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Voice Assistant Using Artificial Intelligence

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ABSTRACT

Voice control is a significant emerging element that is revolutionising how people may live. Smartphones that support human-computer interaction (HCI) are becoming more and more popular. These programmes often have high privileges and access to private system resources in order to assist users in automating certain operations. The use of machine-human interface systems was increasingly prevalent in this digitised society. We develop this voice assistant for such type of engagement utilising machine learning and artificial intelligence. The voice assistant is frequently utilised in computers and cell phones. The operating systems that can identify a human voice and answer with built-in voices are known as AI-based voice assistants. The voice assistant will collect sounds from the microphone, translate it to text, and send it over GTTS.

Keywords — Presdictive analysis,pandemic, linear regression,supervised machine learning, speech recognition, support vector regression.

1. Introduction

Recent years have seen significant advancements in user experience and user interaction only in Virtual Assistants. We already use them for a variety of activities, such as turning on and off lights and playing music through streaming services like Wynk Music and Spotify. This new way of dealing with technology makes lexical communication a new ally for it. In the past, the term "virtual assistant" was used to refer to professionals who offer auxiliary services online. A voice actor's role is broken down into three stages: Speech from text, intention from text, and action from intention; A fully developed voice assistant will expand the present range.

Voice assistants are not confused by virtual assistants, which are real persons that work ad hoc hours and are capable of handling a variety of jobs. Thanks to AI-based voice assistants, they predict our needs and take appropriate action. Voice based search is going to be the future for the next generation of people, where users are all most dependent on voice assistants for every requirement. AI-based speech assistants may be used in many industries, such as IT Helpdesk, Home automation, HR related activities, voice based search, etc. We have created an AI-based voice assistant for this project that can easily complete all of these duties.

2. Literature Survey

In paper [1] "Saadman" et al. described intelligent personal assistants (IPA), such as Siri and Alexa, in article [1], which are designed to help their users with basic digital chores. Here, we outline the procedures we used to create a voice-activated IPA that can handle direct orders in Bengali and English and complete menial chores for the users.

The IPA uses a generalisation function to ensure that the language processor can understand multiple languages without undergoing significant modification, which makes this approach appropriate when training data is scarce. It also exploits the subject/action structure of commands to reduce the size of the word domain.

In paper [2] "Polyakov EV" and colleagues evaluated the The goal of the project is to create a personal assistant for Computer. The PC Personal Assistant was inspired by virtual assistants like Siri for iOS and Google Assistant for Android. It offers a user-friendly interface for carrying out a variety of operations by just a few clearly stated instructions.

Python is primarily used in the creation of PC Personal Assistant. The programme outputs through the system's speaker while receiving voice commands through the device's microphone. It combines several different technologies, including language processing, speech analysis, and voice recognition.

In paper [3] , Khawir et al. conducted analysis and comparison In this research, a singular adaptive multi-role IPA (SAM-IPA) that handles multidimensional IoT and application data in addition to scheduling and search functions is proposed.

Its objectives are as follows:-

The first deals with HCI and includes those features that make SAM-IPA intelligent and reliable from the user’s perspective. The second deals with performance i.e. the intelligence, adaptability and security.

In paper [4] This research project aims to create a personal assistant using the Raspberry Pi as the processing chip and underlying architecture. It is a voice-controlled personal assistant whose movements will be controlled by voice commands and it has the ability to read content from pictures and then articulate the equivalent to the client using the inbuilt speaker.

The Raspberry Pi [2][4] is a low-maintenance computer that can be connected to a PC or TV with little effort. It is a capable small gadget that gives people of all ages the ability to learn about computing and how to create in languages like Scratch and Python.

In paper [5] In order to build the Next-Generation of VPAs model, we employed the multi-modal conversation systems, which handle two or more integrated user input modes, such as speech, picture, video, touch, manual gestures, gaze, and head and body movement.

By utilising technologies like gesture recognition, image/video recognition, speech recognition, and the Knowledge Base, the VPAs system will be utilised to improve human interaction with computers.

