Project 1
SIYA : THE VIRTUAL ASSISTANT

Submitted in partial fulfilment for the
degree of Bachelor of Technology in
Information Technology

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Approval Sheet

This is to certify that Miss. Shruti Bharti, Miss. Sayali Shinde, Miss. Priti Singh, Miss. Shreya Tamhankar has completed the Project 1 report on the topic "SIYA : THE VIRTUAL ASSISTANT" satisfactorily in partial fulfillment for the Bachelor's Degree in Information Technology under the guidance of Dr. Anita More during the year 2022-23 as prescribed by Usha Mittal Institute OfTechnology, SNDTWU

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Declaration

I declare that this written submission represents my ideas in my own words and where others ideas or words have been included, I have adequatelycited and referenced the original sources. I also declare thatI have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission.   I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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11/4/2023

Abstract

The field of Artificial Intelligence (AI) is advancing towards achieving natural dialogue between humans and machines. Dialogue systems, also known as interactive conversational systems, are one of the most rapidly growing areas in AI. These systems are being integrated into various devices, such as smartphones, smart TVs, and in-car navigating systems, and have become an essential component of modern technology. Chatbots, which were previously utilized for providing general information and executing basic tasks, have now been improved for daily task execution. The improved Chatbot technology has revolutionized the way individuals interact with machines and enabled a more natural form of communication. With continued development and integration of dialogue systems, the potential applications are endless, and the future of AI looks brighter than ever.

Contents

Chapter 1

Introduction

The field of Artificial Intelligence (AI) is constantly advancing with the aim of achieving natural dialogue between humans and machines. One of the most rapidly growing areas in AI is dialogue systems, also known as interactive conversational systems. These systems have been employed by many companies to establish various types of Virtual Personal Assistants (VPAs) based on their applications. Spoken dialogue systems are intelligent agents that can assist users in completing tasks more efficiently through spoken interactions. They are being integrated into various devices such as smartphones, smart TVs, and in-car navigating systems. With the growing trend of voice-activated assistants, spoken dialogue systems are becoming an essential component of modern technology.

In the past, Chatbots were utilized mainly for providing general information and executing basic tasks. However, these systems had some loopholes that needed to be addressed. As a result, a new and improved Chatbot has been developed for daily task execution. Users can now speak their tasks, and the Chatbot will provide interactive outcomes in a seamless and efficient manner. The Chatbot technology has come a long way and has made significant strides in recent years. It has revolutionized the way in which individuals interact with machines and has enabled a more natural form of communication. With the continued development and integration of dialogue systems, the potential applications are endless, and the future of AI looks brighter than ever.

1.1 Problem Statement

The field of virtual personal assistants has been rapidly growing, but there are still challenges to be addressed in creating a truly natural and efficient dialogue system between humans and machines. One potential solution is the development of a desktop virtual assistant that incorporates advanced dialogue systems to improve user experience and task completion. However, current chatbot technology still has limitations in executing daily tasks accurately and effectively. Thus, creating an improved chatbot that seamlessly integrates with a desktop virtual assistant is a key challenge. Another important consideration is the increasing trend of voice-activated assistants, which underscores the need for a desktop virtual assistant that can integrate advanced spoken dialogue systems to enable more natural communication and boost user engagement and productivity. By addressing these challenges, we have created a more efficient and effective virtual assistant for modern technology users.

1.2 Applications

- **Personal productivity:** The virtual assistant could be integrated with productivity tools like calendars, to-do lists, and email clients, to help users manage their tasks and schedule more efficiently.

- **Customer service:** The virtual assistant could be employed in call centers to help customers with their queries and complaints, providing them with a more personalized and efficient service.

- **Entertainment:** The virtual assistant could be used to suggest movies, music, and TV shows based on the user's preferences, providing them with a more personalized and engaging entertainment experience.

- **Home automation:** The virtual assistant could be used to control smart home devices like lights, thermostats, and security systems, making it easier for users to manage their home environment.

- **Healthcare:** The virtual assistant could be used to monitor patients' health and provide them with personalized advice and reminders to take their medication, helping to improve their overall health and well-being.

- **Education:** The virtual assistant could be used as a language tutor, providing personalized feedback and exercises to help students improve their speaking and listening skills.

