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AI-Powered Voice Assistant for Accessibility Applications

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Abstract: ***AI-powered voice assistants are revolutionizing accessibility applications by offering intuitive, hands-free interaction for individuals with disabilities. These technologies enable users to manage tasks, control smart devices, and enhance their overall experience, fostering inclusivity and independence. With features such as natural language processing (NLP), these assistants understand and conversationally respond to spoken commands, making interactions seamless and user-friendly. They can learn individual preferences, providing personalized experiences that enhance engagement. Additionally, their integration with smart home devices allows users to easily manage their environments, while support for multiple languages ensures accessibility for diverse linguistic backgrounds. In various industries, such as healthcare, education, retail, and transportation, AI voice assistants streamline processes, improve communication, and facilitate real-time assistance, ultimately transforming the quality of life for individuals with disabilities. By promoting independence and enhancing user experiences, these voice assistants are invaluable tools in the pursuit of a more inclusive society.***
Keywords: AI, voice, learn, assistance, streamline, communication, transportation, retail, education, healthcare.

I. INTRODUCTION

Speech recognition is an important technology that takes the role of older ones like mouse, keyboards, and gestures. Speech recognizers can comprehend what people say and respond appropriately, which helps persons with functional limitations. Voice control can turn on and off lights and appliances, which has led to talks of smart homes that are good for everyone, including those with disabilities. People originally tried to make computers understand speech automatically in the 1950s.The AI-based voice assistant is one of the most commonAI features used by many individuals and organizations to perform various tasks including information retrieval, personalized assistants, and task automation through natural language processing.The voice assistant recognizes the voice of the user and performs the tasks assigned by the user [1].

It is the most effective way to use AI in personal life and to make things easier for physically disabled persons. Speech recognition is the framework where the voice of the users is detected by the AI and performs the task [2].Machine learning techniques have emerged as a promising solution for voice detection in the AI where it finds patterns in the voice and recognizes the voice of the user. To avoid security threatsthe users' voice is kept confidential in the device storage and desktop systems [3].

The voice assistant uses the NLPK to process the tasks and gives the user the best interface to share the information. The main motive of the project is to develop physically challenged persons. Some of the most popular voice assistants are Siri, Google, Bixby, and Alexa which have recently been developed and provide various accessibility features for the users [4].This Software aims at developing a personal assistant for Windows-based systems. The main purpose of the software is to perform the tasks of the user at certain commands, provided in either of the ways, speech, or text [5].

A. Objectives

- A voice assistant is a program that understands what people say and uses synthetic voices to carry out requests. People may ask inquiries, operate their smart home gadgets, and keep track of things like email and to-do lists using it.
- Voice assistants that use AI listen, figure out what you need, and do what needs to be done. As their skills improve, they will be more useful in both personal and corporate settings.

This paper is structured as follows: Section 2 presents a comprehensive literature survey of existing AI-based voice assistants. Section 3 details the methodology, including feature extraction, dataset selection, and model optimization strategies. Section 4 discusses experimental results and performance evaluation metrics. Finally, Section 5 provides a conclusion and outlines future research directions.

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II. LITERATURE SURVEY

This discipline of digital assistants having speech reputation has visible a few fundamental improvements or innovations. That is regularly mainly due to its call for gadgets like smartwatches or health bands, speakers, Bluetooth earphones, cell telephones, computers or desktops, television, etc. maximum the virtual gadgets that rectangular degree coming nowadays rectangular degree returning with voice assistants that facilitate to govern the tool with speech reputation solely [6].

A modern set of strategies is being advanced continually to decorate the overall performance of voice computerized search. As the number of statistics is growing exponentially presently famous as big statistics the only way to enhance the effects of digital assistants is to encompass our assistants with the device getting to know and educating our gadgets constantly with their uses [7].

Extraordinary fundamental strategies that rectangular degree similarly essential rectangular degree pc science, Internet of Things, big statistics get right of entry to and management, etc. Machine Learning is truly hard and fast for PC science. This has been one of the most beneficial improvements in an era. Before AI we had a propensity to have been the ones UN business enterprise had been upgrading era to do an undertaking but presently the device is itself equipped to counter new responsibilities and remedy it even as now no longer was given to contain the people to adopt it [8].

