Rayat Shikshan Sanstha's

Karmaveer Bhaurao Patil Polytechnic, Satara

A Capstone Project Planning Report

On

"JARVIS VIRTUAL ASSISTANT"

Presented By

Roll No	Name of Student
41	Nadaf Saad Asad
43	Atharava Ajit Ombase
32	Kshitij Manishkumar Jangam
1	Aditya Nilesh Dhane

Diploma in Computer Engineering

Guided By

Mrs. Deshmukh P.S.

Computer Engineering Department

[2022-23]

Annexure A

C E R T I F I C A T E

This is to certify that Mr. **Kshitij Manishkumar Jangam** from Karmaveer Bhaurao Patil Polytechnic, Satara having Enrollment No.: 2000410058 has completed report on the **Problem Definition / Semester V Project Report / Final Project Report** having title **JARVIS VIRTUAL ASSISTANT** group of 4 persons under the guidance of the Faculty Guide.

Signature

Name of Guide:- **Mrs. Deshmukh P.S.** Sign:-

Name of HOD:- **Prof. Ghorpade B.S** Sign:-

Appendix B

Evaluation Sheet (ESE)

For

Capstone Project Planning

Name of Student:- Kshitij Manishkumar Jangam **Enrollment No.-2000410058**

Name of Program :- Computer Engineering **Semester: 5**

Course Title and Code :- Capstone Project Planning(22058).

Title of The Project :- JARVIS VIRTUAL ASSISTANT

Name of Polytechnic :- Karmaveer Bhaurao Patil Polytechnic, Satara.

A. POs addressed by the Capston Project: (Mention only those predominant Pos)

a) Use of MySQL and Database Connectivity.

b) Understand data integrity concept.

c) Understood data Extensible markup language.

B. COs addressed by the Capstone Project: (Mention only those predominant Pos)

a) Considered ethical issues and solved them

b) Assessed the impact out project will bring to Users body.

c) Prepared project proposal with action plan beforehand.

d) Communication done by group members.

C. Other Learning Outcome Achieved Through This Project

a) Unit Outcome (Cognitive Domain)

a) Use of Python Language.

b) Use of Speech Recognition python package.

c) Use of MySQL dataset integration

d) Use of MySQL Queries.

b) Practical Outcomes (Psychomotor Domain)

a) Understood packages provided by python.

b) Understood Pyautogui python library for graphical user interface.

c) Understood pyqt5 package for GUI development for our project

d) Understood pyttsx3 python library which converts text to speech

c) Affective Domain Outcomes

a) Understood packages provided by python.

b) Understood Pyautogui python library for graphical user interface.

c) Understood pyqt5 package for GUI development for our project

d) Understood pyttsx3 python library which converts text to speech

	Progressive Assessment (PA) Sheet		
S No.	**Criteria**	**Max. Marks**	**Marks obtained**
1	**Problem Identification/ Project Title**	**10**	
2	**Industrial Survey / Literature Review**		
3	**Punctuality and Overall Contribution**		
4	**Project Diary**		
5	**Project writing including documentation**	**10**	
6	**Presentation**	**05**	
	Total marks	**25**	

Name and Signature Of Project Guide

Mrs. Deshmukh P.S.

Appendix C

Suggested Rubric For Assessment of Capstone Project

S No.	Characteristics to be assessed	Poor	Average	Good	Excellent
1	Problem / Task Identification (Project Title)				
2	Literature Survey / Industrial Survey				
3	Project Proposal				
4	Project Diary				
5	Final Report Preparation				
6	Presentation				
7	Question and Answer session				

End Semester Examination (ESE)

For

Capstone Project Planning

Name of Student: Kshitij Manishkumar Jangam Enrollment No: 2000410058

Name of Program : Computer Engineering Semester: 5

Course Title and Code: Capstone Project Planning (22058)

Title of The Project: JARVIS Virtual Assistant.

S No.	Criteria	Max. Marks	Marks obtained
1	Project writing including documentation	15	
2	Presentation	10	
	Total marks	25	

Project Guide
Mrs. Deshmukh P.S.

Senior faculty / Head of Department

ACKNOWLEDGEMENT

It is great pleasure for us to acknowledge the assistance & contribution of the number of individuals who helped us in presenting the Project "**JARVIS VIRTTUAL ASSISTANT**". We have successfully completed our project with the handful support of Staff, Project Partners, External Resources, etc. We acknowledge all of them & them for their support.

Special thanks to project guide **Mrs. Deshmukh P.S.** gave us valuable guidelines for the seminar & project work. We whole heartedly thank all the staff members & every possible person who possibly helped us in this project.

We would like to give away gratitude to **Mr. Ghorpade B.S.**, Head of Computer Engg. Department for prior support in terms of morality, technical aspects & relative guidance required for the "**JARVIS VIRTTUAL ASSISTANT** which helped us get a better grip & quality in every aspect of the project.

Our sincere thanks to **Prin. Dr.Shaikh K.C.,** Principal, Karmaveer Bhaurao Patil Polytechnic, Satara, for providing us an opportunity to present & express the ideas of our project.

Thanking You,

- **Nadaf Saad Asad**
- **Aditya Nilesh Dhane**
- **Atharva Ajit Ombase**
- **Kshitij Manishkumar Jangam**

