A
Mini-Project Report on

Desktop Artificial Intelligence

Submitted in partial fulfillment of the requirements
for the degree of
BACHELOR OF ENGINEERING
IN
Computer Science & Engineering
(Artificial Intelligence & Machine Learning

by

Bhushan Khopkar (22106099)
Ritik Pandey (22106054)
Om Panchal (22106025)
Hrishikesh Kharkar (22106002)

Under the guidance of

Prof. Monali Korde

**Department of Computer Science & Engineering
(Artificial Intelligence & Machine Learning)
A. P. Shah Institute of Technology
G. B. Road, Kasarvadavali, Thane (W)-400615
University Of Mumbai
2023-2024**

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CERTIFICATE

This is to certify that the project entitled "**Desktop Artificial Intelligence**" is a bonafide work of Bhushan Khopkar (22106099), Ritik Pandey (22106054), Om Panchal (19203012), Hrishikesh Kharkar (19203009) submitted to the University of Mumbai in partial fulfillment of the requirement for the award of **Bachelor of Engineering** in **Computer Science & Engineering (Artificial Intelligence & Machine Learning).**

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Prof. Monali Korde   Dr. Jaya Gupta

Mini Project Guide   Head of Department

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Project Report Approval

This Mini project report entitled "**Desktop Artificial Intelligence***" by
Bhushan Khopkar, Ritik Pandey, Om Panchal and Hrishikesh Kharkar is
approved for the degree of *Bachelor of Engineering* in *Computer Science
&Engineering*, (AIML) *2022-23*.

External Examiner:

Internal Examiner:

Place: APSIT, Thane
Date:

Declaration

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Bhushan Khopkar   Ritik Pandey   Om Panchal   Hrishikesh Kharkar

(22106099)   (22106054)   (22106025)   (22106002)

ABSTRACT

For desktop also called digital assistant, is an A virtual assistant application program that understands natural language voice commands and complete tasks for the users. Most of the digital assistants are interacted with by using human voice. They may also be referred as voice assistant. To interact with a digital assistant, one must use a wake word, that is used to activate the device. Once one said a wake word, the system is now ready to be asked a question. One could then ask "what's about the weather" and the system will forecast the weather in local area aloud.

This aspect of AI programming focuses on acquiring data and creating rules for how to turn it into actionable information. The rules, which are called algorithms , provide computing devices with step-by-step instructions for how to complete a specific task.

As digital assistant become more popular, so do their capabilities and the task they are able to perform. Below are few of popular activities this desktop assistant can perform.

- Answer basic questions

- Searching Google/Wikipedia

- Set alarm, timer

- Get information about temperature

- Playing a Song

- Reading and writing text files & many more.

In this project python programming language is used to develop the application.

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CHAPTER 1

INTRODUCTION

1.INTRODUCTION

Artificial Intelligence: Transforming the Future

In the annals of technological innovation, Artificial Intelligence (AI) stands as a monumental milestone in the relentless march of human progress. As we stand on the precipice of the third decade of the 21st century, AI has transcended its status as a mere scientific concept and has become an integral part of our daily lives, reshaping industries, revolutionizing economies, and challenging our very understanding of what it means to be human.

AI, at its core, refers to the simulation of human intelligence in machines through the use of computer systems and software. This simulation encompasses a myriad of cognitive functions such as learning, reasoning, problem-solving, perception, language understanding, and decision-making. The quest to replicate these quintessentially human faculties has been a driving force behind the development of AI since its inception.

One of AI's most distinctive features is its ability to learn from data. Machine learning algorithms, a subset of AI, enable machines to improve their performance on a specific task as they are exposed to more data. This process, often referred to as training, is analogous to the way humans learn. However, the rapid proliferation of AI has raised important ethical and societal questions. Concerns about job displacement, bias in algorithms, data privacy, and the potential for AI to be used in harmful ways are at the forefront of discussions. Addressing these issues is crucial to ensuring that AI is developed and deployed responsibly, benefiting humanity as a whole.

