

Personal Assistant Using Raspberry Pi

ISSN 2395-1621

Akash Chauhan, Shubham Awati, M P Gajare

Akashchauhan393@gmail.com,
Shubhamawati7@gmail.com
milindgajare@yahoo.com

Department of Electronics and Telecommunication
All India Shri Shivaji Memorial Society(IOIT)
Pune, India



ABSTRACT

This research work aims to build up a personal assistant by using Raspberry Pi the working of a device based on implementation of a voice command system as an intelligent personal assistant. The services provided by the device depends on the input given in the form of voice command by the user and ability to access information from a online sources such as weather, telling News, time or accessing online applications to listen to music[2]. and also do task like control electronic and electrical devices in our home such as lights, TV, fans, Doors etc. with using IOT(Internet Of things) or voice commands using Normal Language Processing and Raspberry Pi. The Device will have speech recognition ability so that we can interact with it like we do with a normal human being. Artificial Intelligence technologies such as Normal Language Processing and Speech Recognition will make it more efficient and userfriendly[6]. This device might provide a platform to visually impaired people as it can perform day to day task and also various functions inside the house such as telling about the weather, stock prices, performing various calculations, playing normal game, checking mail, telling jokes or playing songs all through voice only

Keywords: Virtual Personal Assistant, Normal Language Processing,IOT, Raspberry Pi

ARTICLE INFO

Article History

Received: 8th March 2020

Received in revised form :

8th March 2020Accepted: 10th March 2020

Published online :

11th March 2020

I. INTRODUCTION

A virtual personal assistant can be seen as a software agent that understands natural language voice commands and completes tasks for the user. Such tasks were earlier performed by a personal assistant or a secretary that included tasks like dictation, reading text or email messages aloud, searching for contacts, scheduling, making phone calls and setting reminders for appointments. But in today's world all of these tedious tasks that had to be managed by a single person earlier have been made easy, effective and more efficient by using a device. This device has edge over the people that were hired for the tasks that needed to be performed for some simple and clear reasons, which are, it doesn't get tired so it can work efficiently all day long, it only needs a one-time investment during its purchase and needs no salary thus saving the cost of the user, it is compact and easy to carry anywhere, it can easily save much more data and there's very less probability of data

loss, it can also be used for personal use at home like for listening to music or setting a timer or setting an alarm[2].

Sometimes, after a long tiring day at work, people would prefer music and spending some time on the social media for relief from stress. Cooking alone by e-learning may every so often be monotonous and there would arise a need for an interactive environment. In such cases social robots may be very handy. This paper proposes the model of one such voice sustained personal assistant robot[3]

II. RELATED WORKS

A. *The main body part work setup of the device is enlivened by the following papers*

The following paper show the working of a device based on implementation of a voice command system as an intelligent personal assistant

1. Smart Home With Virtual Assistant Using Raspberry Pi. Virtual Assistant developed specifically for homes, which can be integrated into any home to make it a Smart Home. The user can interact solely through his/her voice with Olivia (the virtual assistant) to get any his/her work done around the house. designed by Shubhang Khattar in year 2019[1]

2. Voice Control Device using Raspberry Pi. the working of a device based on implementation of a voice command system as an intelligent personal assistant. designed by Pooja Singh in 2019[2]

3. A Personal Assistant Robot Using Raspberry Pi. Technology is growing at an unexpectedly fast pace with the unveiling of the family friendly robots that play the role of a personal assistant at home. designed by I Hameem Shanavas in year 2018[3]

B. How we can control or operate the electronic device from Internet are enlightened by the following paper
The following paper show the working of how we can control electronic device using internet

1. IOT based Electrical Device Surveillance and Control System. This paper talks about an energy saving electrical device Surveillance and Control system based on IOT. designed by Alok Kumar Gupta in year 2019[4]

2. IOT based control of Appliances. IOT can be considered as the network of multiple things including inanimate things as well as living organisms. Deploying a sensor network to collect the sensor data in the surrounding environment and remotely actuate the necessary controls is possible through IOT. designed by Ravi Kishore Kodali in year 2016[5]

