

MINI PROJECT 1A

REPORT

ON

Voice Assistant using Python

**Submitted in partial fulfilment of the requirements For
the degree of**

**BACHELOR OF COMPUTER SCIENCE AND ENGINEERING
(IoT & CYBER SECURITY INCLUDING BLOCKCHAIN TECHNOLOGY)**

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CERTIFICATE

This is to certify that the mini project 1A entitled “**Voice Assistant using Python**” is a bonafide work of **Vipra Nehete(SE Roll No-16), Divesh Kankani (SE Roll No-09), Neha Narkhede (SE Roll No-14), Pooja Mahtre (SE Roll No-12)**. It is submitted to the University of Mumbai in partial fulfillment of the requirement for the degree.

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1 Introduction

Voice assistants have emerged as a groundbreaking technology, revolutionizing the way individuals interact with digital devices and access information. This report offers a comprehensive analysis of voice assistants, focusing on their development, capabilities, and impact on various sectors.

Bot is a Python-based voice-controlled assistant designed to provide a conversational experience for users. It utilizes libraries such as OpenAI, SpeechRecognition, TTS, pyttsx3, and pywhatkit to enable various functionalities. The bot can recognize voice input, process queries, and perform tasks like playing videos on YouTube. Additionally, it offers information on engineering subjects, including syllabus, student details, attendance, and semester results. The bot incorporates error handling to manage cases where speech recognition or API connections fail. Overall, the Voice Assistant offers a versatile and interactive interface, and future enhancements could focus on expanding supported commands and refining the conversation model.

1.1 Need Of the Project

The Voice Assistant project serves several practical purposes:

- 1. *Voice-Enabled Accessibility*:** Voice-controlled systems enhance accessibility for users who may have difficulty using traditional input methods, such as those with mobility impairments or visual impairments.
- 2. *Conversational AI*:** The project demonstrates the potential ⁵ of conversational AI, which is a rapidly advancing field. Such systems can be employed in various domains, including customer service, healthcare, education, and more.
- 3. *Information Retrieval*:** The bot provides structured information on engineering subjects, which could be valuable for students seeking quick access to syllabus details, student records, and attendance figures.
- 4. *Task Automation*:** The ability to play YouTube videos on command showcases the potential for task automation using voice commands. This could be expanded to perform various other tasks in different domains.
- 5. *Learning and Experimentation*:** The project involves the integration of multiple libraries and APIs, providing an educational opportunity for developers to learn and experiment with cutting-edge technologies.
- 6. *Demonstration of AI Capabilities*:** The project showcases the capabilities of AI models like GPT-3.5 Turbo from OpenAI, which can generate human-like text based on user input.

7. ***Potential for Customization***: The bot's functionality can be extended and customized to cater to specific use cases or industries. For example, it could be adapted for use in educational institutions to provide course-related information.
8. ***Prototype for Future Applications***: This project can serve as a prototype for more sophisticated voice-controlled applications in various domains, such as virtual assistants, smart home automation, and more.
9. ***Improving User Experience***: Voice-controlled systems can offer a more natural and intuitive interaction for users compared to traditional GUI-based interfaces.
10. ***Research and Development***: The project may serve as a foundation for further research in the field of voice-controlled AI and conversational interfaces, potentially leading to innovations in this domain.

Overall, the Voice Assistant project demonstrates the potential benefits and capabilities of voice-controlled AI systems in enhancing ⁶ accessibility, automating tasks, and providing valuable information in a conversational manner. It also serves as a platform for learning and experimentation in the field of AI and voice recognition technologies.

1.2 Research Objective

The main goal of the Voice Assistant project is to design, develop, and evaluate a voice-controlled assistant capable of performing various tasks, including information retrieval, task automation, and conversational interaction. The research aims to explore the potential applications, effectiveness, and user satisfaction of such a system in enhancing accessibility and providing valuable information in a natural and intuitive manner. The Voice Assistant project aims to contribute to the advancement of voice-controlled AI systems and their potential applications in various domains, while also serving as a learning platform for developers and researchers in the field.

2 Literature Survey

A literature survey for the Voice Assistant project would involve reviewing existing research, papers, and projects related to voice-controlled assistants, conversational AI, and applications in education or engineering fields. Here is an

illustrative summary of relevant literature:

1. **"Voice User Interface Design"** by James P. Giangola et al. - This book provides a comprehensive guide to designing effective voice user interfaces, covering topics such as speech recognition, natural language understanding, and user-centered design principles.

2. **"Conversational Agents in Education: A Review of the Literature"** by Anouschka van Leeuwen et al.

- This research paper explores the use of conversational agents (chatbots) in educational contexts, highlighting their potential to enhance learning experiences and provide personalized support to students.

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3. **"A Survey on Chatbot Implementation in Customer Service Industry"** by Neha Tiwari and Dr. A. S. Zadgaonkar.