AI's impact on the business landscape has been profound. It has ushered in a new era of automation, where routine and repetitive tasks can be performed with unparalleled efficiency and accuracy. This not only reduces operational costs but also frees up human workers to focus on more creative and value-added tasks. In industries such as healthcare, AI is aiding in disease diagnosis and drug discovery, while in finance, it is enhancing fraud detection and algorithmic trading. The potential for AI to drive innovation and improve productivity across sectors is limitless. Beyond the realm of business, AI has seeped into our daily lives in ways we might not even be consciously aware of.

Desktop AI, also known as AI on the edge or edge AI, refers to the deployment of artificial intelligence (AI) models and algorithms on local computing devices, such as desktop computers or edge devices like smartphones, tablets, and IoT (Internet of Things) devices.

The goal of desktop AI is to bring AI capabilities to these devices without relying on a constant internet connection or cloud-based processing.

computers or edge devices like smartphones, tablets, and IoT (Internet of Things) devices.

The goal of desktop AI is to bring AI capabilities to these devices without relying on a constant internet connection or cloud-based processing. Here's some information on desktop AI

In conclusion, AI is not just a technological breakthrough; it is a paradigm shift that is reshaping the world as we know it. Its potential to transform industries, enhance our daily lives, and unlock new frontiers of human knowledge is unparalleled. The future of AI holds both incredible promise and profound challenges, and it is our collective responsibility to navigate this journey wisely and ensure that AI remains a force for good in the world.

CHAPTER 2
LITERATURE SURVEY

1. LITERATURE SURVEY

2.1 History

AI:
The roots of AI can be traced back to ancient myths and legends, where machines with human-like intelligence were a recurring theme. However, the formal birth of AI as a field of study can be pinpointed to a seminal event in 1956 when John McCarthy convened a conference at Dartmouth College. It was at this conference that the term "Artificial Intelligence" was first coined, and a vision for creating machines that could mimic human intelligence was articulated. Since then, AI has evolved through various stages, from rule-based systems to machine learning and deep learning, propelling it into the forefront of technological advancement.

Python:
Python's development began in the late 1980s when Guido van Rossum, a Dutch programmer, started working on the language.The first official Python release, Python 0.9.0, was released in February 1991.Python 1.0, the first major release, included features like lambda, map, filter, and reduce functions.Python's simplicity and readability attracted early adopters.Python 2 introduced list comprehensions, garbage collection, and Unicode support.It became widely adopted for web development and scientific computing.Python 3 marked a significant step forward with a focus on removing inconsistencies and making the language more elegant.Key changes included print becoming a function, improved Unicode handling, and integer division behavior.Python 3 was not backward compatible with Python 2, leading to a period of coexistence.Python 2 was officially discontinued, with no further updates or security fixes.The community was encouraged to transition to Python 3.

Speech recognition:
The concept of speech recognition stated somewhere in 1940s, practically the firstspeech recognition program was appeared in 1952 at the bell labs, that was aboutrecognition of digit in a noise free environment.1940s and 1950s are considered as the foundation period of the speech recognitiontechnology, in this period work was done on the foundational paradigms of the speechrecognition that is automation and information theoretic models. The key technologiesthat were developed in this decade were filter banks and time normalization methods.In 1990s the key technologies developed during this period were the methods forstochastic language understanding, statistical learning of acoustic and language modelsand the method for implementation of large vocabulary speech understanding systems.

