



Smart Voice Based Virtual Personal Assistants with Artificial Intelligence

Ankit Pandey¹, Vaibhav Vashist², Prateek Tiwari³, Sunil Sikka⁴, Priyanka Makkar⁵

Department of Computer Science and Engineering

ankpandey65@gmail.com¹, vashistvaibhav1@gmail.com², prateekmc1997@gmail.com³, ssikka@ggn.amity.edu⁴, pmakkar@ggn.amity.edu⁵
Amity School of Engineering and Technology, Haryana, India.

Abstract

Communication and Technology has a long history but still constantly and actively growing and changing. The technology changes so fast that today everybody has an AI Personal assistant. Most of us have it on our phones in the form of Google assistant or Siri or Bixby. The use of voice based personal assistants is increasing day by day and helping in making our life simple. This paper present intelligent voice assistant with ability to organize and maintain information it includes the management of emails, calendar events, files and to do lists. The attempt has been made to develop an “Intelligent Personal Voice Assistant using Python” which helps people to control device with their voice (speech), extract information and perform tasks on their desktop.

Keywords: Personal Voice Assistants, Speech Recognition, Artificial Intelligence

1. Introduction

Intelligent Voice Personal Assistant is software that has been developed and designed to assist user with basic tasks, usually providing information using natural language [1]. Most of voice assistants use online resources to answer a user's questions about the weather, sport scores, to provide driving directions and to answer similar information-based queries and also provide services, such as calendar and meeting reminders while many offer essential services, like health monitoring and alerts via special applications. Typically, an Intelligent Personal Assistants will answer queries and perform actions via voice commands using a natural language user interface [1]. Some example of commonly known assistants: Siri, Google Assistant, Alexa or Cortana.

In year 2020, there are estimated 3.5 billion voice assistants being used in smart devices around the globe. Voice assistants, an increasingly common place feature of many consumer. The abilities of voice assistant is so good that the demand of voice assistants will reach

around 8 billion by 2023 more than the world's population [2]. Voice assistants come in small packages and can perform a variety of tasks and actions after hearing a wake up word or command. They can play music, turn on the lights, they can answer any question and also place an order for you.

It is a digital assistant that uses voice recognition, natural language processing and speech synthesis to provide aid to users through phone devices and smart devices like Alexa speaker's also through voice recognition applications like Siri. To describe or call any technology by one name that makes our lives easier and smarter is almost impossible. There are a variety of terms that refer to agents that can perform tasks or services for an individual, and they are almost interchangeable — but not quite. They differ mainly based on how we interact with the technology, the app, or a combination of both [3].

Here are some basic definitions, similarities, and differences:

Intelligent Personal Assistants (IPA): This type of software can assist users with some basic tasks, usually using natural language. Intelligent personal assistants are also so smart that they go online and search for an answers to a user's question. It may text or voice either of them trigger an action.

Automated Personal Assistant: automated means the task is performed by itself. The personal assistants are using AI and deep learning according to the user's experience and behaviour towards the IPA they are able to do some automated task.

Smart Assistant: It is usually refers to the types of physical devices that can provide various advance features and services by using smart speakers that listen for a wake up word to become active and can perform certain tasks. Amazon Echo, Google Home, and Apple HomePod are examples of smart assistant's devices.

Chatbot: Its function is similar to its name it uses text as medium to communicate and provide information and do task for user. Chatbots can imitate a conversation with a human user. Today most of the banking companies use them in the customer service sector or managing the accounts to answer basic questions and there is not to worry it also connect with an online person if bot is not able to resolve your query.

Voice Assistant: The input key here is our voice. It is a digital assistant that uses voice recognition, speech synthesis, and natural language processing (NLP) and also AI to provide an amazing service through an application exam Siri, Ok Google. Cortana etc.

This paper describes an intelligent personal voice assistant that assist users in performing specific tasks. The paper is divided into three sections. Section II presents the Literature survey describing the related existing work. The devlopedintelligent personal voice assistant explained in Section III with all technical details and also consist of system design and architecture with comprising results, providing analysis of the project and finally the conclusion and future scope of the paper is presented.

