

# Smart AI Based VA

**Prof. Abhijit Kalbande<sup>1</sup>, Mr. Shreyash Gupta<sup>2</sup>, Mr. Kantesh Murade<sup>3</sup>,  
Mr. Shardul Tidke<sup>4</sup>, Mr. Deep Agashe<sup>5</sup>**

Assistant Professor, Department of Information Technology, P.R.M.C.E.A.M, Badnera Amravati, India<sup>1</sup>

Student, Department of Information Technology, P.R.M.C.E.A.M, Badnera Amravati, India<sup>2-5</sup>

**Abstract:** A Voice Assistant is one of the hot topics in the current world that are programs that listens to human's verbal command and respond to them which makes it a human computer/ device interaction. In the current days, a voice assistant is everywhere which is a lot useful in these busy days. Nowadays, almost everyone in the current world is using voice assistant because it's everywhere starting from Google smartphone assistant which even 5 years old kids will know how to use because of the current world pandemic which makes them use smartphones till Amazon's Alexa which will be very useful to do works starting from entertaining the users till turning on and off the household products (Internet of Things). One of the greatest features is that it will be very useful to even physically challenged people, for example, people who aren't able to walk use the Internet of Things (IoT) feature to operate the household products and maintain them. So, we tend to develop a voice assistant which will be very useful to the users same as the other voice assistants which are currently in the world.

**Keywords:** Internet of Things, Artificial Intelligent, Virtual assistant, Arduino, raspberry pi.

## I. INTRODUCTION

The very first voice activated product was released in 1922 as Radio Rex. This toy was very simple, wherein a toy dog would stay inside a doghouse until the user exclaimed its name, "Rex" at which point it would jump out of the house. This was all done by an electromagnet tuned to the frequency like the vowel found in the word Rex, and predated modern computers by over 20 years. In the 21st century, human interaction is being replaced by automation very quickly. One of the main reasons for this change is performance. There's a drastic 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, Neural Networks, etc. Now in the current era, we can talk to our machines with the help of virtual assistants. Virtual assistants are software programs that help you ease your day-to-day tasks, such as showing weather reports, giving daily news, searching the internet etc. They can take commands by voice. Voice-based intelligent assistants need an invoking word or wake word to activate the listener, followed by the command. We have so many virtual assistants, such as Apple's Siri, Amazon's Alexa and Microsoft's Cortana and Amazon's Alexa and this has been an inspiration for us to do this as a project. This system is designed to be used efficiently on desktops. Voice assistants are programs on digital devices that listen and respond to verbal commands. A user can say, "What's the weather?" and the voice assistant will answer with the weather report for that day and location.

A disease is a condition that affects the individual functioning of body totally. Diseases if neglected will lead to the death of an individual. Diseases can be identified by the symptoms of the body of an individual. Health is the most important in every human's life. Weekly or monthly check up of one's health is most important for the prevention and to stay healthy. Healthcare is the most crucial parts of the human life. Nowadays, so many are not willing to go to hospital, due to work overload and negligence of their health. The doctors and nurses are putting up maximum efforts to save people's lives without even considering their own loves. There are also some villages which lack medical facilities.

Accurate and on-time analysis of any health-related problem is important for the prevention and treatment of the illness. The traditional way of diagnosis may not be sufficient in the case of a serious ailment. In this situation, where everything has turned virtual, the doctors and nurses are putting up maximum efforts to save people's lives even if they have to danger their own.

There are also some remote villages which lack medical facilities. The dataset was processed in ML models Naive Bayes and Decision Tree. While processing the data, symptoms are given as input and the disease was received as an output. This project helps to get the idea about the disease of an individual based on the symptoms he/she have and get the treatment easily by contacting the concern doctor.

## II. PROPOSED SYSTEM

We are proposing a system in an efficient way of implementing a Personal voice assistant, Speech Recognition library has many in-built functions, that will let the assistant understand the command given by user and the response will be sent back to user in voice, with Text to Speech functions. When assistant captures the voice command given by user, the under lying algorithms will convert the voice into text. And according to the keywords present in the text (command given by user), respective action will be performed by the assistant. This is made possible with the functions present in different libraries. Also, the assistant was able to achieve all the functionalities with help of some API's. We had used these APIs for functionalities like performing calculations, extracting news from web sources, and for telling the weather.