2..2 Literature Review

Based on many research reviews we cany say many companies like Microsoft's Cortana, Apple's Siri, Amazon's Alexa, Google's Assistant have used the Natural Language Processing (NLP) to style their voice assistants. These companies used different approaches to change the working flow and improve their Virtual Personal Assistants (VPAs) consistent with the appliance use and its complexity. Google has improved the Google Assistant by using the Deep Neural Networks (DNN) method which highlights the foremost components of dialogue systems and new deep learning architectures used for these components, Pew Research Center survey on May 2017 considering the adults, 46% of them have ever used digital voice assistant, 42% have used on their smartphones, 14% have used on their computers and tablets, 8% on stand-alone devices and 3% on other devices. Among them according to Voicebot Smart Speaker Consumer Adaption Report on January 2018, 57.8% are male users and 42.2% are female users among which Amazon's Alexa holds the highest record of 71.9% users, 18.4% Google's Assistant and 9.7% other digital assistants.[1]

Moustafa Elshafei believes that Virtual Personal Assistants (VPAs) represent the next step in mobile and smart user network services. VPAs are designed to provide a wide range of information in response to user requests, making it easier for users to manage their tasks and appointments, as well as control phone calls using voice commands. One of the key features of VPAs is the task manager, which can be accessed via voice interaction or logging in. This enables users to optimize their time management and improve their overall performance by reducing distractions. Overall, VPAs are a convenient and time-saving tool that enable users to access information and complete tasks quickly and easily using only their voice. As technology continues to evolve, VPAs are expected to become even more advanced and useful for a variety of tasks and applications. The proposed concept involves creating a personal voice assistant that can be easily implemented using a speech recognition library. This library has many built-in functions that enable the voice assistant to understand user commands and respond with voice output using Text-to-Speech functions [11-14]. When a user gives a voice command, the voice assistant captures it and utilizes underlying algorithms to convert the spoken words into text.[1]

"Artificial Intelligence-based Voice Assistant," 2020 Fourth World Conference on Smart Trends in Systems, Security, and Sustainability (WorldS4), London, UK, 2020, pp. 593-596: The request asked by the user gets split into separate commands so that our voice assistant can able to understand "JARVIS: An interpretation of AIML with the integration of gTTS and Python," 2019 2nd International Conference on Intelligent Computing, Instrumentation and Control Technologies (ICICICT), Kannur, India, 2019, pp. 486-489: Analyzing the speech recognition systems in the acknowledged platforms from the viewpoint of Neural Language Processing [NLP], we can classify major three generations of these Intelligence Systems.[2]

Speech Recognition is a technology that enables a computer to capture the words spoken by a human with a help of microphone. These words are later on recognized by Speech recognizer, and at the end system works according to the voice input. Speech recognition, also known as automatic speech recognition (ASR) or speech-to-text conversion, is a technology that enables the conversion of spoken language into written text. It's a fundamental component of natural language processing (NLP) and has a wide range of applications across various industries. Here's an overview of speech recognition:

How Speech Recognition Works:
- **Acoustic Analysis**: Speech recognition systems begin by capturing audio input, which is then divided into small units called phonemes. These phonemes are the basic sounds of a language.
- **Feature Extraction**: The system extracts various acoustic features from the audio, such as spectrograms, mel-frequency cepstral coefficients (MFCCs), and more.
- **Pattern Matching**: Machine learning algorithms, such as Hidden Markov Models (HMMs) or deep neural networks (DNNs), are used to match these acoustic features to phonemes and words in a language

CHAPTER 3

Problem Statement

Developing a Desktop AI with Seamless User Commands

Background:

      In an era marked by unprecedented technological advancements, the integration of Artificial Intelligence (AI) into desktop computing environments has garnered significant attention. AI-powered virtual assistants, commonly found in mobile devices and smart speakers, have already transformed the way users interact with technology. However, there remains a substantial gap in the domain of desktop computing, where users often grapple with fragmented software interfaces and manually perform a plethora of tasks. The challenge is to create a Desktop AI that seamlessly interprets user commands and efficiently performs requested tasks across various applications and services.

Problem Description:

      The objective of this project is to design, develop, and implement a sophisticated Desktop AI capable of comprehending and executing user commands across a wide range of desktop applications and services. The proposed AI system must bridge the gap between user intent and task execution by integrating natural language processing, machine learning, and system integration capabilities.