With the usage of voice assistants [2,3,8], we can adjust the undertaking truly, simply provide the entrance to the device inside the speech type and each one of the responsibilities is going to be completed via way of means of converting your speech into textual content shape to getting rid of key phrases from that textual content and execute the question to provide effects to the user. This has been beneficial in everyday existence style. From cell telephones to personal computers to mechanical industries those assistants' rectangular degrees appreciably call for automating responsibilities and growing efficiency [9].

III. METHODOLOGY

A voice assistant is a digital tool that helps people by using AI, machine learning, and speech recognition technologies to help them via desktop and voice recognition. Some are made using powerful cognitive computing technologies that let them comprehend and carry out requests that need more than one step. The goal of the Jarvis program is to provide a personal assistant for Windows-based devices that users may talk to or type to, like virtual assistants.

When a person has an idea and sends it to someone else, speech creation starts in their head. It is put together into a phrase or sentence using a limited number of phonemes, which are the distinct elements of a speech waveform that the human vocal system makes. Phonemes may be continuant or non-continuant, depending on the shape of the vocal tract. They can also be categorized based on their time waveform or frequency properties.

Using a limited number of phonemes, which stand for distinct elements of a speech waveform produced by the vocal mechanism, it is put together into a phrase or sentence. Phonemes may be either continuant or not continuant.Input design is the process of defining rules and guidelines for how to get data ready for use in an information system. The goal is to keep track of input needs, mistakes, delays, and additional stages. It makes panels for entering data that are straightforward to use, so you can easily examine and change records. This makes data input easy and error-free.

Output design is very important for satisfying user needs and displaying information. It decides how information is moved around for immediate demands and printed output, which helps people make decisions. Output design that is both smart and efficient helps users make decisions and enhances system interactions.



