



Intelligent Tech Assistant Using Machine Learning

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Abstract---

The major aim of the Virtual Assistant is to simplify the human efforts, time and the basic errors along with enhancing the Human-Machine interaction using Natural Language commands. As the technology is developing day-by-day people are becoming more dependent on it, one of the mostly used platform is computer. The traditional way to give a command to a computer is through keyboard but a more convenient way is to give the command through voice. Giving input through voice is not only beneficial for the normal people but also for those who are physically impaired who are not able to give the input by using a keyboard. For this purpose, there is a need of voice assistant which can not only take command through voice but also executes the desired instruction and give the output in the voice or by performing the specified tasks.

Many IT Tech-Giants have used the dialogue-based system technology to establish various kind of Virtual Personal Assistants (VPA's). Microsoft's Cortana, Apple's Siri, Amazon's Alexa and the Google Assistant are the current most popular VPA which are using the voice dependent interaction.

A Personal Voice/Virtual Assistant is the software that can perform the task and provide different services to the individual as per the dictated commands. This is done through a synchronous process involving recognition of speech patterns and then responding synthetic speech. Through this based assistant a user can automate tasks ranging from automating the mails using voice, tasks management like setting a reminder and media playback and much more but it will not be limited to this as the features like Browser Automation, WhatsApp Automation, Gesture controlled mouse, Sign language recognition for impaired people which can ease their task.

Keywords: Voice Assistant, Sign Language recognition, Automation, Natural Language Processing (NLP), Gesture controlled Mouse.

1. Introduction

"Intelligent Tech Assistant Using Machine Learning", is the design of different modules and the logic framework are apply described in this report. Our vision behind making this project is the most important. As we all know we are living in the 21st century and the technology and the innovations going now a day are growing as fast as the yeast spreads in the breads. The data is going to be the most important part of each and everyone's life in coming years. Data will get a-such a importance that it will be more precious than a human. So, analyzing, managing, securing the data is the most important tasks in coming days. Intelligent tech assistant using machine learning" is a well-known name brings up an image of the classical Assistant used in the reel world and coming to the real world it just similar to the Cortana by Microsoft or Alexa by Amazon or to the Google Assistant. But our Intelligent Assistant offers something much more than what today's assistant's and for sure less than the reel world. The add-ons which will make our Intelligent a standout Assistant are developed but never embedded in any assistants.

2. LITERATURE SURVEY

1. Research Paper on Desktop Voice Assistant

Vishal Kumar Dhanraj, Lokesh Kriplani, Sema Mahajan Virtual assistant is used to run machine like laptop or PC's on your own command. Virtual assistant is an application program that understands natural language and voice commands to complete tasks for the users. The Users can ask their assistants' questions, control home automation devices, and media playback Via voice, and manage other basic tasks such as email, to-do lists, open or close any application, send messages to anyone on Whatsapp etc. with. Some other types of Voice Assistant are:

- Intelligent Personal Assistant
- Automated Personal Assistant
- Virtual Digital Assistants
- Chat bot

2. Real-time virtual mouse system using RGB-D images and fingertip detection.

Dinh-Son Tran, Ngoc-Huynh Ho, Guee Sang Lee.

The proposed method overcomes the limitations of most current virtual-mouse systems. It has many advantages, e.g., working well in changing light levels or with complex backgrounds, accurate fingertip tracking at a longer distance, and fingertip tracking of multiple people. The experimental results indicated that this approach is a promising technique for fingertip-gesture-based interfaces in real time.

3. Virtual Assistant Using Artificial Intelligence

A. Sudhakar Reddy, M.Vyshnavi, C. Raju Kumar, and Saumya, "Virtual Assistant Using Artificial Intelligence"

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 "chat bot" 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.

Working

- i) **Speech to Text Conversion:** The foremost task is to detect the speech through microphone and convert it to text by which we will be able to process the user inputs and will provide the desired outputs. Some libraries have been used and custom code are also added to make this function work.
- ii) **Text Analyzing and processing:** Next task is to process the converted text, analyze it and perform the whatever actions are required according to the user input. For example, if text is "Open Calendar" then code will analyze it and will initiate the process to invoke the calendar application of the system.
- iii) **Text to Speech Conversion:** Final task is to convert the desired output of the given input to the speech format. As our code processes the converted speech to text and gives output in text only, so we will now use library and some custom code to convert the text into the speech and give it to the user through the speakers.



Fig. 1. Block Diagram

Modules

Web Browser Automation:

Automation of websites using voice commands require many technologies for its implementation. Voice automation is based on NLP (natural language processing). We integrate voice recognition system in our websites to understand the voice commands and respond accordingly to perform the functionality that we want to be executed over our websites. Today, after so many researches and development in the voice recognition websites are not voice automated. Only a very few websites are available that are using voice automation for websites, if available they are not implemented at its strength. It needs to be implemented over websites to support a wide range of functionality. It can be used to voice based control over all functionality that we do with the help of mouse and keyboard.