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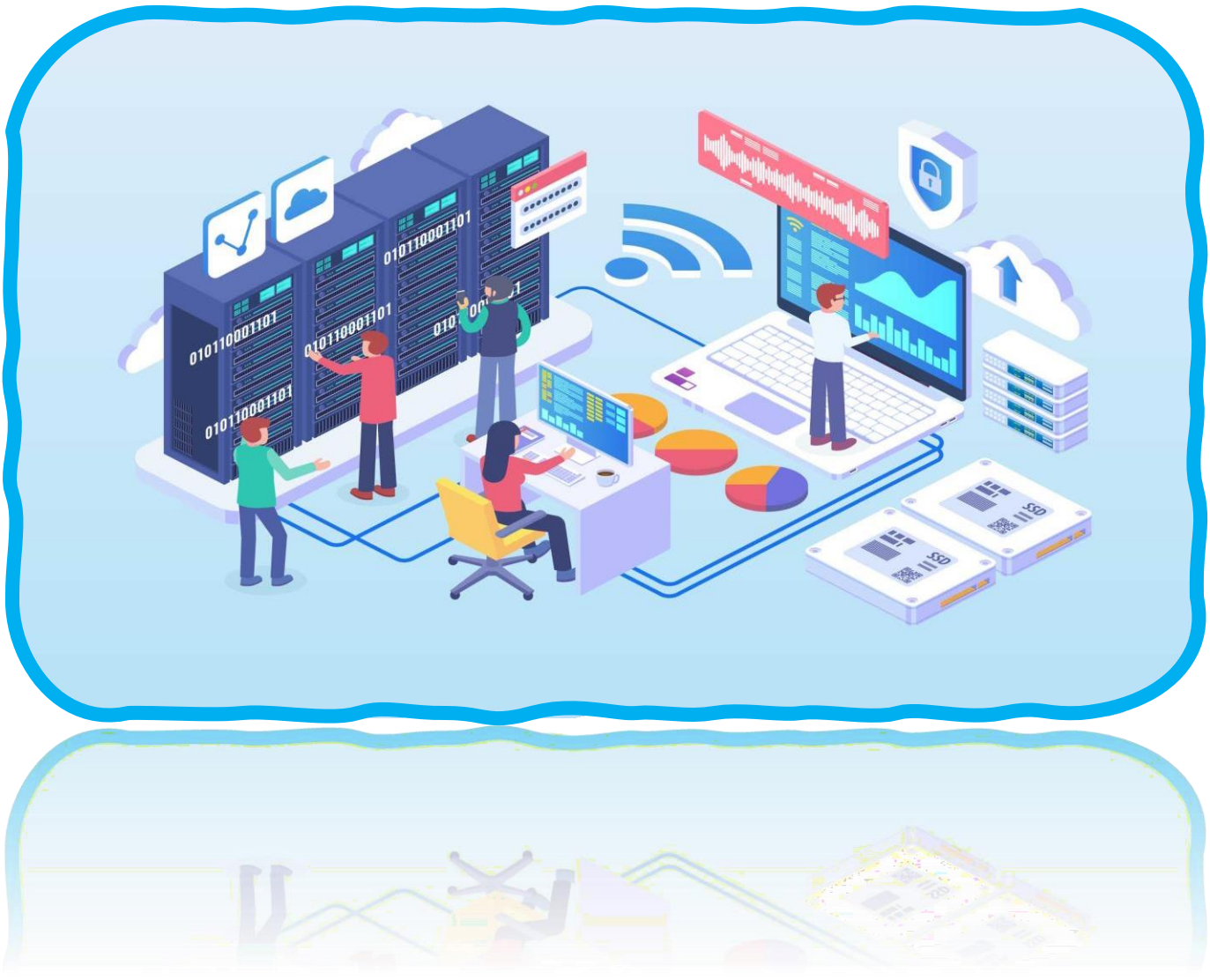
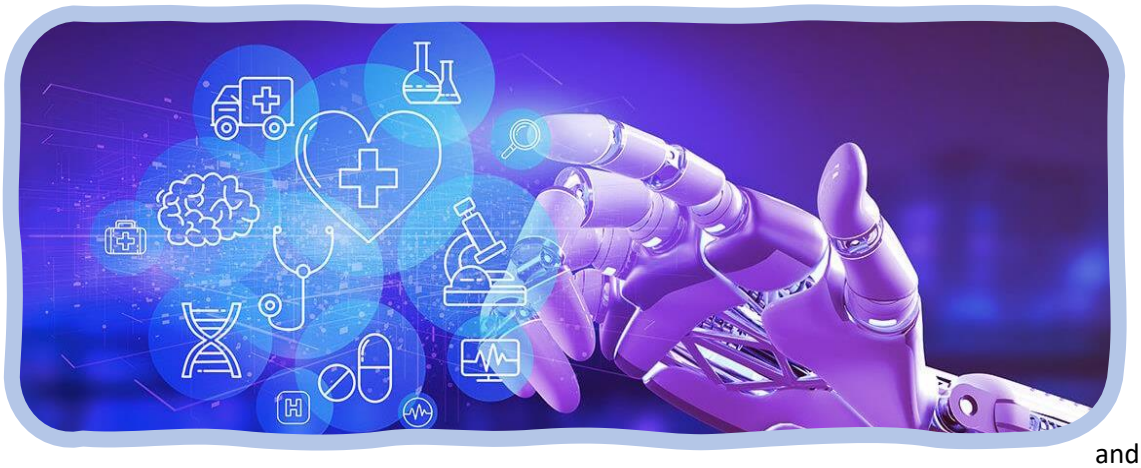
CHAPTER 1: Abstract

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 process of converting speech into text. This is commonly used in voice assistants like 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, We realized that the concept of AI in every field is decreasing human effort and saving time



CHAPTER 2: 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.

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Chapter 3: Literature Survey

S. No	Name	Year	Author	Review
1.	Jarvis, Digital Life Assistant'	2013	Khobragade S.	This paper explains how the author's project uses voice as a communication format, which is basically the Speech recognition application.There are two main basic concepts in speech technology: Synthesizer & recognizer. A speech synthesizer takes input and produces an audio stream as output,while speech recognition takes an audio stream as input and turns it into text transcription.
2.	'Virtual assistant for the visually impaired'	2020	Iyer V.,Shah T.K. ,Sheth S.,Kailas D.	In this paper, the author explains how he built a software that provides a new dimension to access and provide commands to any website.
3.	AI Based Voice Assistant Using Python	2019	Shende D.,Umahiya R.,Raghorte M.,Bhisikar A.,Bhange A.	In this paper, the design and implementation of Digital Assistance is discussed. The project is built using open source software modules with PyCharm community backing which can accommodate any updates in the near future. The modular nature of this project makes it more flexible and easy to add additional features without disturbing current system functionalities.
4.	Research Desktop Assistant	2022	Dhanraj K.V.,Kriplani L. and Mahajan S.	A key objective of AI in this paper is to establish natural dialogue between humans and machines. Voice assistants are great innovations in artificial intelligence that can revolutionize how people live in a very positive way. Since voice assistants were introduced to smartphones, they have been widely accepted. Desktop voice assistants are programs that recognize human voices and

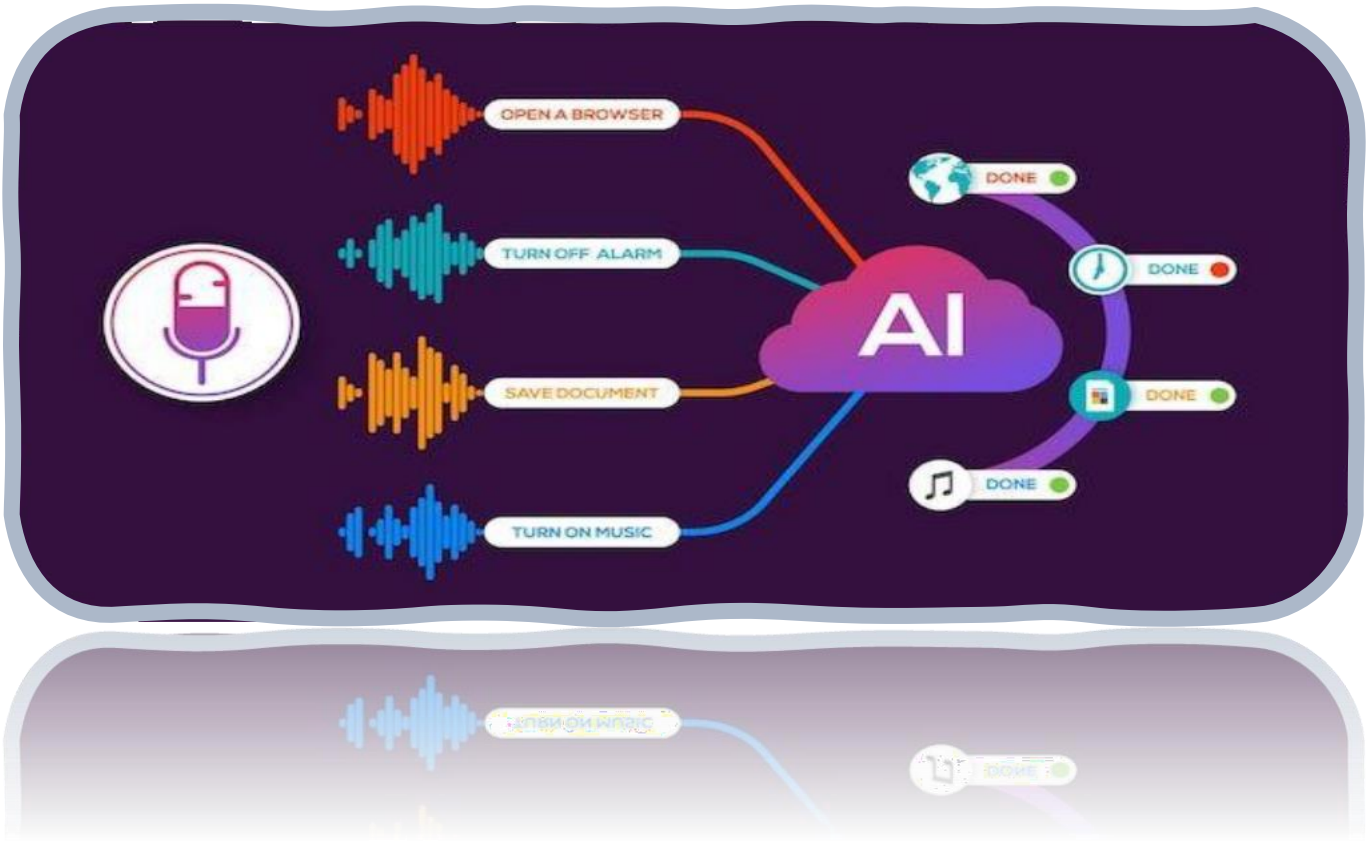
CHAPTER 4 : Problem Statement and Scope

Problem Statement :

