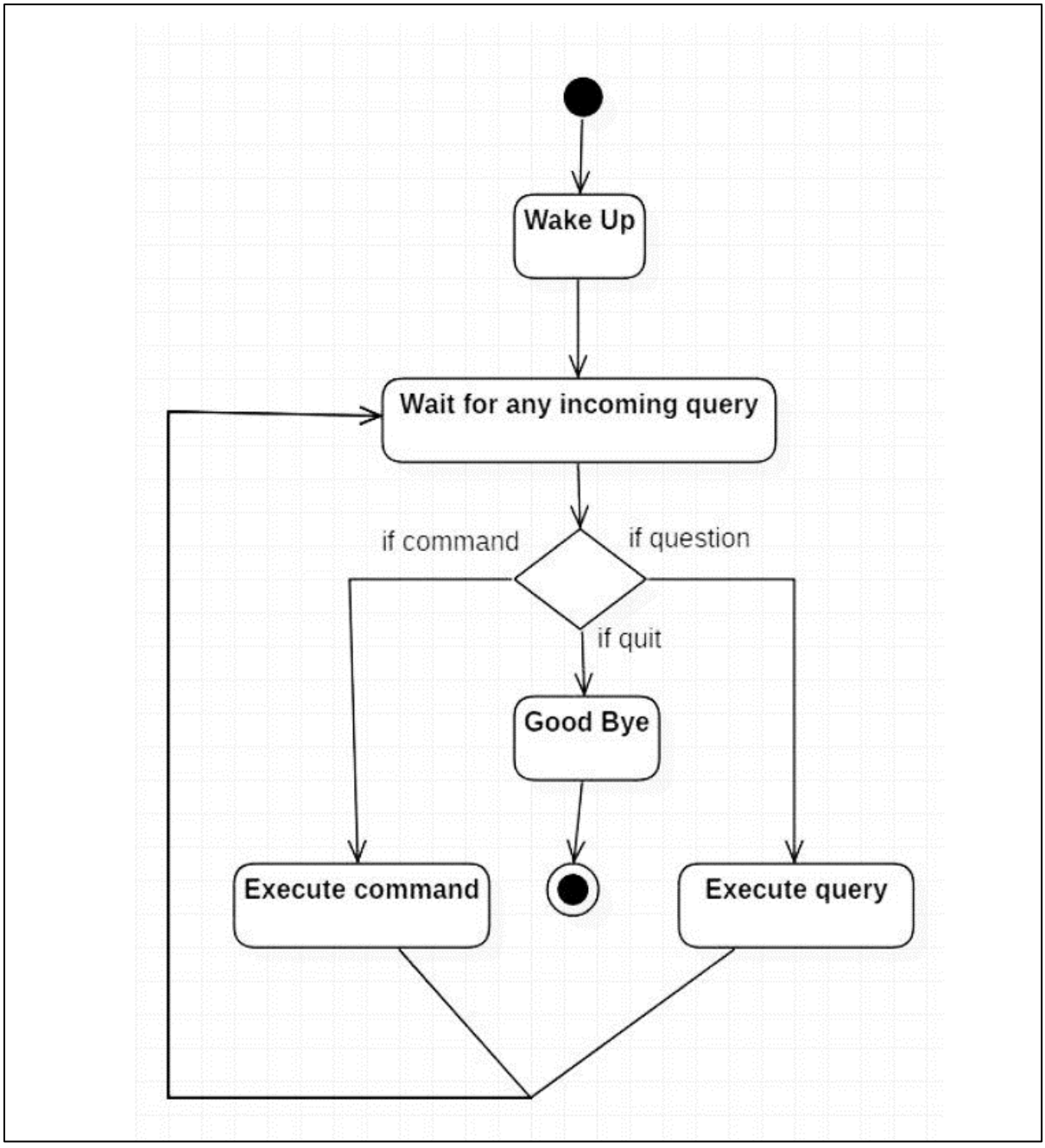
Sequence diagram for Task Execution:

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 receive information is sent back to task and it is accomplished. After execution feedback is sent back to user

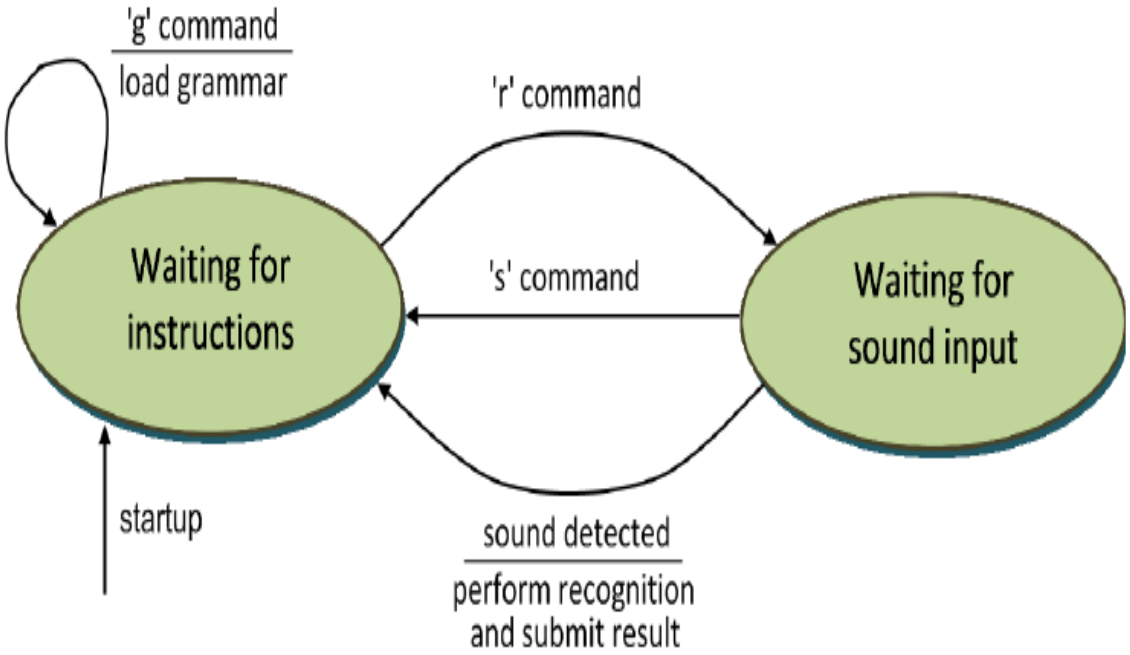


4.6. Activity Diagram

Initially, the system is in idle mode. As it receives any wakeup 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.