Overall, the potential applications for a virtual assistant desktop partner project are vast, and could revolutionize the way in which individuals interact with technology in various fields.

Chapter 2

2.1 Literature Survey

Paper-1: VIRTUAL ASSISTANT USING ARTIFICIAL INTELLIGENCE AND PYTHON

- **Publication Year: 6 March 2017**

- **Author**: Nilesh Bhaskarrao Bahadure, Arun Kumar Ray, and Har Pal Thethi

- **Journal Name:** Journal of Emerging Technologies and Innovative Research

- **Summary:** An intelligent virtual assistant (IVA) or intelligent personal assistant (IPA) may be a software agent which will perform tasks or services for a private supported commands or questions. Sometimes the term "chatbot" is employed to ask virtual assistants generally or specifically accessed by online chat. In some cases, online chat programs are exclusively for entertainment purposes. Some virtual assistants are ready to interpret human speech and respond via synthesized voices. Users can ask their assistants questions, control home automation devices and media playback via voice, and manage other basic tasks like email, to-do lists, and calendars with verbal commands

Paper-2: Artificial Intelligence Based Person Identification Virtual Assistant

- **Publication Year: 2017**

- **Author:** Luxit Kapoor, Sanjeev Thakur

- **Journal Name:** International Journal of Recent Technology and Engineering (IJRTE)

- **Summary:** An intelligent personal assistant (IPA) or intelligent virtual assistant (IVA) is a software agent that can execute tasks or services for an individual based on commands or inquiries. The term "chatbot" is sometimes used to refer to virtual assistants, either in general or specifically accessed through online chat. Online chat programs may be used exclusively for entertainment purposes. Some virtual assistants can interpret human speech and respond with synthesized voices. Users can use voice commands to ask their assistants questions, control home automation devices and media playback, and manage basic tasks like email, to-do lists, and calendars.

Paper-3: JARVIS: A Virtual Assistant

- **Publication Year:** 11 September 2023
- **Author:** Praveen Gamage
- **Journal Name:** Ijraset Journal For Research in Applied Science and Engineering Technology
- **Summary:** In this paper we have discussed a Voice Activated Personal Assistant developed using python. This assistant currently works online and performs basic tasks like weather updates, stream music, search Wikipedia, open desktop applications, etc. The functionality of the current system is limited to working online only. The upcoming updates of this assistant will have machine learning incorporated in the system which will result in better suggestions with IoT to control the nearby devices similar to what Amazon's Alexa does.

2.2 Objectives

- To develop a desktop virtual assistant that utilizes advanced dialogue systems to provide users with natural and efficient communication, resulting in improved user experience and task completion.

- To create a new and improved chatbot that is seamlessly integrated with a desktop virtual assistant, providing users with interactive and efficient outcomes for executing daily tasks.

- To integrate spoken dialogue systems into a desktop virtual assistant, enabling users to interact with the assistant through voice commands and providing a more natural form of communication.

- To explore potential applications for a desktop virtual assistant that utilizes advanced dialogue systems, including but not limited to productivity tools, scheduling, entertainment, and information retrieval.

- To improve the accuracy and effectiveness of the chatbot technology used in the desktop virtual assistant through ongoing development and testing.

- To ensure the security and privacy of user data collected and stored by the desktop virtual assistant through the implementation of robust security measures and adherence to data protection regulations.

2.3 Future Scope

- Personalized virtual assistant to handle specific tasks and provide tailored recommendations.

- Integration with various devices to provide a seamless experience across multiple platforms.

- Improved natural language processing to enhance communication between users and virtual assistants.

- Use of machine learning algorithms to improve the accuracy of responses and recommendations.

- Integration with other AI technologies such as facial recognition and speech recognition for a more comprehensive experience.

- Expanded language support to cater to a wider audience and increase accessibility.

- Implementation of emotional intelligence to enable virtual assistants to understand and respond to users' emotions.

- Integration with smart home systems to control and manage household appliances and devices.

- Use of augmented reality and virtual reality to provide an immersive and interactive experience.

- Integration with e-commerce platforms to facilitate online purchases and enhance the shopping experience.