- To develop Jarvis Virtual Assistant for particular automation for the medical industry.
- **leverages computers and machines to mimic the problem–solving and decision–making capabilities of the human mind.**

Future Scope :

The virtual assistants which are currently available are fast and responsive but we still have to go a long way. The understanding and reliability of the current systems need to be improved a lot. The assistants available nowadays are still not reliable in critical scenarios. The future of these assistants will have the virtual assistants incorporated with Artificial Intelligence which includes Machine Learning, Neural Networks, etc. and IoT. With the incorporation of these technologies, we will be able to achieve new heights. What the virtual assistants can achieve is much beyond what we have achieved till now. Most of us have seen Jarvis, that is a virtual assistant developed by iron man which is although fictional but this has set new standards of what we can achieve using voice-activated virtual assistants.



CHAPTER 5: System Requirement Analysis

Minimum Requirement

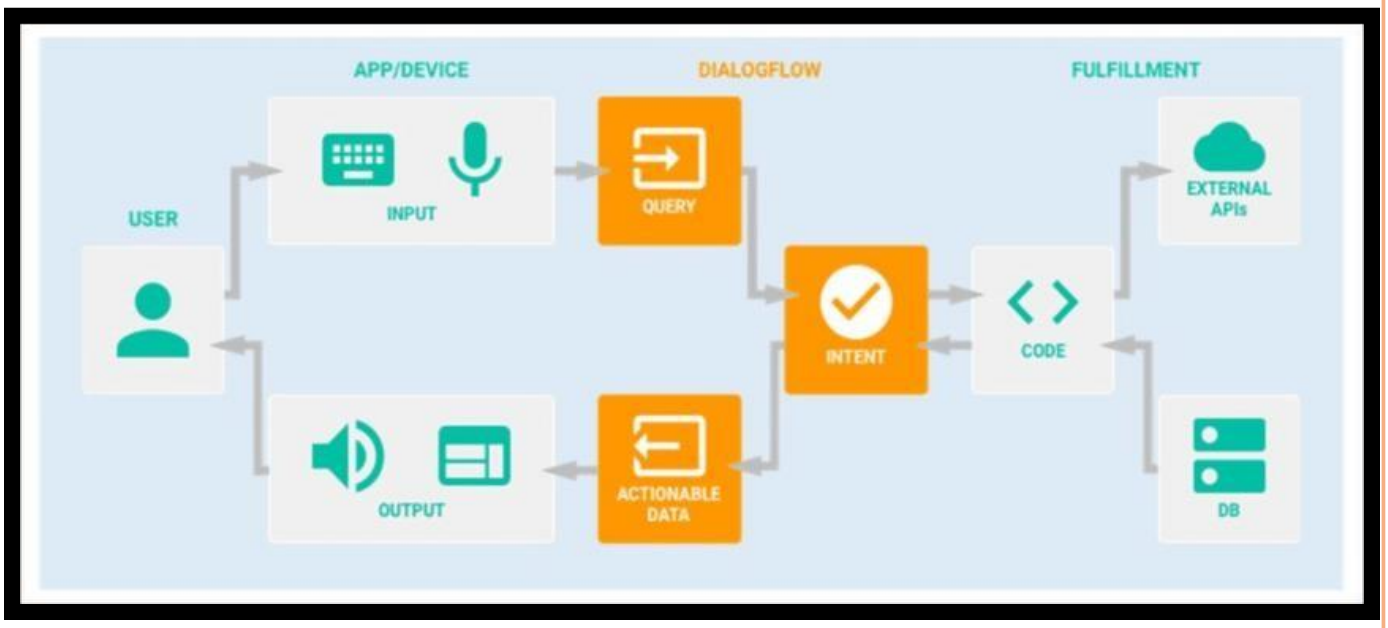
- Computer System
  - Intel Core i5
  - 4 GB RAM
  - Inbuild Microphone (Any)
  - 15 GB ROM
  - Internet Connection

Recommended Requirement

- Computer System
  - Intel Core i7
  - 8 GB RAM
  - Inbuild Microphone -Zebronics
  - 15 GB ROM
  - Internet Connection

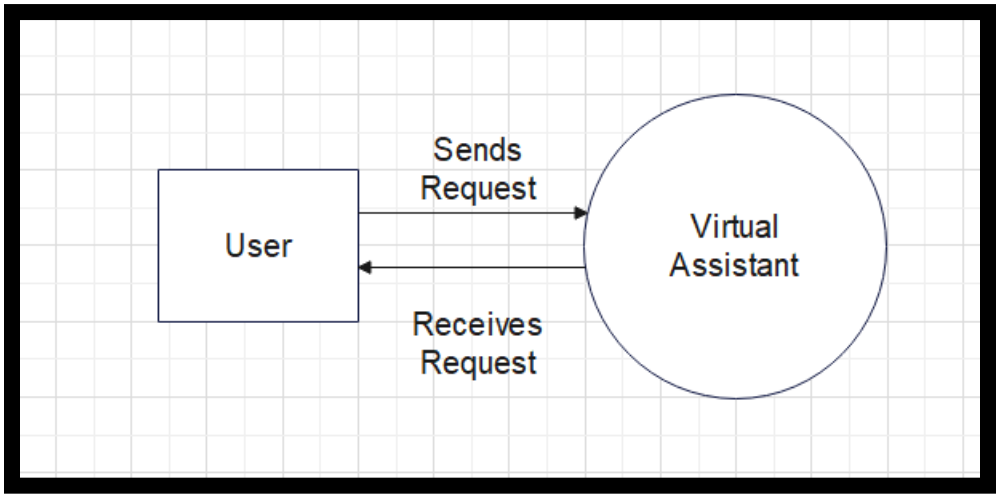
CHAPTER 6: Design And Planning

System Architecture:



DFD Diagram :

DFD Level 0 :