Target Users:

      The target users for this Desktop AI system are professionals, students, and individuals who rely heavily on desktop computing for work, research, or personal use. These individuals can use many tools or functions while being offline and save battery of the system. Parents can use these by keeping their child safe by child locking system.

CHAPTER 4

Experimental Setup

4.1 Hardware Setup

1. *Operating System*: Ensure that your computer is running a supported operating system, such as Windows, macOS, or Linux.

2. *Processor*: A multi-core processor (e.g., Intel Core i5 or AMD Ryzen 5) will provide good performance for most desktop assistant software.

3. *Memory (RAM)*: A minimum of 8GB RAM is recommended for smooth operation. More RAM can be beneficial for running multiple tasks simultaneously.

4. *Storage*: You'll need sufficient storage for the operating system, software, and data. An SSD (Solid State Drive) is recommended for faster load times and responsiveness.

5. *Graphics*: Most desktop assistants don't have intensive graphics requirements, so integrated graphics should suffice. For specific applications that require graphics processing, check for dedicated GPU recommendations.

6. *Internet Connection*: A stable and reasonably fast internet connection is essential for downloading updates and accessing online features.

7. *Input Devices*: You'll need a keyboard and mouse for interacting with the software. Some desktop assistants also support voice commands, so a microphone might be required.

8. *Display*: A monitor with at least 1080p resolution is recommended. Larger displays or multiple monitors can enhance productivity.

9. *Audio*: Ensure your computer has built-in speakers or external speakers for audio feedback, especially if the assistant provides voice responses. 1. *Operating System*: Ensure that your computer is running a supported operating system, such as Windows, macOS, or Linux.

10. *Software Dependencies*: Some desktop assistants may require specific software dependencies or libraries to be installed. Ensure these are met.

11. *Security*: Make sure your system is adequately protected with antivirus software and keep the desktop assistant software up-to-date to address security vulnerabilities.

12. *Hardware Compatibility*: Check if the desktop assistant software is compatible with any specialized hardware, such as smart home devices or IoT (Internet of Things) integrations.

Always refer to the specific software's official documentation for detailed system requirements and any additional recommendations. The above configuration serves as a general guideline to get you started.

4.2 Software Setup

1. *Programming Languages* (if applicable):
   - Python, Java, or other languages depending on the assistant software.

2. *Text-to-Speech (TTS) Engine*:
   - A Text-to-Speech (TTS) engine is a software component that converts written text into spoken words or audio. It's used in desktop assistants and various applications to provide natural-sounding speech synthesis. TTS engines vary in quality and features, and some popular options include Google Text-to-Speech, Amazon Polly, and Microsoft Azure Cognitive Services Text-to-Speech. These engines enable your desktop assistant to vocalize responses and interact with users through speech.

3. *Speech Recognition*:
   - Speech recognition, also known as Automatic Speech Recognition (ASR), is a technology that converts spoken language into written text. It enables computers and software to understand and transcribe human speech. Speech recognition systems use algorithms and models to analyze audio input, identify words and phrases, and generate textual representations. It allows for hands-free interaction with devices and provides a bridge between human speech and computer-based tasks.

4. *Natural Language Processing (NLP) Libraries*:
   - Natural Language Processing (NLP) libraries are software tools that assist in working with human language data. They provide functions and pre-built models to analyze, understand, and manipulate text. Here's a brief overview of some NLP libraries:

- *NLTK (Natural Language Toolkit)*: NLTK is a comprehensive Python library with tools for tasks like tokenization, stemming, and part-of-speech tagging.

- *spaCy*: A Python library known for its speed and efficiency, spaCy offers pre-trained models for tasks such as entity recognition and parsing.

- *Hugging Face Transformers*: This library is renowned for its pre-trained transformer models, making it useful for a wide range of NLP tasks like text classification and language translation..

5. *Database* (if the assistant needs to store and retrieve data):
   - In a desktop assistant application, a database is often used to store and manage various types of data, such as user preferences, conversation history, and potentially any structured information required for the assistant's functionality. Here's an overview of how databases are used in desktop assistant applications: Databases like SQLite, MySQL, or PostgreSQL.