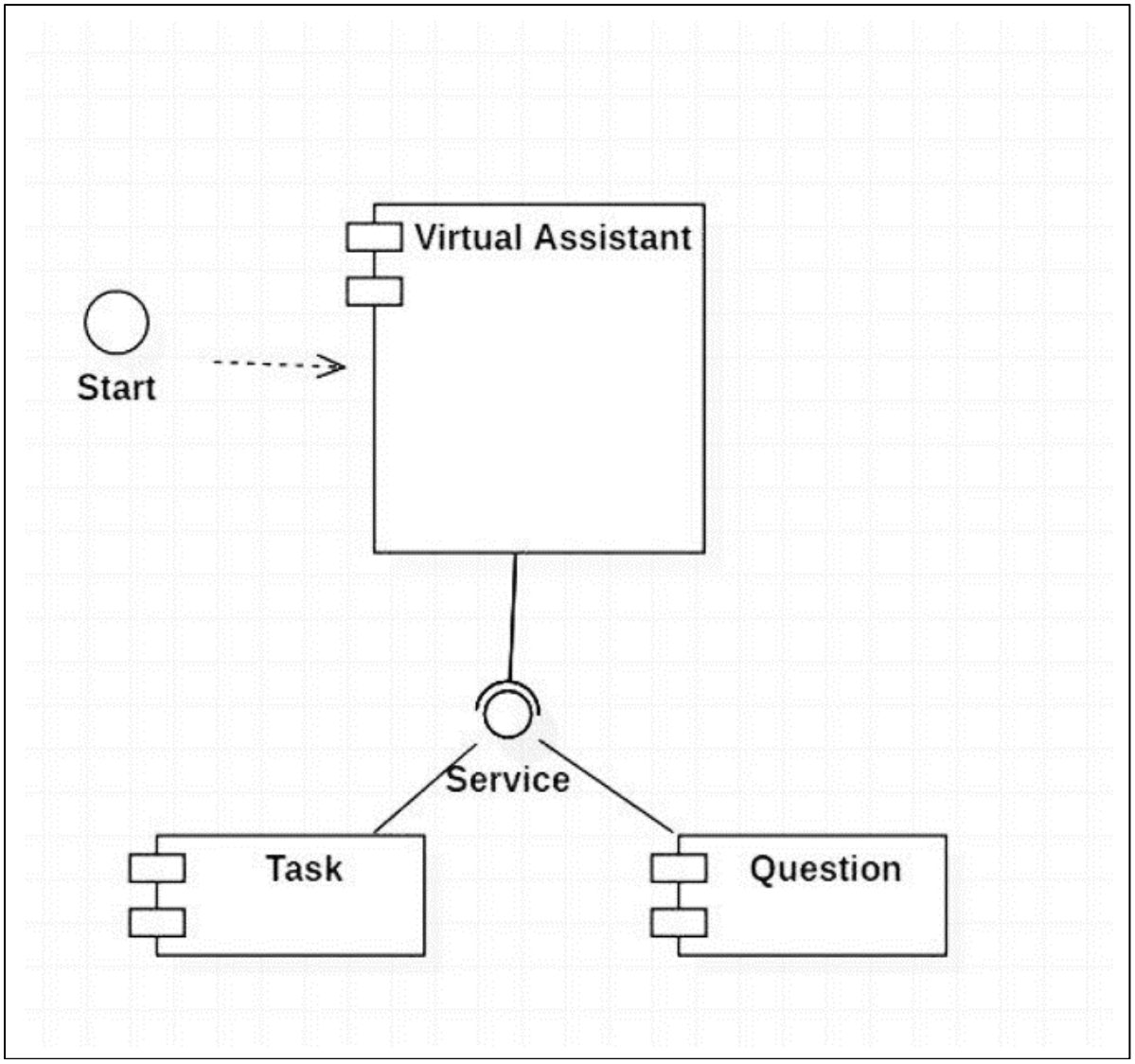


4.7. StateTransitionDiagram



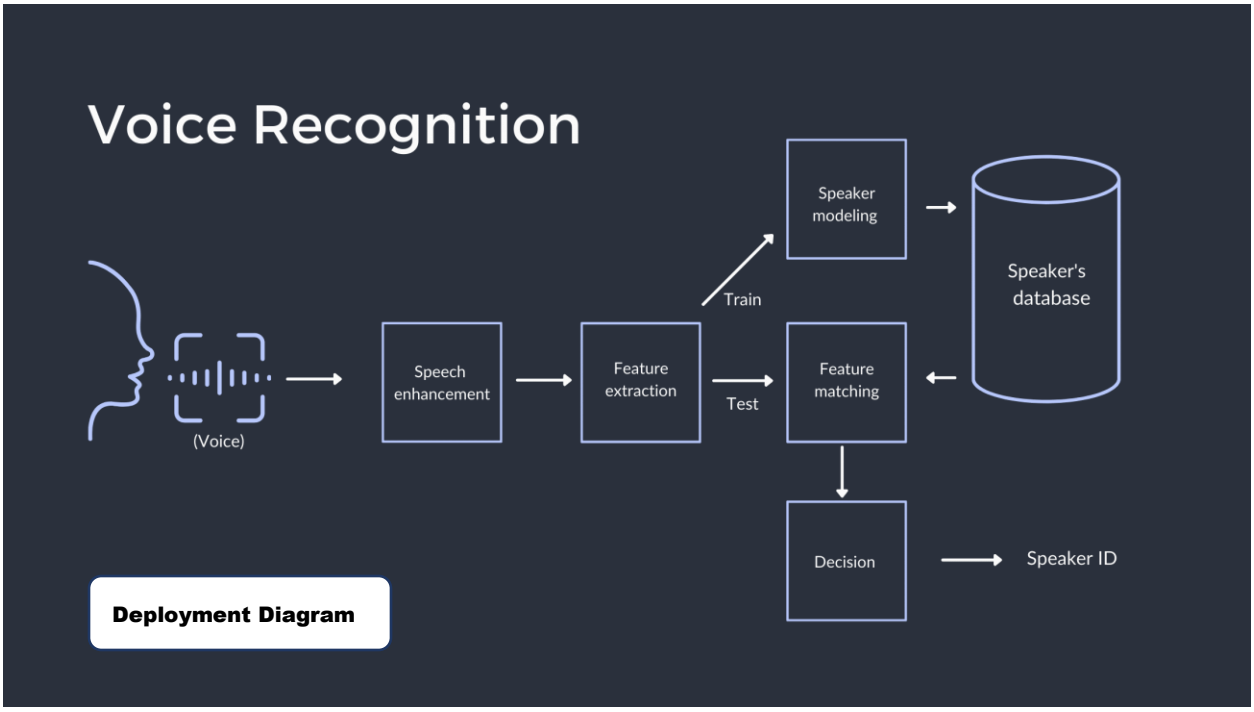
State Transition Testing is a type of software testing which is performed to check the change in the state of the application under varying input. The condition of input passed is changed and the change in state is observed.

4.8. Component Diagram:



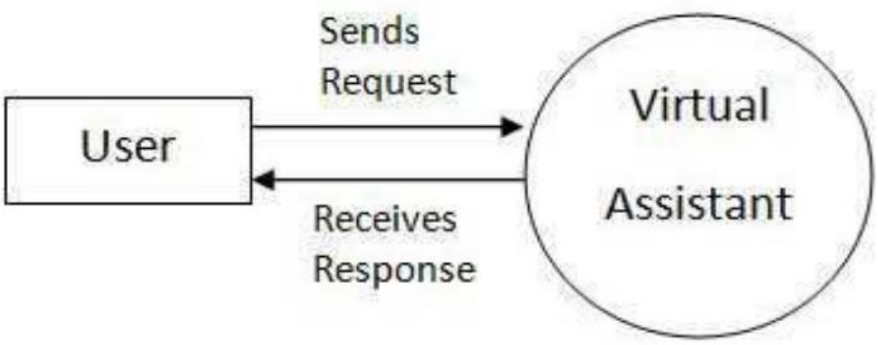
The main component here is the Virtual Assistant. It provides two specific service, executing Task or Answering your question.