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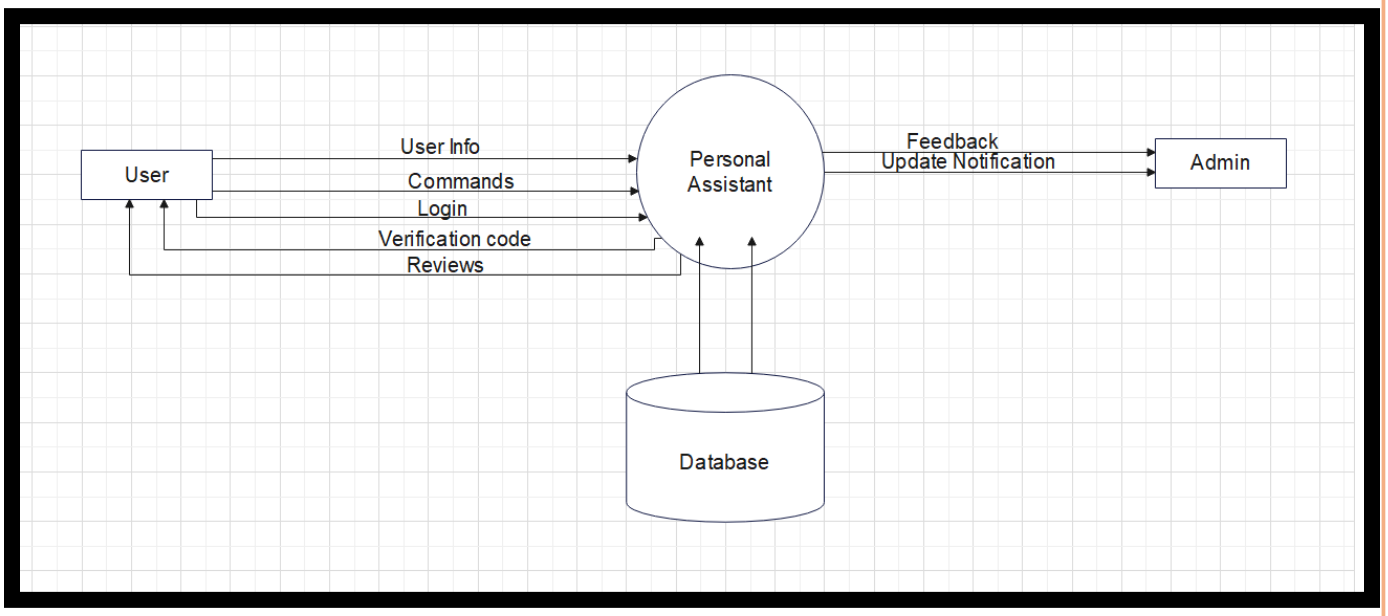