We will be sending a request, and through the API, we're getting the respective output. API's like WOLFRAMALPHA, are very helpful in performing things like calculations, making small web searches. And for getting the data from web. In this way, we can extract news from the web sources, and send them as input to a function for further purposes. Also, we have libraries like Random and many other libraries, each corresponding to a different technology. We used the library OS to implement Operating System related functionalities like Shutting down a system or restarting a system. At the outset we make our program capable of using system voice with the help of sapi5 and pyttsx3. pyttsx3 is a text-to-speech conversion library in Python. Unlike alternative libraries, it works offline, and is compatible with both Python 2 and 3. The Speech Application Programming Interface or SAPI is an API developed by Microsoft to allow the use of speech recognition and speech synthesis within Windows applications. Then we define the speak function to enable the program to speak the outputs. After that we will define a function to take voice commands using the system microphone. The main function is then defined where all the capabilities of the program are defined.

The proposed system will have the following functionality:

- The system will keep listening for commands and the time for listening is variable which can be changed according to user requirements.
- If the system is not able to gather information from the user input, it will keep asking again to repeat till the desired number of times.
- The system can have both male and female voices according to user requirements.
- Features supported in the current version include playing music, texts, search on Wikipedia, or opening system installed applications, opening anything on the web browser, etc.

## III. SYSTEM ARCHITECTURE

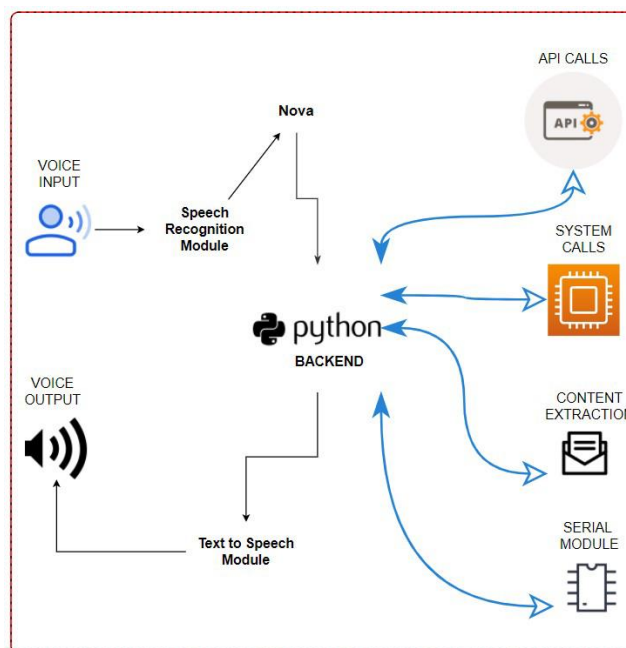


Fig 1. System Architecture

**ALGORITHMS USED****A. SPEECH RECOGNITION MODULE**

1. The class which we are using is called Recognizer.
2. It converts the audio files into text and module is used to give the output in speech.
3. Energy threshold function represents the energy level threshold for sounds. Values below this threshold are considered silence, and values above this threshold are considered speech.
4. Recognizer instance. Adjust for ambient noise (source, duration = 1), adjusts the
5. energy threshold dynamically using audio from source (an Audio Source instance) to account for ambient noise.

**B. SPEECH TO TEXT & TEXT TO SPEECH CONVERSION**

1. Pyttsx3 is a text-to-speech conversion library in Python. And can change the Voice, Rate and Volume by specific commands.
2. Python provides an API called Speech Recognition to allow us to convert audio into text for further processing converting large or long audio files into text using the Speech Recognition API in python.
3. We have Included sapi and espeak TTS Engines which can process the same.

**C. PROCESS & EXECUTES THE REQUIRED COMMAND**

1. The said command is converted into text via speech recognition module and further stored in a temp.
2. Then, Analyse the user's text via temp and decide what the user needs based on input provided and runs the while loop.
3. Then, Commands are executed.