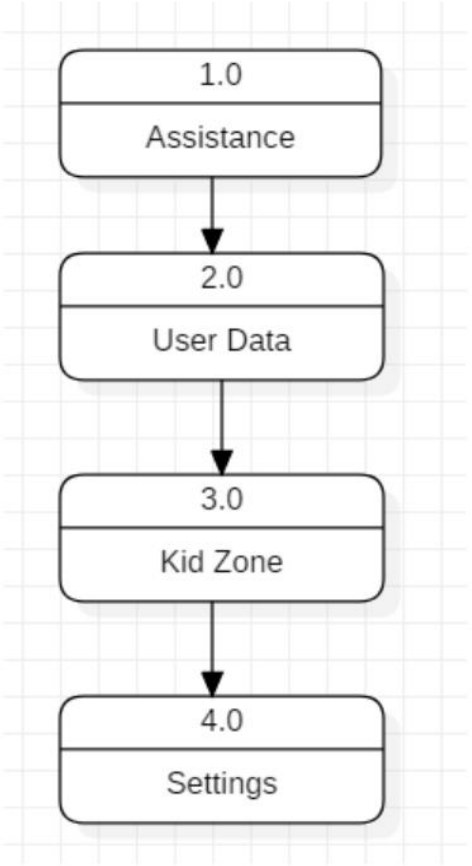
4.9. Deployment Diagram:



4.10. Data Flow diagram [*only if structured approach is used - Level 0 and 1*]

DFD Level 0 and 1 (Context Level Diagram):





Chapter 5
Implementation

Chapter 5: Implementation

This implementation chapter refers to the process of adopting and integrating a software application. Implementation of tools and techniques in Personal Virtual Assistant would be explain. This chapter is all about putting a plan into action; the 'how' as well as the 'what'.

This project will implement new processes for different reasons, including streamlining tasks, promoting efficiency or reducing errors

5.1. Important Flow Control/Pseudo codes

START:

- First, we have to run the **main.py file** which is the actual file for the execution of Assistant.
- After that **greet_user()** function will be performed
- Assistant named as **JARVIS** will greet the user according to the time.
- Then the code moves to the **take_user_input():** it will allow the user to give their command
- Takes user input, recognizes it using Speech Recognition module and converts it into text
- The assistant listens to the command and recognize it.
- The desired function will be performed
- **Open notepad ()**
- **Open discord ()**
- **Open command prompt ()**
- **Open camera ()**
- **Open calculator ()**
- It the user speak the word **EXIT** the assistant will again greet the user and exit the application.

5.2. Components, Libraries, Web Services and stubs

Components, Libraries and web services that have been used in this project are as follow:

- Python extension
- Python interpreter

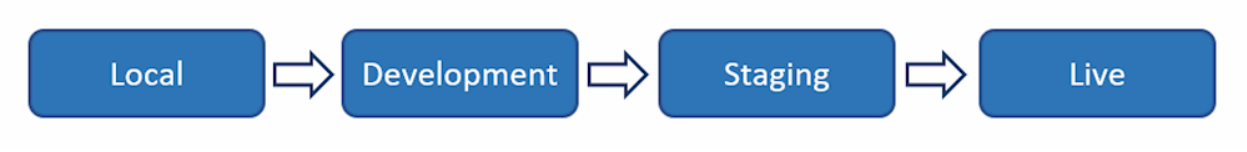
Libraries:

- Requests
- SpeechRecognition
- Python-decouple
- Pywhatkit
- Wikipedia

Web Services:

- Google for searching purpose
- Youtube to play desired videos
- Whatsapp
- Wikipedia
- Weather forecast
- Trending movies
- Latest news

5.3. Deployment Environment



First we have locally developed the code of our application after that moves towards the development cycle in which each every function have been developed. Then by completing the desired the stages we have simply deployed or make our application live.

5.4. Tools and Techniques

Operating system	We have chosen Windows 10 operating system for its best support and user-friendliness.
Tools	Visual studio code
Techniques	Artificial Intelligence
Languages	Python

5.5. Best Practices / Coding Standards

Well-understood and good coding practices that adhere to industry standards ensures that team members can understand how to work within your applications

Good coding in software engineering also helps to prevent errors, control complexity and improve the maintainability of applications

Assigning names to all variables, functions, and methods to make the code easier to read, understand, and maintain. In using a meaningful name, the code will explain itself to anyone who reads it. This will cut down on maintenance costs and confusion when making changes. It is important to be as specific as possible with these names.