6. *User Interface (UI) Framework* (for creating a graphical interface):

   - A User Interface (UI) framework, also known as a GUI (Graphical User Interface) framework, is a software tool or library that provides a set of pre-built components and tools for creating graphical user interfaces in applications. These frameworks simplify the development of visually appealing and interactive user interfaces. Here's a brief overview: PyQt, Tkinter, or other UI frameworks based on the chosen programming language.

The choice of UI framework depends on the programming language, platform, and specific requirements of your desktop assistant or application. These frameworks streamline the process of creating visually appealing and user-friendly interfaces, reducing the need for low-level graphic design and interaction coding.
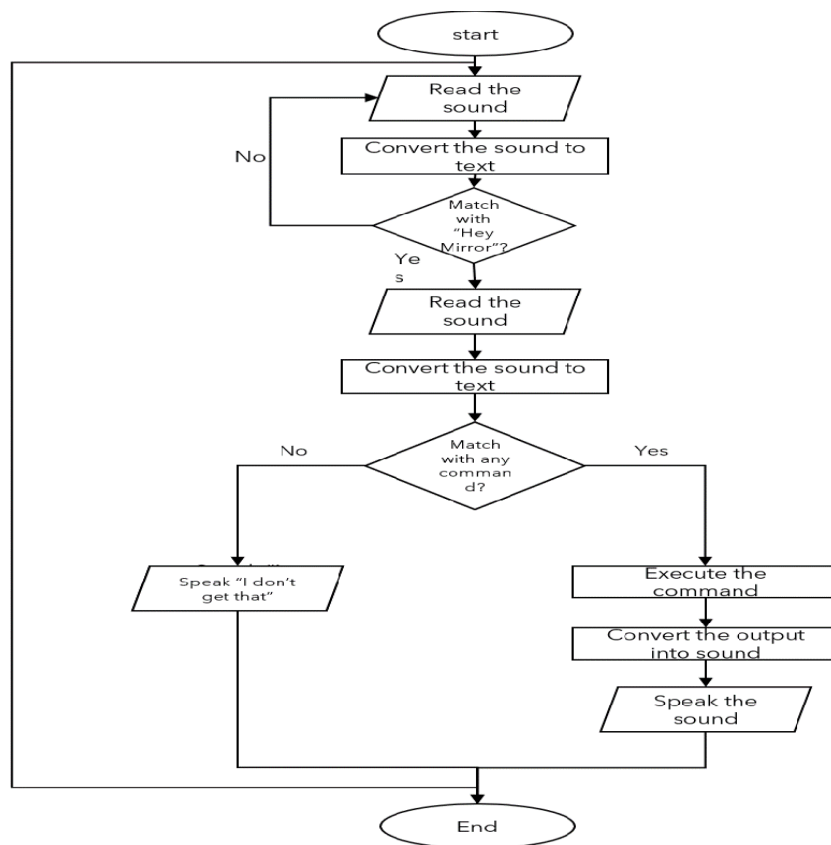
CHAPTER 5

Proposed System & Implementation

5.1 Diagram of Desktop Assistant

- Block diagram of Desktop Assistant
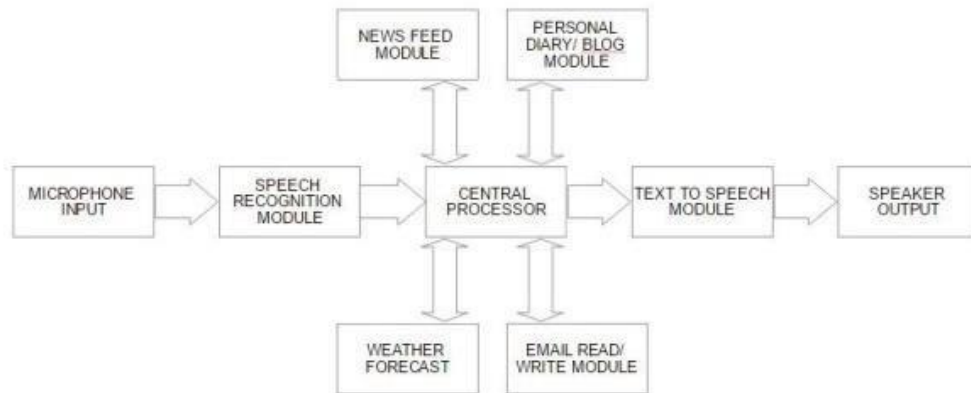
- Flowchart of Desktop Assistant