**IV. WORKING PRINCIPAL**

The project work of the voice assistant has been clearly explained in this report, how useful it is and how we can rely on a voice assistant for performing any/every task which the user needs to complete and how the assistant is developing everyday which we can hope that it'll be one of the biggest technologies in the current technological world. Development of the software is almost completed from our side and it's working fine as expected which was discussed for some extra development. So, maybe some advancement might come soon where the assistant which we developed will be even more useful than it is now.

It starts with a signal word. Users say the names of their voice assistants for the same reason. They might say, "Hey Siri!" or simply, "Alexa!" Whatever the signal word is, it wakes up the device. It signals to the voice assistant that it should begin paying attention. After the voice assistant hears its signal word, it starts to listen. The device waits for a pause to know you've finished your request. The voice assistant then sends our request over to its source code. Once in the source code, our request is compared to other requests. It's split into separate commands that our voice assistant can understand.

The source code then sends these commands back to the voice assistant. Once it receives the commands, the voice assistant knows what to do next. If it understands, the voice assistant will carry out the task we asked for. For example, "Hey RUDRA! What's the weather?" RUDRA reports back to us in seconds. The more directions the devices receive, the better and faster they get at fulfilling our requests. The user gives the voice input through microphone and the assistant is triggered by the wake-up word and performs the STT (Speech to Text) and converts it into a text and understands the Voice input and further performs the task said by the user repeatedly and delivers it via TTS (Text to Speech) module via AI Voice. These are the important features of the voice assistant but other than this, we can do an plenty of things with the assistant. List of features that can be done with the assistant:

- A. Playing some video which, the user wants to see.
  - B. Telling some random fact at the start of the day with which the user can do their work in an informative way and the user will also learn something new.
  - C. One of the features which will be there in every assistant is playing some game so that the user can spend their free time in a fun way.
  - D. Users might forget to turn off the system which might contain some useful data but with a voice assistant, we can do that even after leaving the place where the system is just by commanding the assistant to turn the system off.
- As discussed about the mandatory features to be listed in voice assistant are implemented in this work, brief explanation is given below.

1. **API CALLS:** We have used API keys for getting news information from news api and weather forecast from open weather map which can accurately fetch information and give results to the user.
2. **SYSTEM CALLS:** In this feature, we have used OS & Web Browser Module to access the desktop, calculator, task manager, command prompt & user folder. This can also restart the pc and open the chrome application.
3. **CONTENT EXTRATION:** This can Perform content extraction from YouTube, Wikipedia and Chrome using the web driver module from selenium which provides all the implementations for the web drive like searching for a specific video to play, to get a specific information in google or from Wikipedia.
4. **SERIAL MODULES:** Finally, we used the serial module for implementing the Internet of Things (IOT) feature for this project. It is a module which acquires the access for the serial port of the Arduino board and used port number 11 and COM3.