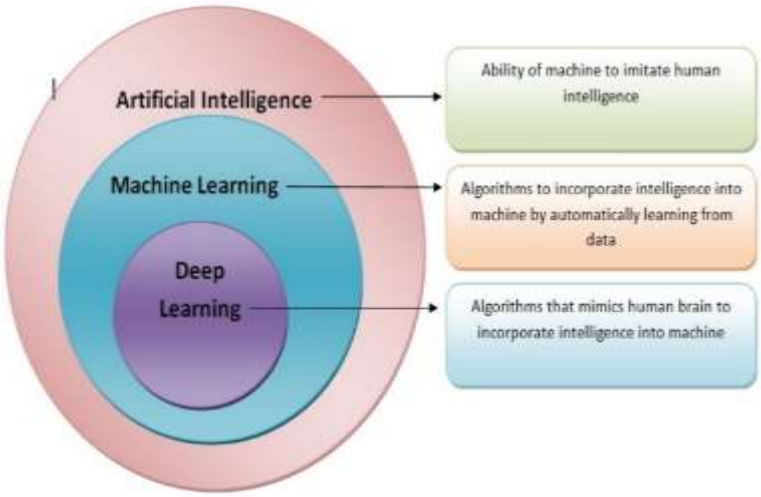
3. Data Collection

The data is collected from 2000 certification marks and logos from the websites (web crawler) of the Testing, Inspection and Certification (TIC) members, e.g. TÜV SÜD AG, Dekra and Bureau Veritas.

4. Artificial Intelligence

The major limitation in defining AI as simply “building machines that are intelligent” is that it doesn't actually explain what AI is and what makes a machine intelligent. AI is an interdisciplinary science with multiple approaches, but advancements in machine learning and deep learning are creating a paradigm shift in virtually every sector of the tech industry.

ML refers to an AI system that can self-learn based on the algorithm. Systems that get smarter and smarter over time without human intervention is ML. Deep Learning (DL) is a machine learning (ML) applied to large data sets. Most AI work involves ML because intelligent behaviour requires considerable knowledge.



5. Methodology

Method 1: GTTS ENGINE

The GTTS engine goes through three steps to operate. Speech from text, intention from text, and action from intention.

ASR turns inputs into audio files and eliminates background noise as part of its operation.

It use element recognition technology to transform the audio stream into text.

Acoustical evaluation:

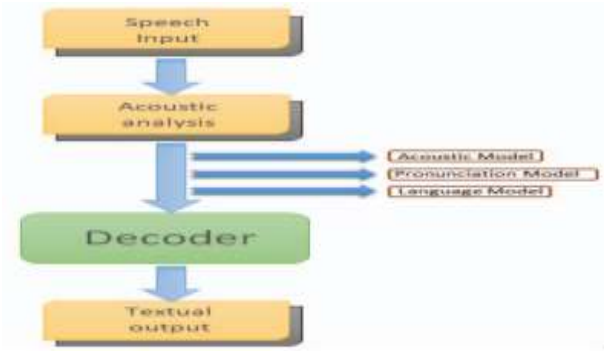


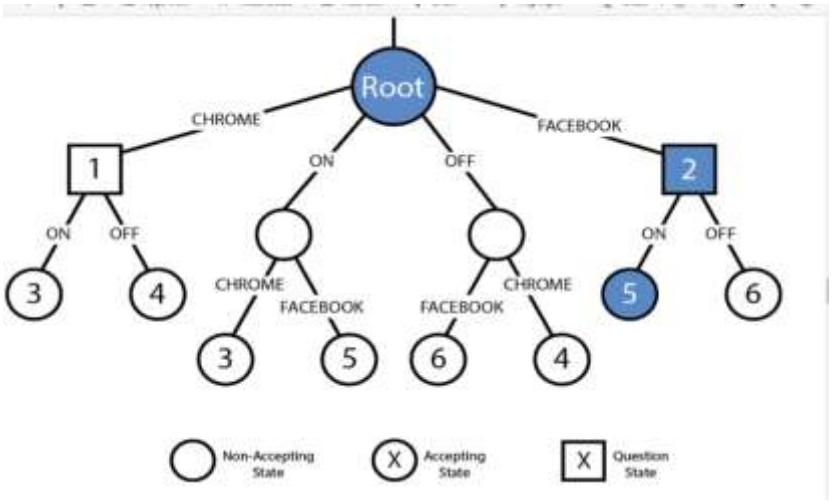
Fig. 2. Acoustic Analysis

Method 2: Finite State Automation

The simplest machine to identify patterns is a finite automaton (FA). The abstract machine known as the finite automata or finite state machine comprises five components, or tuples. It has a number of states and a set of guidelines for changing between them, although they rely on the input symbol used.

6.Application Functionality: The software that conducts observable activities for the user on the user interface (which can be visual or aural), or that can either observe actions as they happen or get any responses or errors from the IPA, is said to have application functionality.