5.2 Description of block diagram and flowchart

A desktop assistant, often referred to as a virtual assistant or a personal assistant, is a computer program designed to provide user assistance, perform tasks, and facilitate interactions between a user and their computer or other digital devices. Desktop assistants leverage various technologies, including artificial intelligence (AI), natural language processing (NLP), speech recognition, and more, to offer a wide range of functionalities. Here's a detailed explanation of a desktop assistant using 5.1:

1. *Speech and Text Input*:
   - Users can communicate with the desktop assistant through speech input using a microphone or text input through a keyboard. Some assistants also support other forms of input, such as touch or gesture controls.

2. *Speech Recognition*:
   - Speech input is processed by a speech recognition component, which converts spoken words into text. This technology enables the assistant to understand and interpret user voice commands. Speech recognition, also known as Automatic Speech Recognition (ASR), is a technology that converts spoken language into written text. It enables computers and software to understand and transcribe human speech. Speech recognition systems use algorithms and models to analyze audio input, identify words and phrases, and generate textual representations

3. *Natural Language Processing (NLP)*:
   - The text input, whether from speech recognition or text entry, is passed through an NLP module. This component analyzes and interprets the user's intent and meaning, allowing the assistant to understand natural language and context.

4. *Text-to-Speech (TTS)*:
   - When the assistant needs to respond to the user, it uses a text-to-speech engine to convert text responses into spoken words. This allows the assistant to communicate with users using natural speech. A Text-to-Speech (TTS) engine is a software component that converts written text into spoken words or audio. It's used in desktop assistants and various applications to provide natural-sounding speech synthesis.

5. *Data Storage and Management*:
   - User data, including profiles, preferences, and conversation history, is managed by a data storage component. Databases may be used to efficiently store and retrieve this information. In a desktop assistant application, a database is often used to store and manage various types of data, such as user preferences, conversation history, and potentially any structured information required for the assistant's functionality.

6. *Error Handling*:

   - The system is equipped to handle errors and exceptions gracefully. It provides helpful error messages to users and strives to minimize disruptions in the user's experience. Error handling in a desktop assistant is crucial to ensure the software can gracefully manage and recover from unexpected issues or exceptions that may occur during its operation. Proper error handling enhances the user experience, prevents application crashes, and helps in diagnosing and resolving issues.
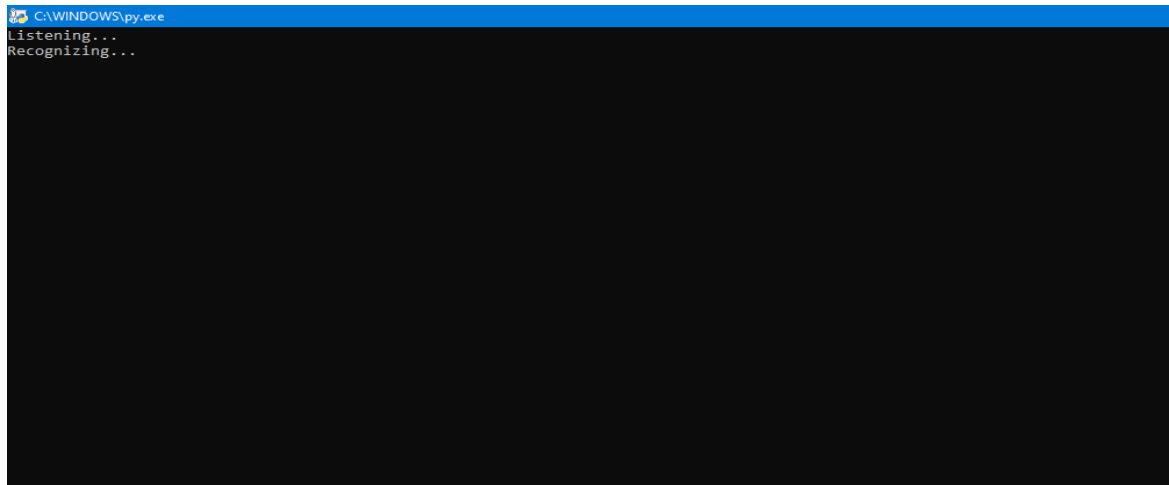
7. *Voice Commands (Optional)*:

   - Many desktop assistants support voice commands, enabling hands-free control and interaction with the software. Users can give voice commands to perform tasks, answer questions, and more.
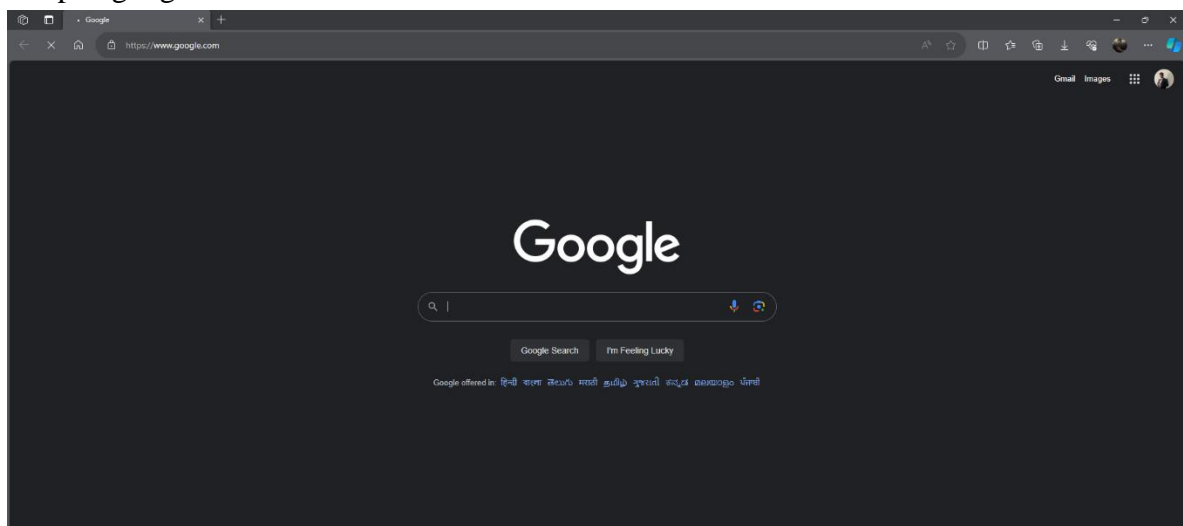
5.3 Implementation

- Desktop assistant (converting speech)

- Open google command

Tell me a joke command

- Wikipedia information on any topic

```
Listening...
Recognizing...
User said: Wikipedia on Albert Einstein

Albert Einstein ( EYEN-styne; German: [ˈalbɛɐt ˈʔaɪnʃtaɪn] ; 14 March 1879 - 18 April 1955) was a German-born theoretical physicist who is widely held to be one of the greatest and most influential scientists of all time. Best known for
developing the theory of relativity, Einstein also made important contributions to quantum mechanics, and was thus a central figure in the revolutionary reshaping of the scientific understanding of nature that modern physics accomplished
 in the first decades of the twentieth century.
```