Fig 1: through voice control opens the YouTube

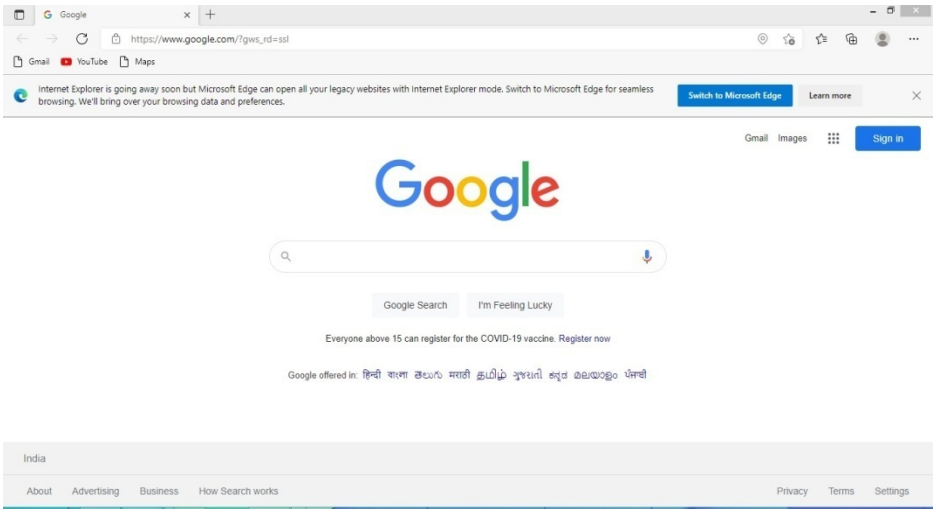


Fig 2: through voice control opens the google

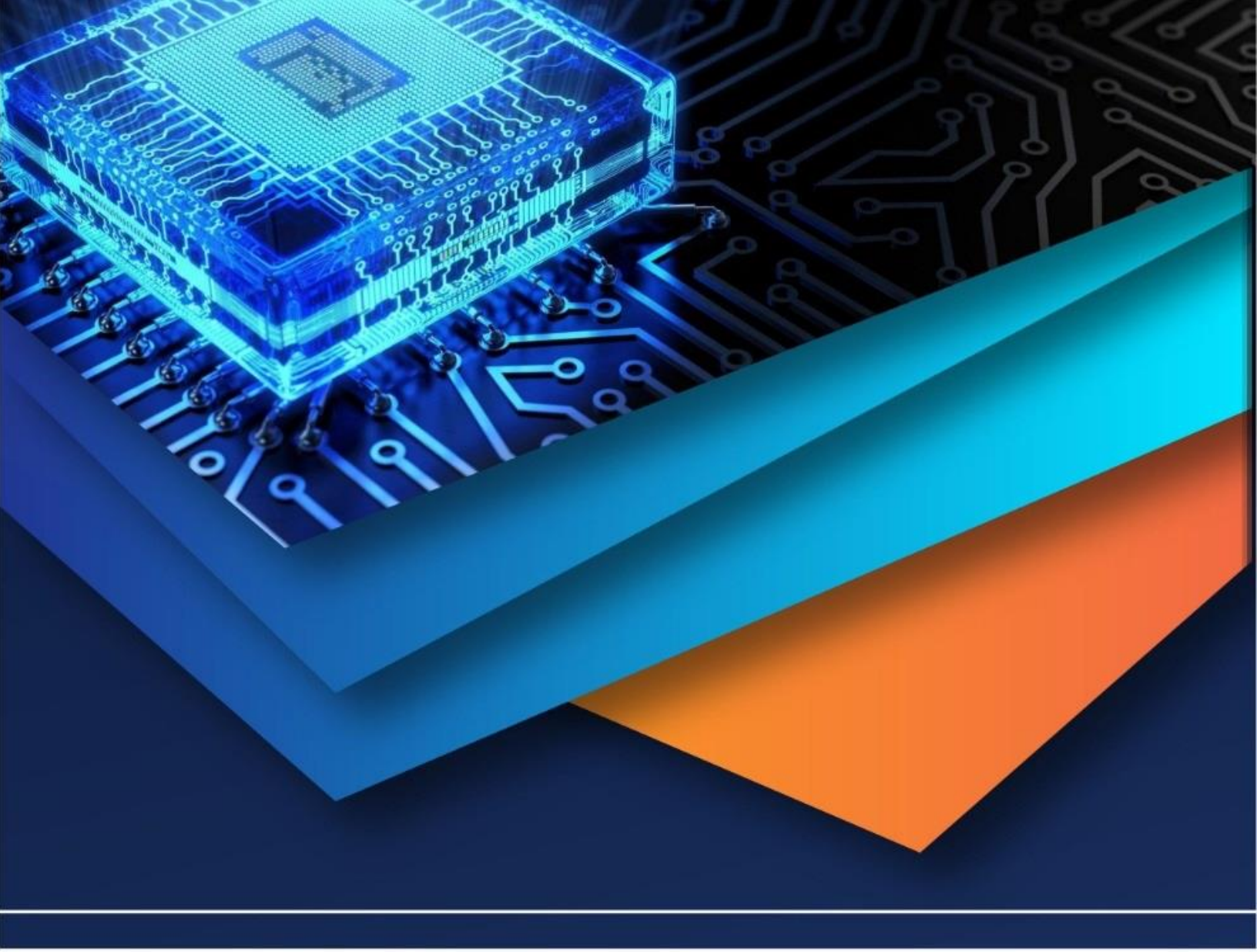
IV. CONCLUSION AND FUTURE SCOPE

With just one query, the voice assistant can automate several services, making it easier for users to do things like search the web, get the weather forecast, and access applications like Instagram, Facebook, and the calculator. This method verifies speakers by looking at the unique information in their speech signals. The goal of the project is to become a full server assistant, taking over all server management tasks. In the future, we want to connect Jarvis to mobile devices using React Native so that users may have the same experience on both platforms. The present version offers strong features and is responsive, however it might be better at comprehending and being reliable. The long-term plan is to combine NLP, machine learning, and IoT technologies to get better outcomes.

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