Its implementation can be done using many technologies for creating the websites. It requires a functionality that listen to the voice commands and act in response to that particular commands. For this we are using anyyang.js (a javascript library) that allow user to control the site with voice commands. This

library is based on natural language processing. This library is used to navigate through the site. We can use HTML5s speech recognition functionality to fill form forms in websites, this changes the traditional way of filling the form with typing.

We can easily fill forms and submit them, this automated the website as we can control and use website as hands free. In our website we are going to use these Annyang.js and HTML5s speech recognition system to create voice automated website.

WhatsApp Automation

A Python is an amazing language. You don't have to be a pro to do exciting things with it. The language is perfect for automation. The first automation I tried was email automation. Then web scraping, and now WhatsApp messages. Perhaps you want a WhatsApp message to deliver at a particular time but you could be busy or even at sleep at that time. Or you may want to know how you can automate WhatsApp messages just for the fun of it.

You can automate WhatsApp messages with two lines of python code. Use Pycharm or any other IDE you are comfortable with. Install Pywhatkit. Import the Pywhatkit. Write your message and include the phone number you want to send the automated message and the time you want the message sent.

Gesture Mouse

A real-time gesture-based interface is still challenging for human- computer interactions. There are several issues such as noise due to sensors, lighting conditions in environment where system is used, system unable to track gestures. Here comes sixth sense technology in picture, sixth sense technology helps us in efficiently tracking the hand gestures with less hardware requirement. The module will use the camera embedded with the system. Initially the user has to show his/her palm, the camera will capture the palm, once it recognizes the palm the software module in it will trace the fingertips and it will keep the track fingers, as soon as the gesture made by the user matches to the one stored in database it will perform the action associated to that gesture. The database will contain all the possible gestures and associated tasks with respect to that gesture.

Modules which will be implemented are: -

- Hand detection
- Hand gesture extraction and matching
- Fingertip detection and gesture tracking

Algorithms:

Virtual Assistant Algorithm

1. Start
2. Import required libraries.
3. Initialize voice engine.
4. Initialize audio engine.
5. Command to execute startup function.
6. Start a loop until user exits.
7. Take continuous commands from user.
8. Process the inputs and give the desired output.
9. If stop command is encountered exit the loop.
10. Stop.

WhatsApp Automation Algorithm

1. Start
2. Import required libraries.
3. Initialize voice engine.
4. Initialize audio engine.
5. If command = Send Message then prompt audio engine.

6. Ask user the recipient of the message.
7. Then ask the message to send.
8. Then send the desired message to the desired person.
9. Stop.

Browser Automation Algorithm

1. Start
2. Import required libraries.
3. Initialize voice engine.
4. Initialize audio engine.
5. Open the desired browser to open or command our assistant to open.
6. If command = Chrome/Edge Automation.
7. Ask user to give command.
8. Check all the possible conditions of the automation.
9. If Condition matches execute its related code or else check other condition.
10. If not found any prompt audio engine to say invalid command.
11. If command = Stop Automation then, Exit. XII.
12. Stop.

Virtual Mouse Algorithm

1. `var_leftmost→min_argument[tuple(hull[hull[:,0].argmin()][0])]`
2. `var_rightmost→max_argument[tuple(my_con[my_con[:,0].argmax()][0])]`
3. `var_topmost→tuple assignment (hull [hull [:, :1].argmin()][0])`
4. `var_bottommost→tupleassignment(my_con[my_con[:,1].argmax()][0])`
5. `var_Temp→bottommost[0]+30 cv2.line(roi,topmost,(topmost[0], h-280),(0,242,225),2)`
6. `cv2.line(roi,leftmost,(topmost[0],bottommost[1]- 80),(0,242,225),2);`

Mathematical Model

Input Set:- The personal assistant takes voice input, text input and text input through remote signal. So the set of inputs will be, $I_1 = \{\text{predefined command, fixed pattern sentential command, random sentences as command}\}$ $I_2 = \{\text{voice, text, remote text}\}$ Thus, $I = I_1 \cup I_2$ Input $I = \{\text{all sentences in English via speech, all sentences in English as text, remote text input}\}$.

Output Set:- The outputs for the desired inputs are response determined by the system according to the input given and the database containing all the necessary inputs and their respective outputs. $O_1 = \{\text{voice, display, text}\}$ $O_2 = \{\text{GUI, application response}\}$ Thus, $O = O_1 \cup O_2$ Output $O = \{\text{Response for corresponding voice input, Response for corresponding input via GUI, application response}\}$ There is a one to one relation between input and output. For single input there is only one output.

III. Conclusion

Thus to overcome the existing system's limited nature and adding more features to the personal assistant machine learning can be used with the help of python libraries and google's frameworks. The Intelligent Tech Assistant will be able to perform the mentioned tasks of tab manipulation and automation of the system more easily and efficiently with accuracy.

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