We use commonly spoken language for the names. Descriptive text, typically in w the native language. We do not use abbreviations, even those that are commonly used.

The shorter and clearer names or commands use. Too much additional text can result

5.6. Version Control

I. Version control is a method of tracking changes to documents and files to always know which version is the current iteration. By using project software with version control, or version management, we can efficiently track and control changes to these documents directly within our software.

II. Version control is a system that records changes to a file or set of files over time so that you can recall specific versions later.

III. A version control system records all the changes made to a files so a specific version may be call later if needed

Chapter 6

Testing and Evaluation

Chapter 6: Testing and Evaluation

Use Case Testing is a functional black box testing technique that helps testers to identify test scenarios that exercise the whole system on each transaction basis from start to finish. This chapter will tell us that how our project will work under stress conditions This chapter include testing of each and every function included in our project

6.1. Use Case Testing

6.1.1

Test Suite ID	TS001
Test Case ID	TC001
Tes-tCase Summary	To verify that by starting the project first the assistant should greet the user according to the time
Related Requirement	RSoo1: User should able to listen its name and get the greetings from assistant.
Prerequisites	No
Test Procedure	1. Play the assistant 2. it should greet user
Expected Result	1. Call the user by its name 2. Greet them according to time 3. Start taking input from user
Actual Result	Same as the expected result
Status	Pass
Remarks	This test case is simple and easy.
Created By	Evan Eric
Date of Creation	01/07/22
Executed By	Hassan Aslam
Date of Execution	04/07/22
Text Environment	Windows 10 and visual studio code

6.1.2

Test Suite ID	TS002
Test Case ID	TC002
Test-Case Summary	To verify that whether it is sending WhatsApp messages or not
Related Requirement	RSoo2: User must have internet connection and must give the phone number of the receiver
Prerequisites	No
Test Procedure	1.Ask assistant to send WhatsApp message 2. It will listen and recognize
Expected Result	1. Ask the user for receiver number 2. Will ask you the message to send 3. After sending you the message will confirm you
Actual Result	Same as the expected result
Status	Pass
Remarks	This test case is simple and easy.
Created By	Hassan Aslam
Date of Creation	08/07/22
Executed By	Hassan Aslam
Date of Execution	09/07/22
Text Environment	Windows 10 and visual studio code

6.1.3

Test Suite ID	TS003
Test Case ID	TC003
TestCase Summary	To verify that whether it is sending WhatsApp messages or not
Related Requirement	RSoo2: User must have internet connection
Prerequisites	No
Test Procedure	1.Ask assistant to search on Wikipedia 2. It will listen and recognize
Expected Result	1. Ask the user for the content to search 2. Will listen and recognize 3. first it will read the search and then print it on the screen
Actual Result	Same as the expected result
Status	Pass
Remarks	This test case is simple and easy.
Created By	Talha
Date of Creation	021/07/22
Executed By	Hassan Aslam
Date of Execution	21/07/22
Text Environment	Windows 10 and visual studio code

6.1.4

Test Suite ID	TS004
Test Case ID	TC004
TestCase Summary	To verify that whether the YouTube feature is working or not
Related Requirement	RSo04: User should have internet connection and YouTube app
Prerequisites	No
Test Procedure	1. Play the assistant 2. it should greet user 3. ask the query 4. ask assistant to play youtube
Expected Result	1. It will ask you that what you want to play 2. will listen and recognize 3. then play the requested video
Actual Result	Same as the expected result
Status	Pass
Remarks	This test case is simple and easy.
Created By	Evan Eric
Date of Creation	03/10/22
Executed By	Hassan Aslam
Date of Execution	04/10/22
Text Environment	Windows 10 and visual studio code

6.2. Equivalence partitioning

1. Username is alphabetic	**valid**
2. Username non-alphabetic	invalid
3. Email without ‘@’ or ‘.com’	invalid
4. Email without ‘@’ or ‘.com’	valid
5. Queries must be in English	valid
6. Queries in other language	invalid
7. Phone number is alphanumeric	Invalid
8. Phone number is numeric	valid

6.3. Boundary value analysis

Sr.		Partition 1	Partition 2	Partition 3
1.	Password	Less than 8 character	1 – 8 character	9 – 12
2.	Phone Number	<=0	11	9 – 12

6.4. Data flow testing

The relationship between one entity and another while performing a specific task in during data flow. Such as between the listening and recognizing etc.

