VIRTUAL DESKTOP ASSISTANT USING MACHINE LEARNING

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ABSTRACT

Intelligent voice assistants are internet-connected devices, which listen to the voice and react to spoken user commands to retrieve information from the internet, control appliances, or notify the user of incoming messages, reminders, etc. Virtual assistant implies the program which can assist you to reply to your query or virtually to do a task for the user. In our paper, we are developing an application assistant for desktops. We already know some voice assistants like Google Assistant, Siri, etc.

Our project was started on the premise that there is a sufficient amount of openly available data and information on the web that can be utilized to build an assistant that has access to make an intelligent decision for the user. Now in our desktop application, it can act as a search tool where we have to give voice input and get output through voice and display on the screen. To identify the spoken words speech recognizer uses NLP and derives meaning from human language in a smart and useful way. It overcomes drawbacks in the existing system such as Siri, which does not work on desktop but our system will work on desktop applications.

Keywords:- *virtual assistant, Text-to-Speech, Voice recognition, Desktop application.*

INTRODUCTION:

In the modern era, automation is quickly replacing human interaction. One of the main reasons for this change is performance. There's a huge change in technology rather than advancement. In today's world, we train our machines to do their tasks by themselves or to think like humans using technologies like machine learning, (natural language processing) neural networks, etc. Now in the current age, we can interact with our machines with the help of virtual assistants. There are companies like Google, Microsoft, Apple, etc. With virtual assistants like google now, Cortana,

Siri, respectively. Which helps their users to control their machine by just giving input in the form of voice commands. These types of virtual assistants are very useful for physically challenged people, blind & old age, children, etc. making sure that the interconnection with the machine is not a difficult task anymore for people. Even blind people who couldn't see the machine can interact with it using their voices. Some of the basic tasks that are supported by most of the virtual assistants are:

- ❖ Checking weather updates
- ❖ Search on Wikipedia
- ❖ Mathematics calculations
- ❖ Stream music
- ❖ Open application

Virtual assistants can take commands via text (online chatbots) or by voice. Voice-based intelligent assistants need a wake word to activate the listener, followed by the voice command. This project is designed to be used efficiently on desktops. Personal assistant software improves user productivity by managing routine tasks of the user and by providing information from an online source to the user. This project was started on the belief that there is a sufficient amount of openly available data and information on the web that can be utilized to build a desktop virtual assistant that has access to making smart decisions for daily life user activities.

LITERATURE REVIEW :

Kishore Kumar et.al has proposed in [1], and economically effective and performance-wise effective VA using Raspberry Pi for home automation based on the concept of the internet of things and speech recognition. The device responds through voice and fetches search results from the Internet along with controlling the home appliances. The drawback of this device is that it cannot be run on desktop applications.

Dr. Kshama V. Kulhali et.al, has proposed in [2], the most application of iPhone 'SIRI' which helps the user to communicate with mobile using voice and respond to the voice command. The device designed by them can work with or without the internet. They named it Personal Assistant with Voice Recognition Intelligence. Their work is based on the concept of speech recognition. The drawbacks of the system are it does not work on desktop applications.

Veton kepuska has proposed in [3], one of the goals of Artificial intelligence (AI) is the realization of natural dialogue between humans and machines.   However, in this paper, they have used the multi-modal dialogue systems which
process two or more combined user input modes, such as speech, image, video, touch, and head and body movement to design the next generation of Virtual Personal Assistant model. In their work, they have tested the new VPAs model by using IBM Watson cloud server with Python, Node-Red.
We are developing a Virtual Assistant which involves all the features in one system such as opening applications, playing music, setting reminders, etc. so that the client doesn't have to go for different options. If we take the example of Alexa which is the personal assistant of Amazon, It is not capable of opening desktop applications but as we are working for desktop application, it is capable of doing such function.

METHODOLOGY:

In this work, we are implementing a desktop virtual assistant, where the speech recognition library has many build functions that will help the virtual assistant to understand the command given by the user and it will respond to the user invoices.

The NLP algorithm will convert the user voice into text and according to the keywords present in the text respective action will be performed by the desktop virtual assistant. Also, our assistant will be able to perform some other functions like searching history, mathematics, and science questions also extracting news with the help of API WolframAlpha.