2. Literature Survey

Aditya Sinha et al. presented a virtual voice based personal intelligent assistant for visually disabled persons. This

project will recognize and respond to what user will say in an effective and efficient manner via voice, just like having a conversation In this paper the main focus was on the improvement of conversational agent and speech recognition module which will work offline and understand the Indian accent ans their approach is to make IPA includes the use of Java library Sphinx-4, MaryTTS and neural networks to embed the learning capabilities[4]. Moreover, in 2017 Othman proposed paper on Voice Controlled Personal Assistant Using Raspberry Pi at International Journal of Scientific & Engineering Research Volume 8, The project show the implementation of a Voice Command System as an Intelligent Personal Assistant (IPA) that can perform numerous tasks or services for an individual using Raspberry Pi as a main hardware to implement this model which works on the primary input of a user's voice[5].Bibek Behera has proposed a model for a personal assistant to ease out the work done by humans for tasks like booking tickets, ordering food, etc. Chappie uses natural language processing (NLP) to analyse chats and extracts intent of the user. Then it uses this information and AIML (Artificial Intelligence Mark-up Language) to make aconversation with the user[6].

According to MoustafaElshafei [7], Virtual Personal Assistant (VPA) is next generation of carrier services for mobile and smart device users. VPA effectively responds to conversational voice commands and provides a single point of contact that flawlessly engages a wide range of information. It also controls the telephone calls, manages the personal activities through calendar, enables the user to access his task manager via voice interface, and includes all the functions of Unified Messaging. The virtual personal assistant enables the user to optimize the time and cost, enhance his/her overall productivity, and minimize the interruptions to regular workflow.

3. Component and Working

The project aim is to build a personal voice assistant that will make easy for users to use computer with voice command and make task easier. To implement intelligent personal voice assistant, python libraries and Google Speech Recognition API's are used for speech

recognition module and to interpret voice response. Python 3.7 or above, Spyder IDE or Visual studio code or pycharm, is used for development.

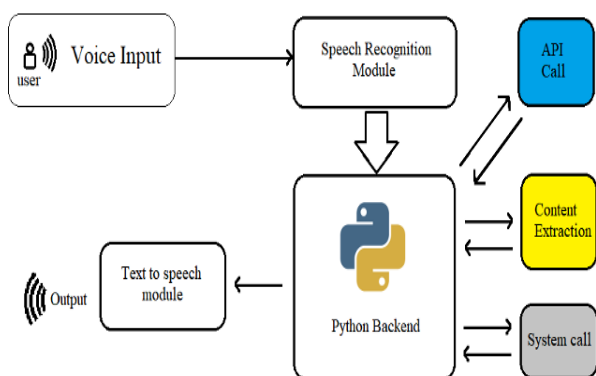


Figure 1. Component of the proposed voice assistants. Following are the major components of proposed voice assistants

- Speech Recognition module.** The system uses Google’s speech recognition system for converting speech input to text. This module uses the library of speechRecognition 3.8.1 for performing speech recognition, with support for several engines and APIs, online and offline.
- Python backend** get the output from the speech recognition module and then identifies whether the command or the speech output is an API Call, Context Extraction, and System Call then the output is send back to the python backend to give the required output to the user.
- API Calls.** It allows two applications to talk to each other. API is working as a messenger that delivers request to the provider that are requesting it from and then delivers the response back.
- Context Extraction** is the function of automatically or robotic extracting structured information from unstructured or semi-structured or both machine-readable documents. In majority of the instance this task concerns processing of human language texts by the method of natural language processing (NLP).
- System Calls,** is the programmatic method in which a computer program (function) appeal a service from the kernel of the operating system it is executed on. It include hardware related assistant and services like access of hard disk drive, creation and execution of new processes, and interacting with integral kernel

services like process scheduling. It deliver an essential interface between a process and the operating system.