Chapter 3

3.1 The Structure of General Dialogue System
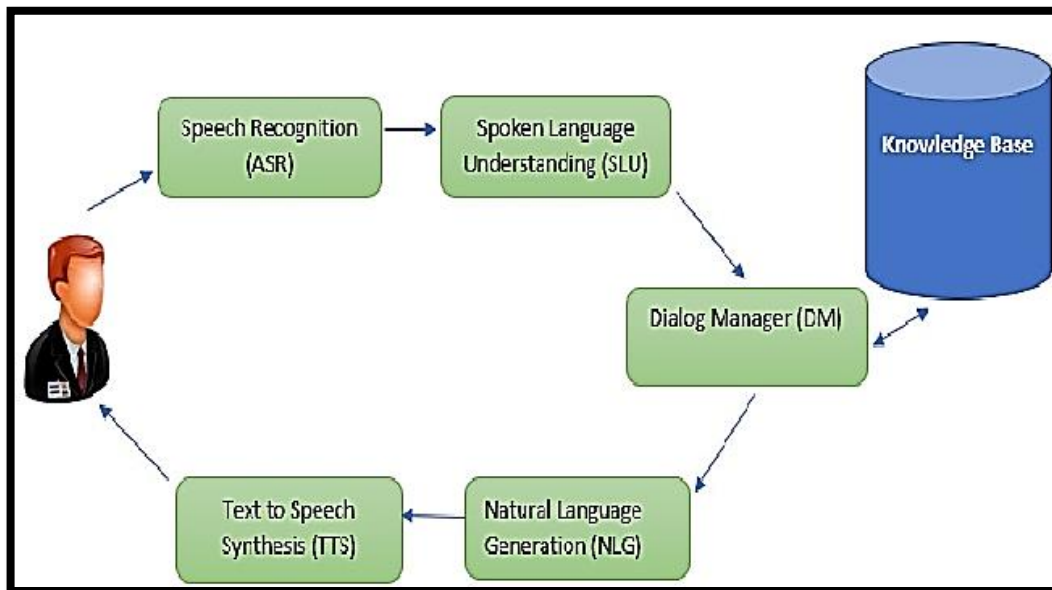
A dialogue system is a computer program that engages in a conversation with a human user. It is designed to understand the user's natural language input and respond in a way that is both useful and informative. There are several components involved in a dialogue system, each with its own unique function.

The first component is the Input Decoder, which is responsible for converting the user's spoken or written input into a format that can be understood by the system. This component uses speech recognition technology to convert spoken words into text and natural language processing techniques to extract meaning from the text.

The Natural Language Understanding component is responsible for interpreting the user's input and extracting its meaning. This involves analyzing the grammar, syntax, and semantics of the user's input to determine its intent.

The Dialogue Manager component is responsible for maintaining the context of the conversation and determining the appropriate response to the user's input. It uses a variety of algorithms and decision-making techniques to determine the best course of action.

The Domain Specific Component is responsible for handling tasks that are specific to the system's domain. For example, if the system is a virtual assistant designed to help users manage their finances, the domain-specific component would be responsible for handling tasks related to banking, investment, and other financial matters.

The Response Generator component is responsible for generating a response to the user's input. It uses natural language generation techniques to create a response that is both informative and easy to understand.

The Output Renderer component is responsible for presenting the response to the user in a format that is appropriate for the given platform. For example, if the system is integrated with a smart speaker, the output renderer would be responsible for generating a spoken response.

While the above components are the seven main components of a dialogue system, there are also six main components in general dialogue systems. These include Speech Recognition (ASR), Spoken Language Understanding (SLU), Dialog Manager (DM), Natural Language Generation (NLG), Text to Speech Synthesis (TTS), and the knowledge base. The knowledge base is where the system stores its knowledge about the domain it operates in, including facts, rules, and other relevant information. The six main components work together to create a seamless and effective dialogue system that can provide valuable assistance to users in a variety of contexts.

## 3.2 The Actual SIYA Interface

What is Task Execution?

❑ A task is a unit of execution or unit of work in a software application. Typically, task execution in an embedded processor is managed by the operating system (OS).