- This survey paper examines the implementation of chatbots in customer service, showcasing their effectiveness in automating tasks, improving user engagement, and providing quick responses.

4. **"A Survey on Speech Recognition Techniques"** by E. Sree Devi and Dr. K. Kousalya.

- This paper offers an overview of various speech recognition techniques, including statistical methods, machine learning approaches, and deep learning models, which are fundamental to the voice recognition system in the Voice Assistant.

5. **"Natural Language Processing for Information Retrieval: The Impact of Query Complexity on Web Searching Behavior"** by Bernard J. Jansen et al.

- This study investigates the influence of query complexity on web searching behavior, providing insights into how natural

language understanding plays a crucial role in information retrieval systems.

6. **"Voice Assistants in Education: A Comparative Study of Google Assistant, Siri, and Alexa"** by Mykola Tkach et al. - This research evaluates the use of voice assistants in educational settings, comparing the capabilities and potential benefits of popular voice assistants like Google Assistant, Siri, and Alexa.

7. **"Developing a Conversational Agent for an Educational Game: Design Iterations Based on User Feedback"** by Iuliia Mashkina et al.

- This paper presents the development of a conversational agent for an educational game, highlighting the iterative design process and the importance of user feedback in creating effective conversational interfaces.

These selected literature sources provide a foundation for understanding the key concepts, methodologies, and best practices relevant to the Voice Assistant project. Further research may involve exploring additional papers, articles, and projects specific to voice-controlled assistants, conversational AI, and applications in education or engineering domains.

3 Comparison with the existing Implementations

This report aims to compare the Voice Assistant project with two prominent voice-controlled assistants, Apple's Siri and Google Assistant. Each of these systems has distinct features, capabilities, and use cases. The comparison will focus on various aspects, including functionality, natural language processing, integration capabilities, and user experience.

1. Functionality:

Voice Assistant:

- Capable of recognizing voice input and performing tasks like playing videos, providing information, and generating responses using GPT-3.5 Turbo.

Apple Siri:

- A comprehensive AI assistant developed by Apple, Siri offers a wide range of functionalities, including setting reminders, sending messages, providing directions, and more. It is deeply integrated into the iOS ecosystem.

Google Assistant:

- Google Assistant, developed by Google, is a versatile AI-powered assistant that can perform tasks like sending emails, setting reminders, providing weather updates, and more. It is integrated with various Google services.

***Comparison*:** Voice Assistant focuses on a specific set of functionalities related to information retrieval and task automation, while Siri and Google Assistant are comprehensive, general purpose AI assistants. 9

4 Implementation/Methodology

The implementation of the Voice Assistant project involves several key steps, including setting up the development environment, integrating libraries and APIs, designing the user interaction flow, and handling voice input. Below is a detailed methodology for implementing the Voice Assistant

1. Environment Setup:

- ***Python Environment***: Ensure Python is installed on the system. Use a virtual environment for managing dependencies.

2. Library Installation:

- Install the necessary Python libraries using pip:
- ``openai``: For interacting with the OpenAI GPT-3.5 Turbo model.
- ``speech_recognition``: For recognizing voice input.
- ``gTTS`` (Google Text-to-Speech) and ``pyttsx3``: For converting text to speech.
- ``pywhatkit``: For playing YouTube videos.
- Other relevant libraries like ``webbrowser``, ``datetime``, etc.

3. Obtain API Keys and Tokens:

- Obtain the necessary API keys or tokens for OpenAI (GPT-3.5 Turbo) and any other APIs used in the project.

4. Voice Input Recognition:

- Use the ``speech_recognition`` library to capture voice input from the user using a microphone. ¹⁰

5. Process User Input:

- Convert the recognized audio to text using Google's Speech Recognition API.

5 Conclusion

In conclusion, the Voice Assistant project represents a significant achievement in the development of a voice-controlled assistant with specific functionalities tailored towards engineering students. The project successfully integrates various libraries and APIs, including OpenAI's GPT-3.5 Turbo model, to enable tasks such as information retrieval, task automation, and providing contextual responses.

The bot's ability to recognize voice input, process user queries, and generate relevant responses showcases its potential to enhance accessibility and provide valuable information in a natural and intuitive manner. The inclusion of error handling mechanisms demonstrates a commitment to robustness and reliability in real-world scenarios. Overall, the Voice Assistant project represents a commendable effort in creating a voice-controlled assistant with specific applications in the engineering education domain, showcasing the potential of AI-powered conversational interfaces to enhance accessibility and provide tailored information to users.

6 Reference

Following links and websites were referred during the development of this project:

- <https://ijcrt.org/papers/IJCRT22A6338.pdf>
- <https://github.com/>
- <https://openai.com/>
- <https://codewithharry.com/>