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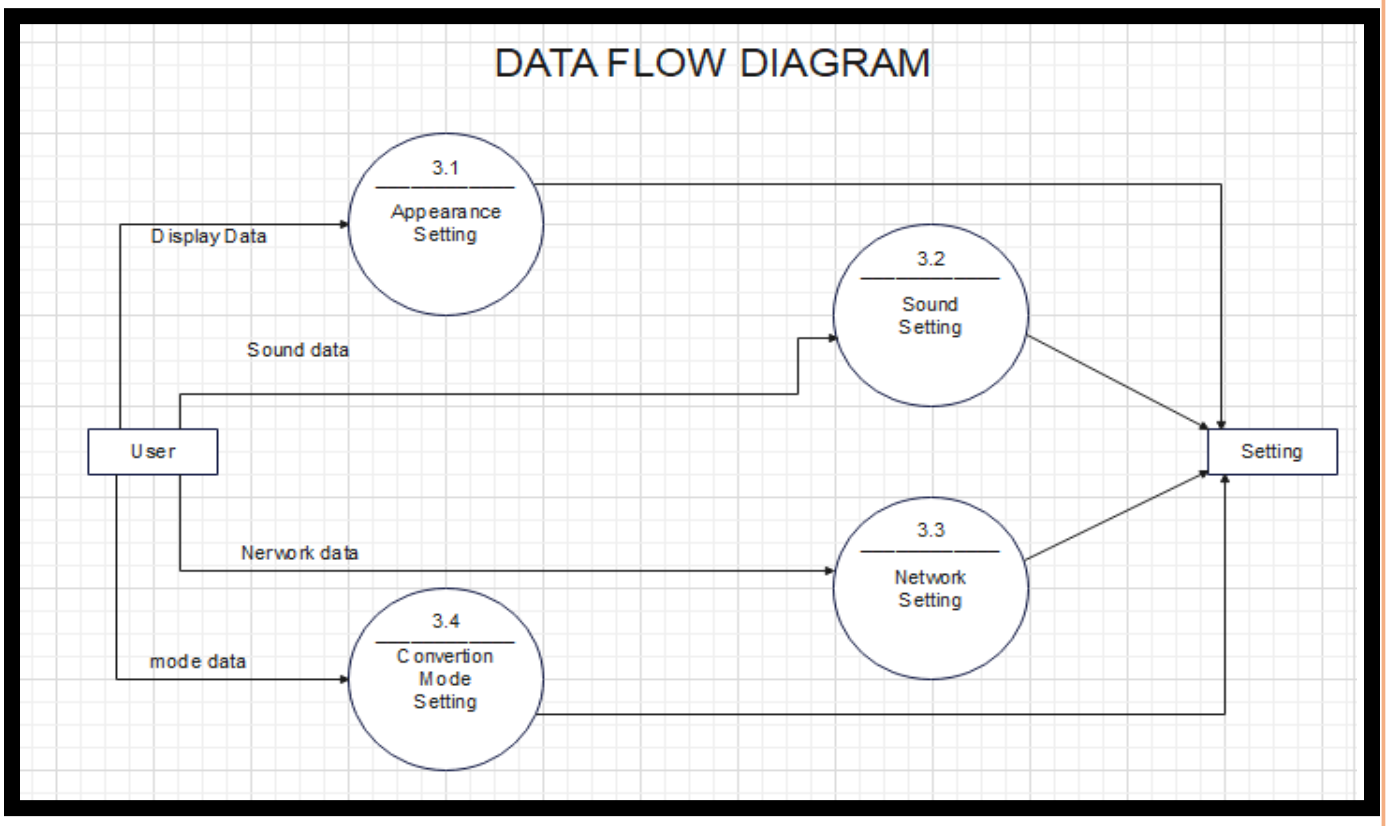
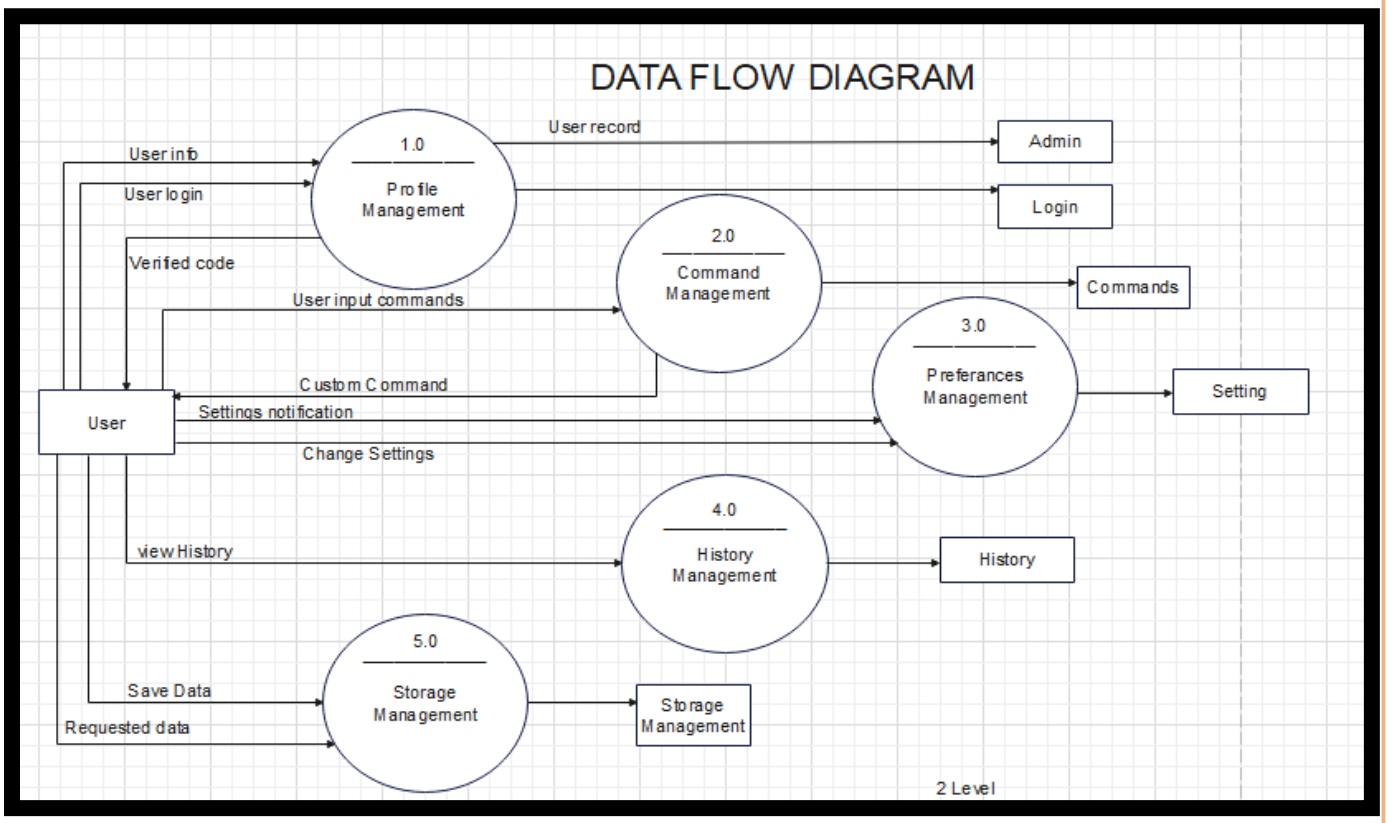
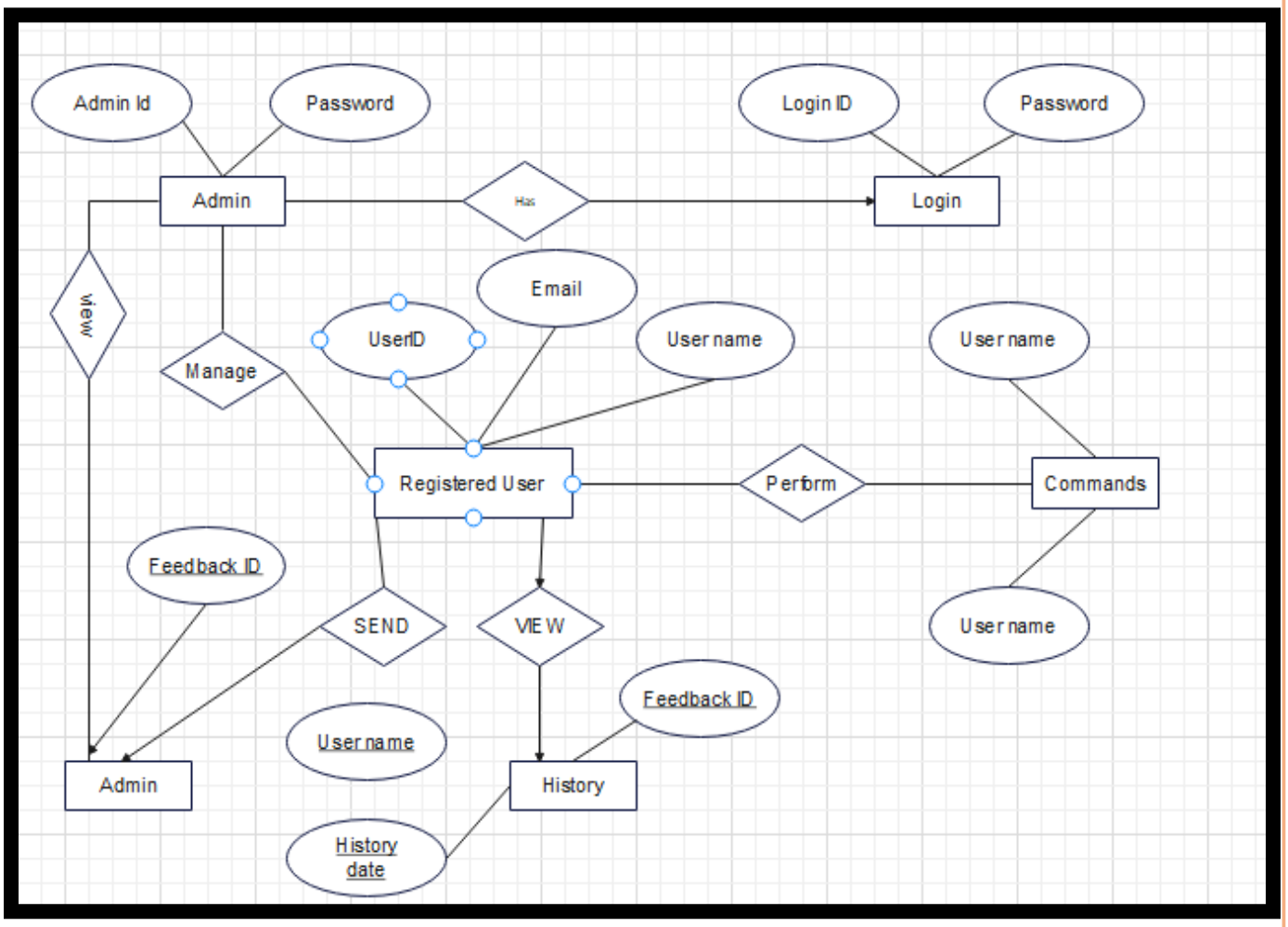


DFD Level 2 :


DATA FLOW DIAGRAM
User info
User login
Verified code
1.0
Profile Management
User record
Admin
Login
2.0
Command Management
User input commands
Commands
3.0
Preferances Management
Setting
Custom Command
Settings notification
Change Settings
User
view History
4.0
History Management
History
5.0
Storage Management
Save Data
Requested data
Storage Management
2 Level

ER Diagram :


Admin Id
Password
Login ID
Password
Admin
Has
Login
view
Email
UserID
User name
User name
Manage
Registered User
Perform
Commands
Feedback ID
SEND
VIEW
User name
Feedback ID
User name
Admin
History
History date

UML Diagram :