- Text-To-Speech Text-to-Speech (TTS) engine** refers to the ability of computers to read text. The engine converts written text into a phonemic representation, then it will convert the phonemic representation to a waveforms and that can be output as sound.

```

11 engine = pyttsx3.init('sapi5')
12 voices = engine.getProperty('voices')
13 print(voices[0].id)
14 engine.setProperty('voice', voices[0].id)
15
16 def speak(audio):
17     engine.say(audio)
18     engine.runAndWait()
19
20 def wishMe():
21     hour = int(datetime.datetime.now().hour)
22     if hour >= 0 and hour < 12:
23         speak("Good Morning!")
24     elif hour >= 12 and hour < 18:
25         speak("Good Afternoon!")
26     else:
27         speak("Good Evening!")
28
29 name = input("Enter your name: ")
30 speak(f"Sir, how may I help you?")
  
```

Figure 2. Module for Interpret Voice Response & Text to Speech

Intelligent personal voice assistants was meant to control the applications online as well as offline and to analyze the performance of the project the working of Intelligent personal voice assistant with desktop application is shown in figure 3. Opening youtube with voice command.

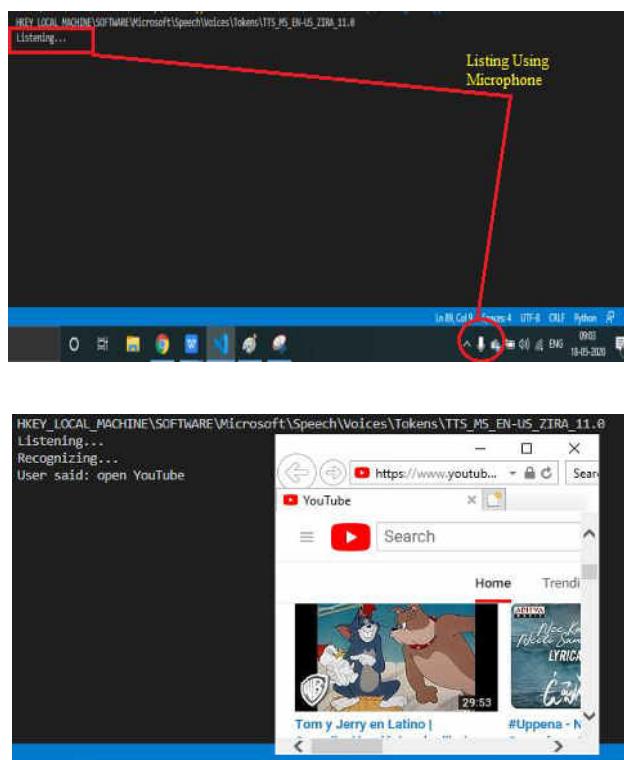


Figure 3. Working-Activating Microphone & Open YouTube

4. Conclusion and Future Scope

The personal voice assistant system presented in this paper is very fundamental system with few features however the additional and advance feature may be introduced as future work of this project , In this paper the design and implementation of a Intelligent Personal Voice Assistance is described. The project is built using available open source software modules with visual studio code community backing which can accommodate any updates in future. The modular approach used in this project makes it more flexible and easy to integrate additional modules and features without disturbing the current system functionalities. It not only works on human commands but also it is designed for give responses to the user on the basis of query being asked or the words spoken by the user such as opening tasks and operations.

This Intelligent Voice Assistant has an enormous and limitless scope in the future. Like Siri, Google Now and Cortana most popular personal voice assistants. The project will easily be able to integrate with devices near future for a Connected Home using Internet of Things, voice command system and computer vision.

References

- [1] Webopedia, web page [Online]. Available: <https://www.webopedia.com/TERM/I/intelligent-personal-assistant.html>
- [2] Statista, web page [Online]. Available: <https://www.statista.com/statistics/973815/worldwide-digital-voice-assistant-in-use/>
- [3] smartsheet, web page [Online]. Available: <https://www.smartsheet.com/voice-assistants-artificial-intelligence>
- [4] Aditya Sinha, Gargi Garg, Gourav Rajwani, Shimona Tayal, "Intelligent Personal Assistant". International Journal of Informative & Futuristic Research, Volume. 4, Issue 8, April 2017.
- [5] Emad S. Othman . "Voice Controlled Personal Assistant Using Raspberry Pi". International Journal of Scientific and Engineering Research Volume 8, Issue 11, November-2017.
- [6] Bibek Behera, "Chappie - A Semi-automatic Intelligent

Chatbot".

- [7] Moustafa Elshafei, "Virtual Personal Assistant for Mobile Users".