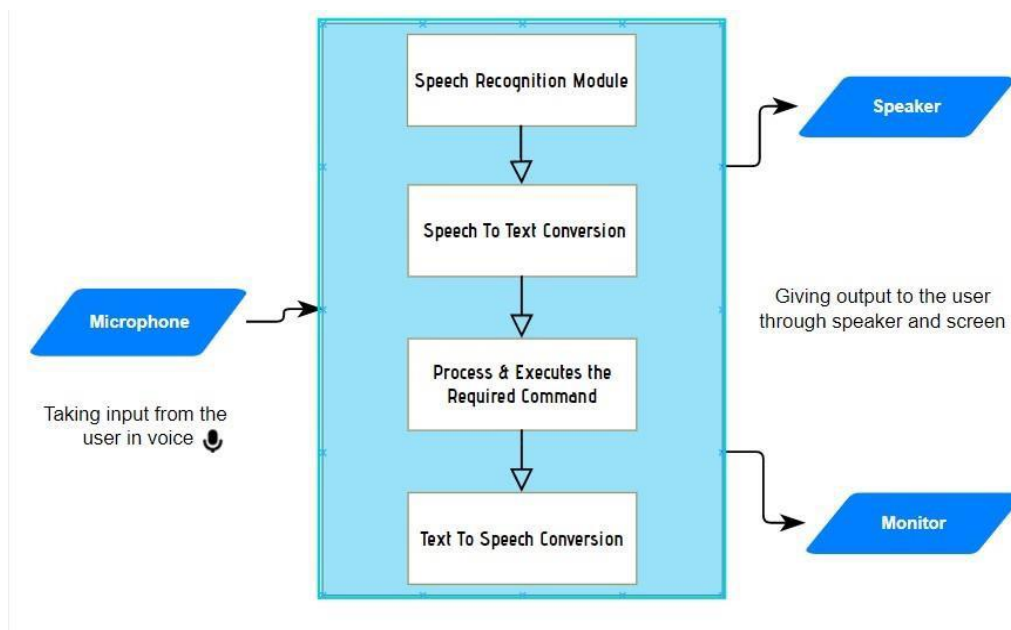


Fig 2. Flow Chart

- A. Must provide the user any information which they ask for: - The user might need any information which will be available on the internet but searching for that information and reading that takes a lot of time but with the help of a voice assistant, we can complete that task of getting the information sooner than searching and reading it. So, this is a small proof that a voice assistant helps the user to save time.
- B. Telling the day's hot news in the user's location: - In Common, watching a news channel just to know the important news in one's location takes a lot of time and the user might even want to listen to some news which is unnecessary to them or a news of some different location before getting to know the news which they want needs a lot of patience to the user but having a voice assistant makes all that nothing, it'll give the news of the location which the user wants to now or the news which they want to know.
- C. Telling some joke to chill up the moment: - Now let's be honest, everyone would have had at least one moment in their life where they were so tensed up or had an argument with their close people. So, these moments can be chilled up at least ten percentage with some random joke which might cool us that moment or stop that fight. We even have a quote stating "Laughter is the best medicine" which is relatable to the words mentioned here in this paragraph.
- D. Opening the file/folder which the user wants: - In the busy world, everything should do quick else, our schedule will get changed and sometimes we need assistance of someone to complete that task quickly but, if we have a voice assistant, we can complete that task in right away in a hustle freeway. For example, let's say the user is doing some documentation but after a while, he needs some file for reference and he goes searching for that file which wastes a lot of time and he ends up missing the deadline but, with a voice assistant we can do the searching part in a quick way by commanding the assistant to open the folder. So, by this we can say that it is one of the important features of a voice assistant.

E. Telling the temperature/weather at the user's location: - Let's start this with a question, why is it important for us to know the weather of the day? or why is it important for us to monitor the weather every day? The answer is pretty simple it forewarns the users asking about the weather saying that "It might rain today so carry an umbrella if you go out" or "It will be a sunny day so wear a sun glass". So, by this we can say that this is also a must have feature.

F. Searching for what the user asks: Today in the 20th century, we people often get doubts and we need to clear that doubt as soon as possible else that one doubt will be multiplied and at the end, we'd have no doubts and to clear the doubts searching the question in the internet will give us an answer and clear our doubts and asking that to the assistant will save a lot of time. Other than clearing the doubts, we need to search a lot of questions or topics on the internet to keep up with the trend and we can do this searching just by giving command to our assistant, asking it to search a specific topic/question.

G. Internet of Things: The final important feature which is the most important feature and that is Internet of Things which is a lot useful because, it'll save a lot of time. Let's take an example, let's say that there is a person with a walking disability, and he has to turn on the fan, but the switch is a bit far and he can't walk but what he can do is that he can tell the assistant to turn on the fan and that will turn it on. This is just one example but with the help of IoT, we can do a lot of helpful stuffs like this.

## V. CONCLUSION

As stated before, "voice assistant is one of the biggest problem solvers" and you can see that in the proposals with the examples that it is in fact one of the biggest problem solvers of the current world. We can see that voice assistant is one of the major evolving artificial intelligences in the current world once again on seeing the proposal examples because at the past, the best feature which a voice assistant had was telling the date and searching the web and giving the results but now look at the functions that it can do so with this, we can say that it is an evolving software in the current world. The main idea is to develop the assistant even more advanced than it is now and make it the best ai in the world which will save an ample of time for its users. I would like to conclude with the statement that we will try our best and give one of the best voice assistants which we are able to.

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