7. Output or Observable action: Here, the user's desired output can be shown.



Method 3: SAM-IPA

The SAM-IPA is envisioned as a complex agent with a variety of needs and objectives. This study divides the target parameters into three dimensions for the purpose of class identification. The first section focuses on HCI and comprises the functionalities that, in the eyes of the user, give SAM-IPA its intelligence and dependability. The second focuses on performance, or the capacity to think critically, adapt, and be secure. The final prerequisite for the IPA to be a multi-role agent is the integration requirement. Fig. 3A provides an illustration of these criteria. Simulating intelligence using HCI

SAM-interaction IPA's performance, or its capacity to accurately understand user needs together with emotional cues and then communicate with the user or other people on his behalf, is the primary usability criterion for the system.

Fig. 3. Goals for SAM-IPA - HCI, Performance and Integration

Method 4:ASR MODEL

All voice assistants are programmed to listen to the user's requests and carry them out as instructed. We used the Python programming language in this project to construct the AI-based voice assistant. The voice assistant transfers the user's request to its database to be searched when it notices a pause, indicating that the user has finished their request.

The duration of time the system spends listening may be adjusted to suit the user's needs. The system will continue to listen for commands.

The system will prompt the user to repeat the procedure until the desired number of times has been reached if it is unable to gather information from the user's input.

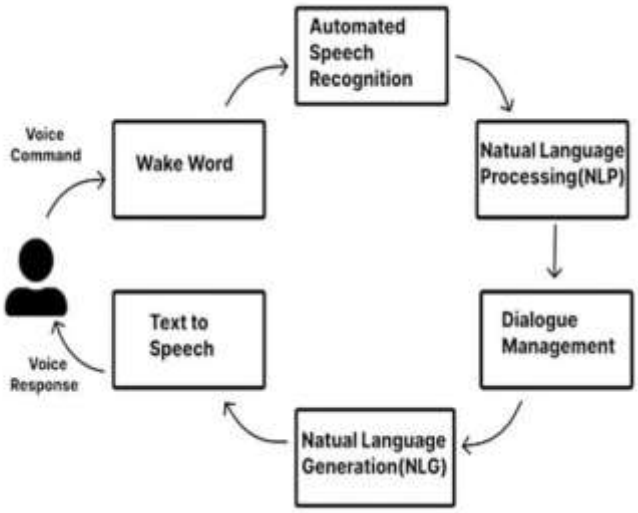


Figure: Machine Learning Model

Method 5: RASPBERRY PI

voice command: The major goal of our project is to develop a voice-driven menu control for our helper. We are using the voice commands listed below to command the assistant:

Virtual helper:

1) As a crucial first step, Google first logs your browsing history and sends it to its server for more thorough analysis.
2) The server breaks down your input into discrete sounds. At that point, it suggests consulting a database of distinct words' elocutions to see which words most closely resemble the combination of unique sounds.
3) It then picks up on keywords to comprehend the tasks and do associated duties.

voice instructions:

INPUT (User Speak)	OUTPUT (Assistant doe
Forward	moves forward
Back	moves back
Right	turns right
Left	turns left
Stop	stops doing current tas

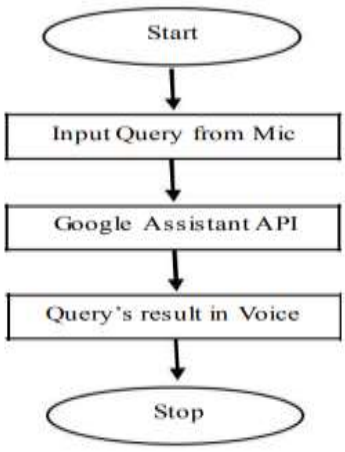


Fig.7. Flow Diagram of Virtual Assistant

7. Results and Discussion

Both the methods have been applied and results are compared.

S.NO	Model	Accuracy
1	GTTS ENGINE	57.4
2	FINITE STATE AUTOMATION	83.5
3	SAM IPA	94.12 and 93.67
4	ASR MODEL	97
5	RASBERRY PI	70

8. Conclusion

Compared to other helpers, we have implemented a lot of stuff in our project. Because it is a hands-free application nowadays, it is highly helpful in everyday life. It is a very easy application. It is also employed in the corporate world, for instance in laboratories where workers wear body suits and gloves for protection, making it difficult for them to type. By using a voice assistant, however, they may access any information, making their job simpler.

Voice assistants are helpful in a variety of areas, including education, everyday life applications, home appliances, etc. They are also beneficial for those who are illiterate since they allow them to access luxury due to AI based voice assistants.

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