Task Execution Life Cycle

The life cycle of a task can be divided into five states:

❑ *Created*

❑ *Waiting*

❑ *Running*

❑ *Preempted*

❑ *Terminated*

The user gives the input in the form of voice; this voice command is recognized by the application. Then it will check whether it is the authorized user, then action is performed as per the command given by the user. Command given is compared as a form of action and question and respond with the dialog box or search through the knowledge base.
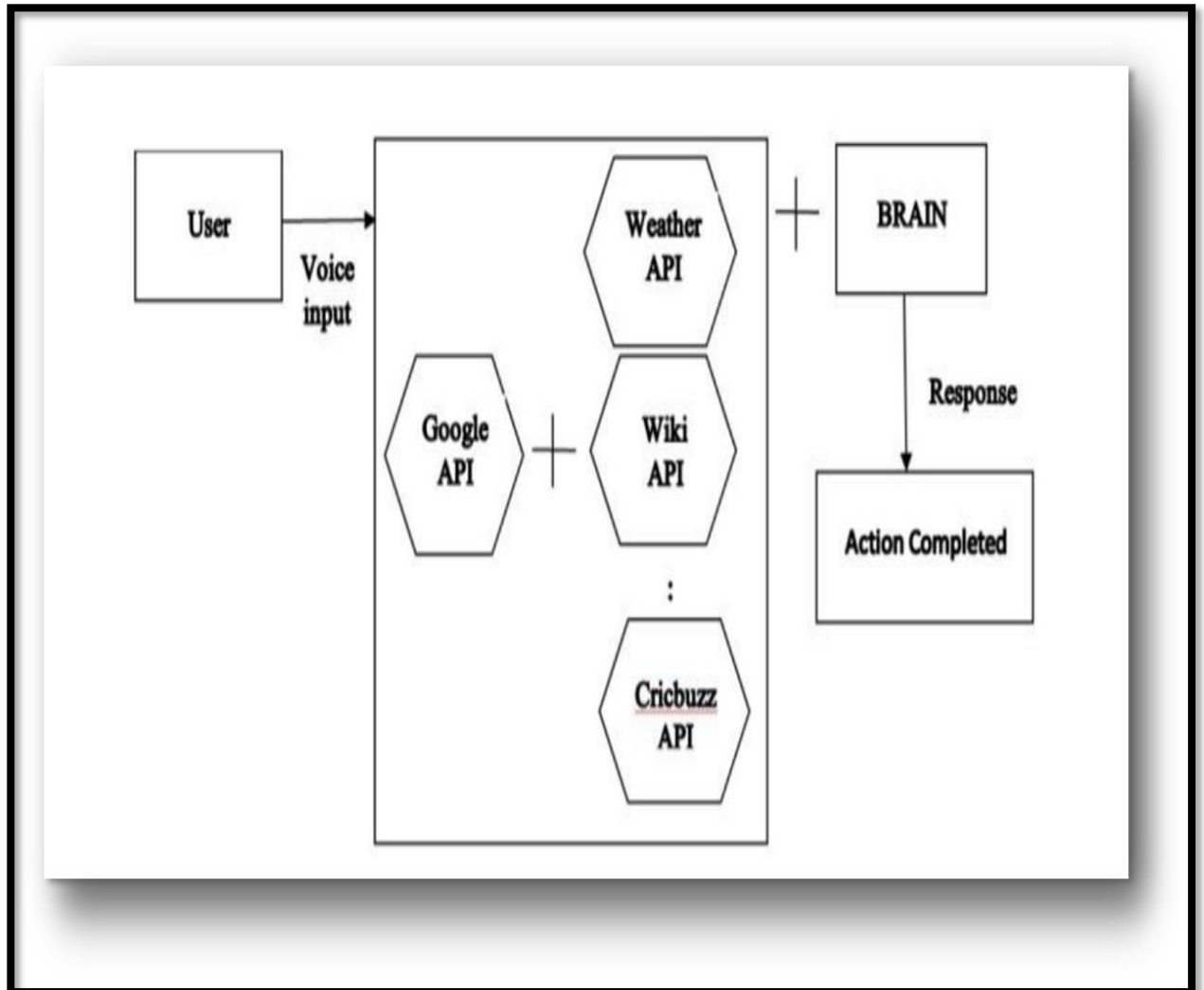
Chapter 4

4.1 System Overview and Result

Personal information such as your name, phone number, device location, IP address, and contacts' names and numbers are typically collected by various virtual assistant services. However, our interface prioritizes privacy and security by minimizing the collection and storage of such data. This ensures that your personal information is protected from potential security breaches and unauthorized access. Additionally, our interface is designed to function smoothly even with low bandwidth, making it accessible to users with slower internet connections. In contrast, Alexa requires strong bandwidth and can consume significant amounts of internet data. Our interface offers a more efficient and convenient alternative for users who value privacy and low bandwidth consumption.