6.5. Unit testing

In unit testing we have testified our different panel codes individually by performing different tests and by executing them individually, separately on different computers and they were successfully executed and they performed well.

6.6. Performance testing

In performance testing a particular certain situation is given to the voice assistant let's just say users try to give commands to the voice assistant frequently and it handles all the queries and tasks given to it very well and fast. It also replies back to the user within no time. So according to our extracted results.

So according to the extracted results our voice assistant is efficient and smart as well as users can perform their tasks within no time.

6.7. Stress Testing

Activity	Description
Greet User	The assistant greets the user according to the time.
Take user input	Listens to the command of the user and take it as input
Open camera	Open the camera of the desktop upon user's command
Open notepad	Opens the notepad and user can save their notes
Open calculator	Opens the calculator for calculations
Search Ip	Tells the IP address of the device you are using
Google Search	Ask user that what they want to search on google and shoes the result
Wikipedia	Ask user about the article they want to search on Wikipedia and also prints the results on the screen
Youtube	Play the desired video of the user
Send whatsapp message	Ask the number and the message from the user
Send email	Ask receiver address, message and subject
Exit or Stop	These keywords help the user to leave the application

Chapter 7

Summary, Conclusion and Future Enhancements

Chapter 7: Summary, Conclusion & Future Enhancements

7.1. Project Summary

Now that the project Personal Voice Assistant is completed so that we can explain the purpose of the app it is basically a voice assistant. The main purpose of this assistant is to take commands from user in human voice and convert them into text and execute the demanded queries of the user and perform tasks.

It will help many people to control their mobile phones and personal computers with their voice with no efforts. This assistant also replies back to the user very efficiently.

It can handle both online and offline functionalities of the computers.

However, with the passage of time we can add more functions to it according to the requirement.

That said, there is always room for improvement

7.2. Achievements and Improvements

The biggest achievements here are that we were able to enhance our skills to the professional extend that we learned in four years of studying and apply it to this project. We learned software architecture design techniques, UML modeling, project management, testing and much more, and were able to apply it all in this project.

The next big achievement is the things we learnt during this project. New languages, frameworks, libraries, different software's for diagrams Database. All that will be useful for us in our futures. We learn Creative thinking.

We have achieved all the targeted goals that we have set for our final year project such as the following functions of our personal voice assistant:

1. Greeting the user
2. Online functions
3. Offline functions

4. Goodbye function

Our voice assistant reply, execute commands and understand the user queries and demand within seconds.

7.3. Critical Review

The critical element of our system is:

It requires strong connectivity of internet to make the assistant keep in working . To manage all these aspects, it took lot of time and hard work.

We are still working on noise enhancement feature which is difficult for us to achieve but with the passage of time we will achieve it.

7.4. Lessons Learnt

We observed very much from this project. This project sharpens our skills in python and visual studio many other tools and many management concepts as well as how to deal with a problem and how to stick for finding the solution of any problem until you found it. As well as technical skills this project also enhances our personal development skills such as team working, dedication and hard work

7.5. Future Enhancements/Recommendations

As it has been already said, there is always room for further improvement.

We will make it more efficiency, accessibility, flexibility, we are definitely going to scale it up which we believe ours is eventually going to become. We make it more user-friendly interface.

We can move towards smart homes as well where we can control all our home appliances through voice assistant.

We can add more features to make it more efficient and smarter.

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Reference and Bibliography

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