- When there is an error

```
Listening...
Recognizing...
Say that again, please...
Listening...
Recognizing...
Say that again, please...
Listening...
```

5.4 Advantages/ Application/ result table can be included in this subsection.

There are many applications of Desktop Assistant, here are few examples:

- Information retrieval:
Is a fundamental function of a desktop assistant, allowing it to provide users with relevant and timely information. Here's how information retrieval is implemented in a desktop assistant. When a user interacts with the desktop assistant, they may pose questions or request information on a wide range of topics. These queries can be in the form of text or speech. The assistant's system analyzes the query to determine the type of information the user is seeking. This can include factual information, news updates, weather forecasts, or answers to general knowledge questions.

- Task automation:
Is a key functionality of a desktop assistant, offering users the ability to streamline and simplify various tasks and workflows. This feature enables the assistant to execute a wide range of operations on the user's behalf, providing convenience, efficiency, and increased productivity. Here's an in-depth explanation of task automation in a desktop assistant.

- Entertainment:
Features in a desktop assistant are designed to provide users with a wide range of engaging and enjoyable experiences, helping them relax, unwind, and have fun. These features go beyond the traditional functional tasks and enhance the user's overall experience with the assistant. Here's an in-depth exploration of entertainment in a desktop assistant. Desktop assistants can offer a variety of games and interactive experiences, from trivia quizzes to adventure games, often powered by voice or text-based interactions. A variety of games, from word games and quizzes to adventure or puzzle games, can be made available.

- Language translation:
Is a valuable feature in a desktop assistant that enables users to convert text or speech from one language to another. This functionality enhances communication, breaks down language barriers, and facilitates interactions in a globalized world. Here's a comprehensive explanation of language translation in a desktop assistant. Users can have conversations with people who speak different languages, as the assistant translates their messages in real time. The assistant can help users learn new languages by translating text and offering pronunciation assistance.

- Smart home integration:
  Is a feature in a desktop assistant that allows users to control and manage their smart home devices and appliances using voice or text commands. It transforms the desktop assistant into a centralized hub for home automation. Here's a detailed explanation of smart home integration in a desktop assistant. The assistant integrates with various smart home ecosystems and platforms, such as Amazon Alexa, Google Home, or proprietary smart home hubs, to communicate with connected devices. The assistant learns user preferences for smart home control and adapts to their routines and preferences over time.

- Productivity:
  Features in a desktop assistant are designed to help users efficiently manage tasks, streamline workflows, and stay organized while using their computer. These features aim to enhance users' productivity by automating repetitive tasks, providing organization and time management tools, and facilitating seamless access to information. Here's an in-depth explanation of productivity features in a desktop assistant. Users can dictate notes, create lists, or capture ideas for reference. The assistant helps keep files and folders organized and clutter-free. Users can automate tasks that are performed routinely, such as data entry or data analysis.

CHAPTER 6

Conclusion

Conclusion

Future Scope:

The future of desktop assistants is intertwined with the advancement of AI, machine learning, and natural language processing technologies. These digital companions will continue to evolve, making desktop computing even more efficient, intuitive, and enjoyable for users. Additionally, the integration of voice assistants into a broader ecosystem, including mobile devices, smart speakers, and in-vehicle systems, will contribute to a seamless user experience across various environments. There will be a continued focus on making desktop assistants more accessible to users with disabilities, with improved support for screen readers, voice commands, and other assistive technologies.

Conclusion:

Desktop assistants have evolved into indispensable tools that enhance user productivity, accessibility, and convenience in a desktop computing environment. These intelligent software solutions provide a wide range of features and capabilities, from voice recognition and natural language processing to task automation and entertainment. Desktop assistants like Siri, Cortana, and Google Assistant, as well as third-party solutions, were widely used to simplify tasks, improve workflow efficiency, and make desktop computing more accessible. They automate repetitive tasks, reducing manual effort and enhancing productivity. Task management, email assistance, document creation, and file organization enhance efficiency and organization.

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