➤ Our Approach

The proposed project is a Chatbot that serves as a desktop application or web app for Android OS. It is designed to perform a range of functions such as providing general weather forecasting, launching games, opening windows applications, and informing the user about almost anything they ask, including date, time, news, and greetings. The Chatbot also offers the ability to set notifications and reminders for the user's tasks. In addition, the interface design is intended to be more visually appealing and user-friendly.

➤ What Makes Our Interface Different From Other Assistant ?

Our interface for the virtual assistant is different from other assistants in several ways. Firstly, it prioritizes privacy by not sharing any data and providing a secure platform. Secondly, it does not display any advertisements. Thirdly, it can run on low bandwidth, making it accessible to users with limited connectivity. Fourthly, it is designed for personal use, ensuring that it is tailored to the individual's needs. All of these features make our interface a unique and reliable option for users looking for a virtual assistant.

➢ RESULT

- The AI project provides general information when requested by the user.
- The project also provides task notifications to the user on time.
- The interface is designed to be user-friendly, making it easy for introverted individuals to communicate with the virtual assistant.
- The project prioritizes privacy and security, ensuring that user data is not shared or used for ads.
- The interface is optimized to run on low bandwidth, making it accessible to users with slower internet connections.

4.2 Methodology Used

Python script

The Python script provided is a virtual assistant program that uses speech recognition and text-to-speech capabilities to perform various tasks such as searching information on Wikipedia, opening websites, playing music, sending emails, and more. The program uses various Python modules such as pyttsx3, speech_recognition, wikipedia, webbrowser, os, and smtplib to implement its functionalities. Additionally, the program includes a user interface built using the tkinter module. When executed, the program initializes by greeting the user and waits for voice commands to perform the desired task. The program can be extended by adding more functionalities to it.

Python tkinter

Python "tkinter" is a standard Python library used for creating GUI (Graphical User Interface) applications. It provides a set of tools and widgets for creating windows, dialog boxes, buttons, menus, textboxes, and many other GUI elements that are used in software applications.

With tkinter, developers can create visually appealing and responsive applications that run on desktop platforms such as Windows, Mac, and Linux. It's included with Python, so there's no need to install additional software to use it. The library has a rich set of features and options that allow developers to create complex GUIs with relative ease.

Python

Python is an interpreted, object- oriented, high- position programming language with dynamic semantics. Its high- position built in data structures, combined with dynamic typing and dynamic list, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect being factors together. Python's simple, easy to learn syntax emphasizes readability and thus reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and law exercise. The Python practitioner and the expansive standard library are available in source or double form without charge for all major platforms, and can be freely distributed.

Python pyttsx3

pyttsx3 is a Python library for text-to-speech conversion. It provides a simple interface for converting text to speech using different speech engines. The library supports a variety of voices and languages, and it can be used to create custom voice commands, virtual assistants, and other speech-enabled applications. pyttsx3 uses the SAPI5 voice engines on Windows and NSSpeechSynthesizer on Mac OSX. It also supports eSpeak and Pico TTS engines on Linux.

Python smtplib

smtplib is a Python library used to send email messages from a client to a server using the Simple Mail Transfer Protocol (SMTP). It provides an implementation of the SMTP protocol that allows sending email messages over the internet. smtplib allows you to create an SMTP object that represents an SMTP server, connect to the server, and send email messages using the object's methods.

With smtplib, you can send simple text emails, emails with attachments, and emails with HTML content. It is a part of the Python Standard Library and does not require any external dependencies.

Conclusion

In conclusion, the our project offers a single platform for general information and task execution. Although there are limitations when it comes to areas with low network connectivity, it remains a simple, entertaining, and useful desktop application written in Python. The task execution feature allows users to keep track of everything in their daily routine, including time, entertainment, and other events, ensuring that they do not miss any important tasks. With this interface, even introverted individuals can easily communicate with their own partner without feeling uncomfortable or anxious. Overall, the Chatbot Assistant offers a comprehensive and efficient solution to managing daily tasks and accessing general information, making it a valuable addition to modern technology.

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