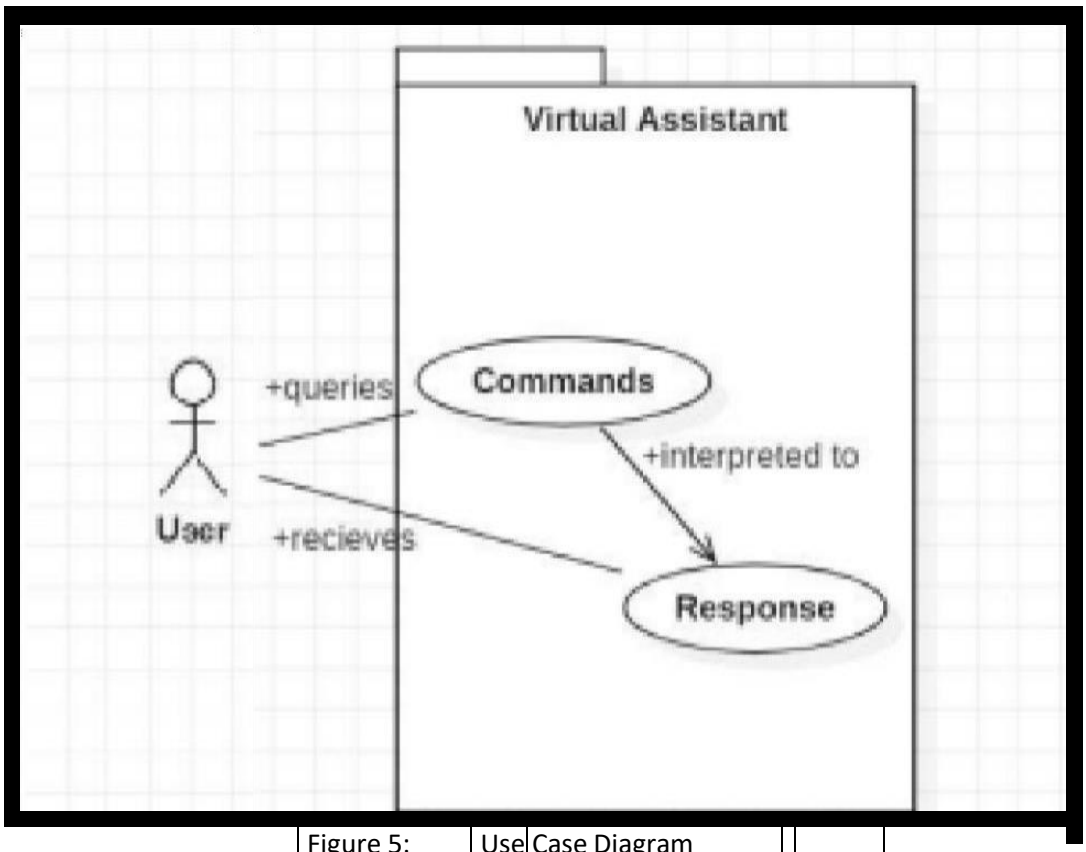


Figure 5: Use Case Diagram

Activity Diagram :

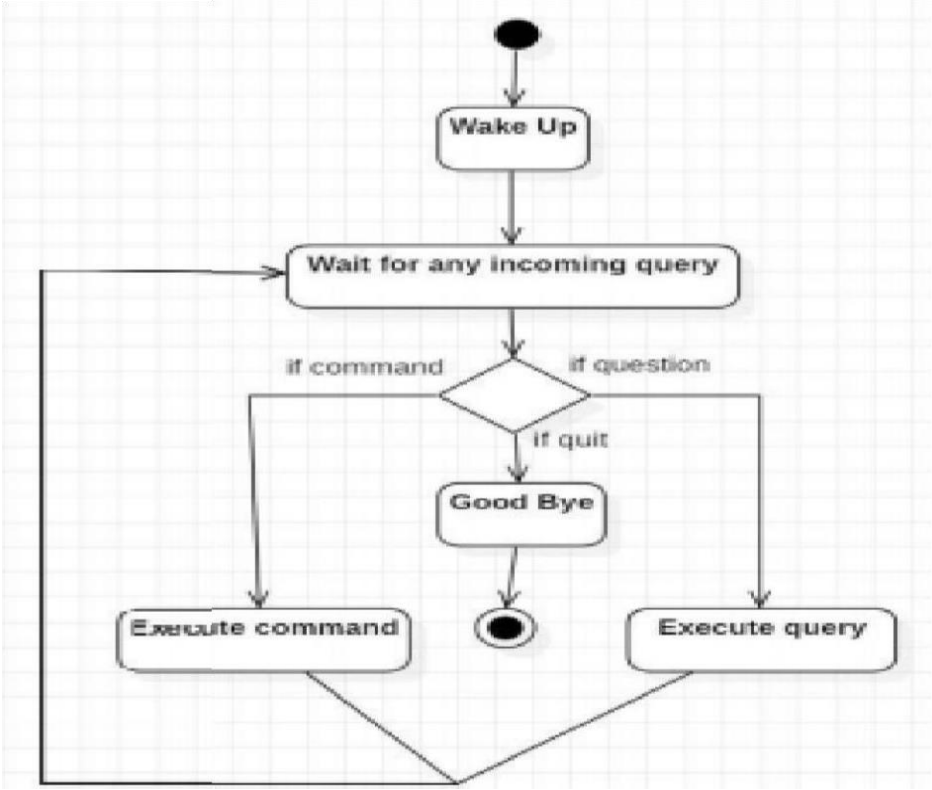


Figure 3: Activity diagram

Sequence Diagram :

A. Sequence diagram for Query -

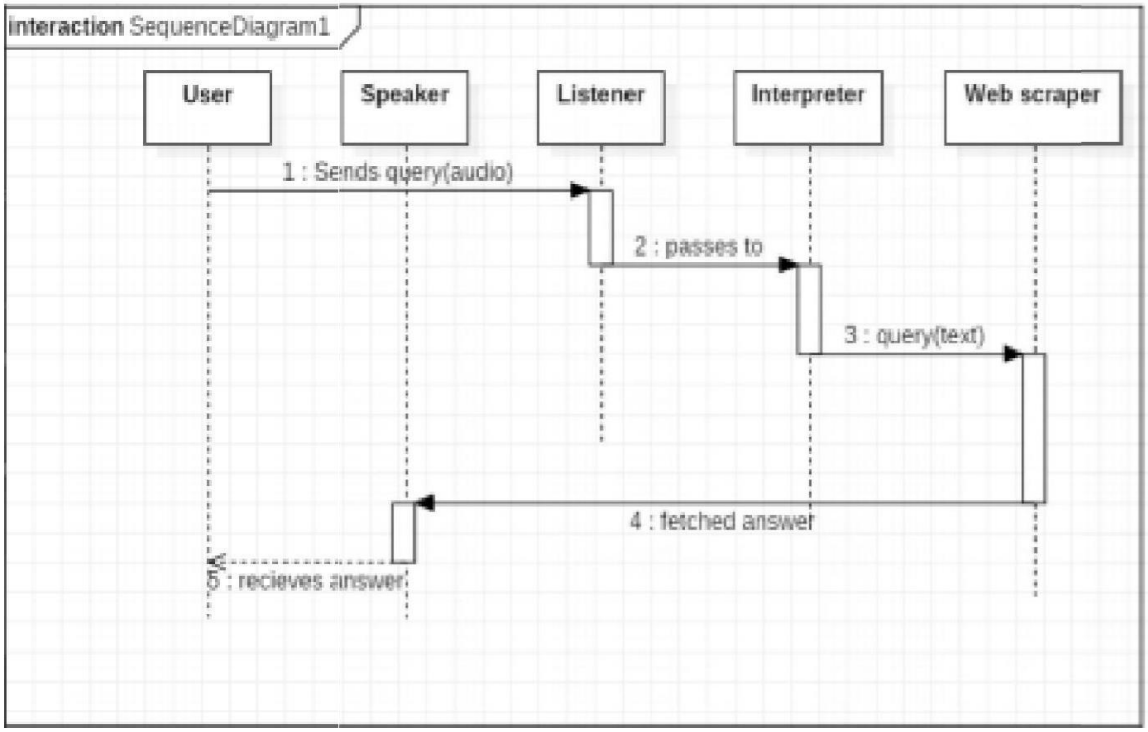


Figure 6: Sequence Diagram

B) Sequence Diagram for Task Execution :