We are using libraries like random, OS, Turtle, My alarm etc. each corresponding to these techniques. We will use the libraries random for gaming, OS to implement operating system function like battery percentage, sleeping system, volume up, volume down. By using pyautogui will be able to take the screenshot. Distutil library is useful for checking battery status.

Some other modules are:-

1)Speech recognition — Speech recognition is an important feature used in various forms like house automation and artificial intelligence devices. The important function of this library is to try to understand whatever the humans speak and converts the speech to text form.

2) pyttsx3 — pyttsx3 is a conversion library OF text to speech in python. This module supports text to speech engines on mac, Linux, and windows.

3) Wikipedia — Wikipedia is an online encyclopedia used by many people from the academic community ranging, freshmen to professors to students who want to gain knowledge over a particular topic. This module in python extracts data required from Wikipedia.

4) CV2 — This module is used to capture images from your camera

5) DateTime — This is a default module in python and it works on time and date.

6) OS — It provides the function to interact with the operating system and this module is a standard library in python

7) time — This module helps us to showtime.

8) Web browser — It extracts data from the internet and this is an in-built package in python.

9) Subprocess — This is a standard library used to process various system commands like to sleep or to restart and shut down your PC.

10) Json- The json module is used for storing and exchanging data from API (Application Programming Interface).

11) request- The request module is used to send all types of an HTTP requests. Its accepts URL as a limitation and gives access to the given URL'S.

12) WolframAlpha - WolframAlpha is an API that can compute expert-level answers using Wolfram's algorithms, information base, and AI technology.

NLP:

Speech recognition uses Natural Language Processing for the recognition of speech. NLP is used by computers to analyze, understand, and derive meaning from human language in a smart way. NLP is a branch of AI and particularly deals with the interaction between humans and computers. It works on a machine learning algorithm and enhances the ability of a computer program to understand human spoken language. It helps the computer to understand and manipulate human language and perform tasks like language translation.

The sentence undergoes through 6 steps:

Fig: steps to recognize speech
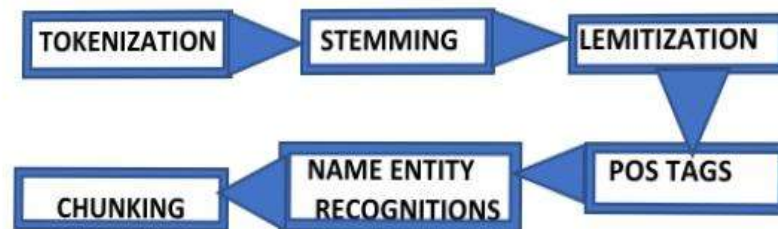
Tokenization: Tokenization is essentially splitting a phrase, paragraph, or an entire text document into tokens. Each of these smaller units is known as a token. For example, Sara eats cake. So the sentence is broken down as 'Sara' 'eats' 'cake'.

Stemming: Stemming is a technique that is used to extract the base form of the words by removing affixes. For example, the root of the words eating, eats, eaten is eat.

Lemmatization: In Lemmatization root word is called Lemma. For example, eats, eating, eat are all forms of the word eat, therefore eat is the lemma of all these words.

POS tags: PoS tagger is to resolve the ambiguity accurately based on the context of use. For example, the word "eat" can be a noun or a verb.

Name entity recognition: Named entity recognition (NER) helps you easily identify the key elements in a text like names of people, places, brands, etc. For example, Sara is a name.

Chunking: Chunking is a process to take small pieces of information and group them into large units

CONCLUSION:

In this paper, we have discussed a VA developed using python. This assistant currently works online and performs basic tasks like weather updates, streaming music, searching Wikipedia, playing music, opening desktop applications, etc. the system requires an internet connection. This Personal Assistant has been designed with ease of use as the main feature. The Assistant works properly to perform tasks given by the user.

It will overcome the drawbacks of the existing solutions. A similar application is Cortana which comes with Windows operating system does not work in other operating systems but our system will work on any of the operating systems. There are many benefits of using this assistant such as it reduces labor costs, improves work quality, increases productivity, increases flexibility, etc.

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