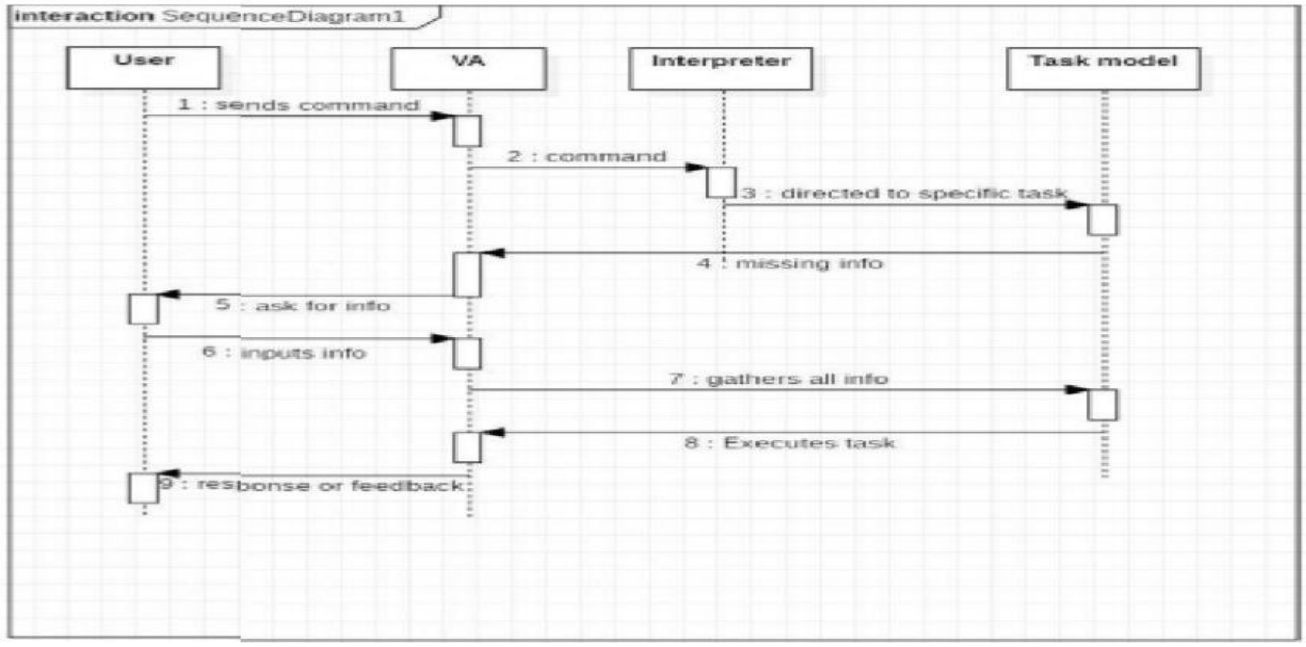


Figure 7: Sequence diagram for Task Execution

CHAPTER 7 : IMPLEMENTATION DETAIL

7.1 : FRONT END

7.1.1 Python.

Python is a high-level, general-purpose, self-contained programming language designed to meet the needs of computer scientists, software developers, and college students interested in coding. Python was created in the early 1980s by Guido van Rossum while he was at IBM. The language is named after its inventor. It's become one of the most popular programming languages in recent history. Python is a high-level, interpreted, dynamic object-oriented programming language that can be used to program applications or websites. It is also known as object-oriented programming (OOP) language. The main benefits of using Python instead of other languages are that it is very easy to start programming with and because of its flexible syntax, it can be used to program almost any kind of software application. Python is an open-source language that's free to use and has a wide range of features that make it easy to customize. It's also a great choice for beginners because it's easy to pick up and use. In addition to its ease of use, Python has a number of other features that make it an excellent choice for programmers who want to get into the world of software development. In this article, we will discuss some of the major features of Python that make it stand out from other languages.

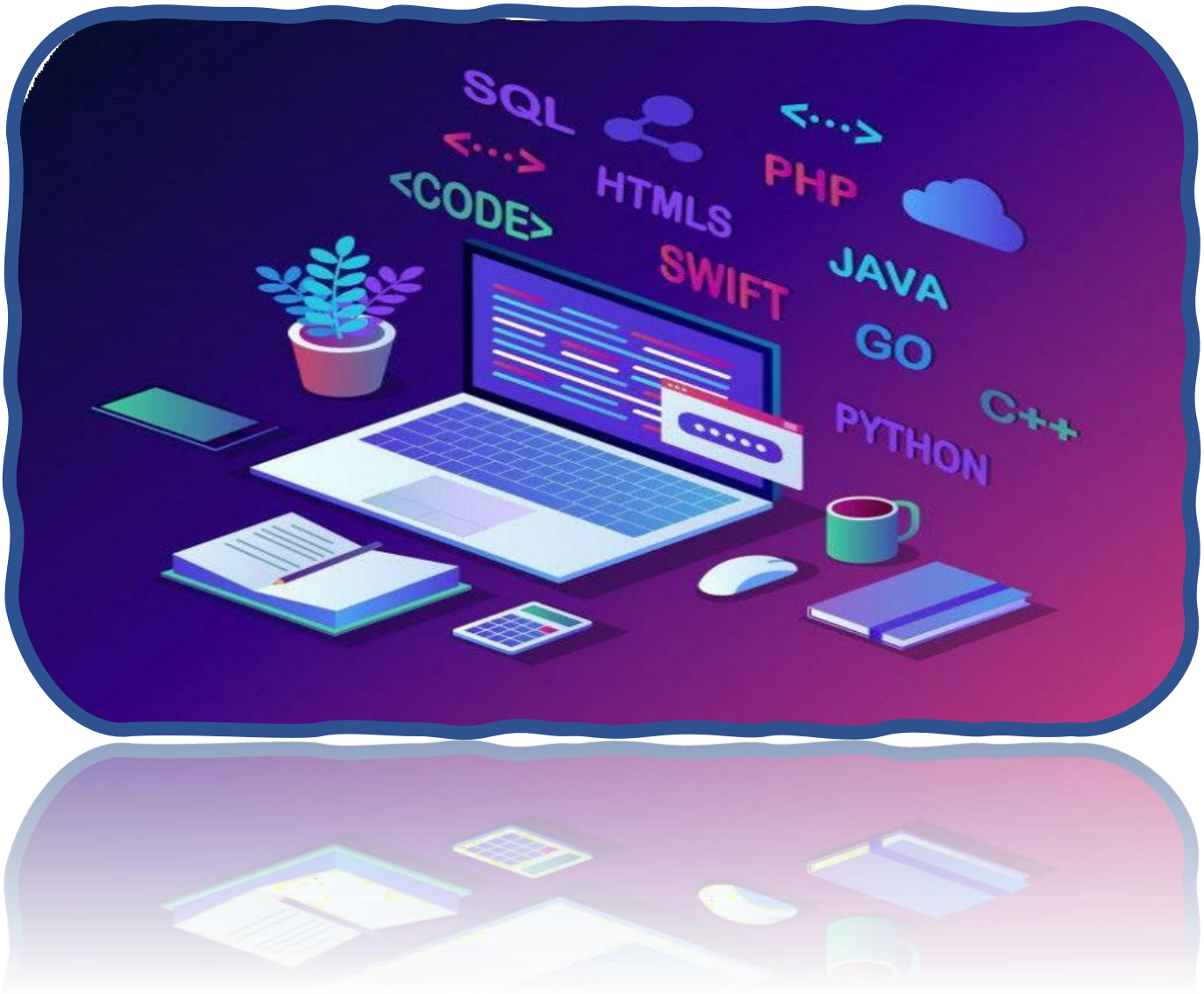
7.2 : BACK END

7.2.1 MySQL

MySQL is a database management system that is used to maintain relational databases. It is an open-source software backed by Oracle Corporation. This was originally founded by a Swedish company called MYSQL AB which was later acquired by sun microsystems and finally with Oracle Corporation. As it is an open-source database system, the source code can be modified according to our needs. It also offers premium services if a commercial license is purchased from Oracle Corporation. MySQL is a scalable, fast, and reliable database management system which can run on any platform like Windows, Unix, Linux, etc., and can be installed on a desktop or any server machine.

It is also very to master compared to other database management systems existing in the market like Microsoft SQL Server, Oracle Database, etc. MySQL is most suitable for web applications. MySQL is an essential component of the LAMP stack, which includes Linux, Apache, MySQL, and PHP. LAMP is a platform for web development using Linux as the operating system, the web server of apache, the relational database management system of MySQL and the object-oriented scripting of PHP. There are many top websites using MySQL. Apart from this, there are numerous corporations using MySQL as their relational database management system. A few examples include Youtube, Facebook, Twitter, etc. MySQL works on a client-server model, the MySQL server being the core handling all commands.

Under a client-server networked environment, MySQL server is available as a separate program. Also, it is available as a library that can be linked to separate applications. There are several utility programs supporting the administration of the MySQL database. On the other hand, MySQL clients are installed on computers in the network. Instructions are sent from the MySQL client to the MySQL server, and then the MySQL server acts on it accordingly. In spite of MySQL being installed on one machine, it is capable of sending databases to multiple locations, and users are able to access the same using different MySQL client interfaces. The results are displayed as these interfaces transmit the SQL statements to servers. There is no need for users to learn new commands as MySQL can be operated using existing SQL commands only. Data replication and table partitioning can also be done in MySQL which allows users to have better performance and more durability. Multiple storage engines like NDB, InnoDB, etc., can be used to store and access data.



CHAPTER 8: Testing

This project includes five modules and is listed below:

1. Unite Testing:
2. Integration Testing:
3. Software Verification and validation :
4. Black-Box Testing :
5. White-Box Testing :
6. System Testing:

A. Unite Testing:

In computer programming, unit testing is a software testing method by which individual units of source code, sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures, are tested to determine whether they are fit for use. Intuitively, one can view a unit as the smallest testable part of an application. In procedural programming, a unit could be an entire module, but it is more commonly an individual function or procedure. In object oriented programming, a unit is often an entire interface, such as a class, but could be an individual method. Unit tests are short code fragments created by programmers or occasionally by white box testers during the development process. It forms the basis for component testing. Ideally, each test case is independent from the others. Substitutes such as method stubs, mock objects, fakes, and test harnesses can be used to assist testing a module in isolation .Unit tests are typically written and run by software developers to ensure that code meets its design and behaves as intended**.**

B. Integration Testing:

Integration testing (sometimes called integration and testing, abbreviated I&T) is the phase in software testing in which individual software modules are combined and tested as a group. It occurs after unit testing and before validation testing. Integration testing takes as its input modules that have been unit tested, groups them in larger aggregates, applies tests defined in an integration test plan to those aggregates, and delivers as its output the integrated system ready for system testing .

C. Software Verification and validation:

In software project management, software testing, and software engineering, verification and validation (V&V) is the process of checking that a software system meets specifications and that it fulfills its intended purpose. It may also be referred to as software quality control. It is normally the responsibility of software testers as part of the software development lifecycle. Validation checks that the product design satisfies or fits the intended use (high-level checking), i.e., the software meets the user requirements. This is done through dynamic testing and other forms of review. Verification and validation are not the same thing, although they are often confused. Boehm succinctly expressed the difference between

- Validation: Are we building the right product?
- Verification: Are we building the product right?

D . Black-Box Testing:

Black-box testing is a method of software testing that examines the functionality of an application without peering into its internal structures or workings. This method of testing can be applied virtually to every level of software testing: unit, integration, system, and acceptance. It typically comprises most if not all higher-level testing, but can also dominate unit testing as well.

E. White-Box Testing:

White-box testing (also known as clear box testing, glass box testing, transparent box testing, and structural testing) is a method of testing software that tests the internal structures or workings of an application, as opposed to its functionality (i.e. black-box testing). In white-box testing, an internal perspective of the system, as well as programming skills, are used to design test cases. The tester chooses inputs to exercise paths through the code and determines the appropriate outputs. This is analogous to testing nodes in a circuit, e.g. in-circuit testing (ICT).

F. System Testing:

System testing of software or hardware is testing conducted on a complete, integrated system to evaluate the system's compliance with its specified requirements. System testing falls within the scope of black-box testing, and as such, should require no knowledge of the inner design of the code or logic. As a rule, system testing takes, as its input, all of the "integrated" software components that have passed integration.

1 UNIT TESTING

Unit Testing is done to check whether the individual modules of the source code are working properly. i.e. testing each and every unit of the application separately by the developer in the developer's environment. It is AKA Module Testing or Component Testing

Done by: Developers

2 INTEGRATION TESTING

Integration Testing is the process of testing the connectivity or data transfer between a couple of unit tested modules. This process is carried out by using dummy programs called Stubs and Drivers.

Types on Integration testing:

- Top-Down Integration Testing
- Bottom-Up Integration Testing
- Big Bang Integration Testing

Done by: Developers

3 SYSTEM TESTING

Also knows as a black box testing. This step involves testing the fully integrated application; it is also knows as an end-to-end scenario testing.

Done by: Testers

4 ACCEPTANCE TESTING

Acceptance Testing is a level of software testing where a system is tested for acceptability. The purpose of this test is to evaluate the system's compliance with the business requirements and assess whether it is acceptable for delivery.

Types on Integration testing:

- **Alpha Testing**- Is mostly like performing usability testing which is done by the in-house developers who developed the software.
- **Beta Testing** - Is done by a limited number of end users before delivery, the change request would be fixed if the user gives feedback or reports defect.
- **Gamma Testing** - is done when the software is ready for release with specified requirements

Done by: End users

CHAPTER 9: Advantages

- **Easy to use**
- **Can work with a variety of commands**
- **Custom Command**
- **Secure**

CHAPTER 10: Conclusion

Conclusion :

Voice Assistant helps the users with hand free voice control of their system. Speech recognition is the technology which provides a new way of human interaction with machines. It is very much helpful to the physically challenged people. This helps the visually impaired to have access to the most important features of the system enhancing the quality of the system by making use of the different custom layouts and using text to speech. It not only works on human commands but also gives responses to the user on the foundation of a query being asked or the words spoken by the user such as opening tasks and operations. It is addressing the user the way the user feels more enjoyable and feels free to interact with the voice assistant. The entire system works on verbal input rather than text.

11.1 Action Plan (Sequence and Time Required For Major Activities for 8 Weeks)

Sr. No.	Details of activity	Planned Start date	Planned Finish date	Name of responsible team members
1	Decide the subject of project	30/10/2022	16/011/2022	Nadaf Saad Asad. Kshitij Manishkumar Jangam. Athrva Ajit Ombase. Aditya Nilesh Dhane.
2	Collecting information of project	20/11/2022	02/012/2022	Nadaf Saad Asad. Kshitij Manishkumar Jangam. Athrva Ajit Ombase. Aditya Nilesh Dhane.
3	Creating report	04/012/2022	14/12/2022	Nadaf Saad Asad. Kshitij Manishkumar Jangam. Athrva Ajit Ombase. Aditya Nilesh Dhane.

11.2)**Resources Required**(Major Resources Such As Raw Materials, Some Machining Facility, And Software Etc.)

Sr. No.	Name of resource / material	Specification	Quantity	Remarks
1	Computer system	Intel(R) Core (TM) i31450 CPU32 bit operating system	1	Used
2	Operating System	Windows 11	_	Used
3	Software	Visual Studio, Python	_	Used