III. REQUIREMENTS

A. Hardware Requirements

- 1) Raspberry Pi
- 2) Pi Camera
- 3) Power Bank
- 4) USB Microphone
- 5) Ethernet Cable

Raspberry Pi-

The Raspberry Pi 3 Model B features a quad-core 64-bit ARM Cortex A53 clocked at 1.2 GHz. This puts the Pi 3 roughly 50 percent faster than the Pi 2. Compared to the Pi 2, the RAM remains the same – 1GB of LPDDR2-900 SDRAM, and the graphics capabilities, provided by the VideoCore IV GPU, are the same as they ever were. As the leaked FCC docs will tell you, the Pi 3 now includes on-board 802.11n WiFi and Bluetooth 4.0. WiFi, wireless keyboards, and wireless mice now work out of the box.



Fig. 1: Raspberry Pi 3

Pi Camera-

This 8mp camera module is capable of 1080p video and still images that connect directly to your Raspberry Pi. This is the plug-and-play-compatible latest version of the Raspbian operating system, making it perfect for time-lapse photography, recording video, motion detection and security applications. Connect the included ribbon cable to the CSI (Camera Serial Interface) port on your Raspberry Pi



Fig. 2: Pi Camera

Power Bank-

The Xiaomi PLM01ZM Pro 10000 mAh Power Bank has a battery with 10000 mAh capacity. It provides charging time of AC Adaptor Charging, Charging time: 3.5 Hours, USB Charging, Charging time: 5.5 Hours. Over that, it has 2 USB port/s and power output of 5 V 2A.



Fig. 3: Power Bank

USB Microphone-

The Snowball family's excellent sound quality and easy operation make them the industry-standard USB microphones for podcasting and desktop recording.

Transducer Type: Condenser, Pressure Gradient With USB digital output. Polar Patterns: Cardioid. Frequency Response: 40 –18 kHz. Sample/word Rate: 44.1 kHz/16 bit.



Fig. 4: USB microphone(blue snowball)

Ethernet Cable-

Cat3 cable is an unshielded ethernet cable that relies on copper conductors to transmit data and power. These cables were the standard for ethernet cables in the 1990's and are capable of handling up to 10 MBPS.



Fig. 5: Ethernet Cable

B. Software Requirements

Various software libraries and applications were used in developing this system. Major software resources used include:

1. **OPENCV**—This library gives a infrastructure for computer vision applications. It offers algorithms to detect and recognize classify human actions, face, identify objects, track object movement and much more. OpenCV works with various computing languages such as C++, Java, Python, MATLAB interfaces and supports Windows, Linux, Mac OS and Android also. We used it for face recognition and face detection in our system. It is easy to implement in python.
2. **PYTHON** — Due to the simplicity and availability of wide range of libraries we chose python as our primary language. Removal of errors is much easier with python interpreter thus making the process of development easy. Some important libraries and packages used in the system are:

1. **Speech Recognition**—This is a library which is used to perform speech recognition with Google

Speech Recognition API. It was used for speech to text conversion in our program. The audio input from microphone was converted to string with the help of speech recognition.

2. **gTTS**—This library is used to generate an mp3 file from Spoken text using Google Text-To-Speech(TTS) API .The output speech by Olivia was produced using gTTS library and text can be converted to speech using google text to speech[8]. It does not generate a robotic voice thus giving a human like feel to the speech.
3. **SMTP**—SMTP stands for Simple Mail Transfer Protocol. It is used while communicating with mail servers to send email.We used it to notify the owner of the house with Email containing the name and image of the visitor.

4. **Tkinter**— It is a python GUI toolkit. We used it to create Control Panel for our system.

IV. EXPERIMENT AND RESULTS

Step1 - The device is trained for solely interacting with person.

Step2- If we ask question like how was weather today. it will star recording our voice and then convent into text and search from google



Fig. 6: Start Recording

Step3- After google Search get completed it will convert text to speech and get output from speaker

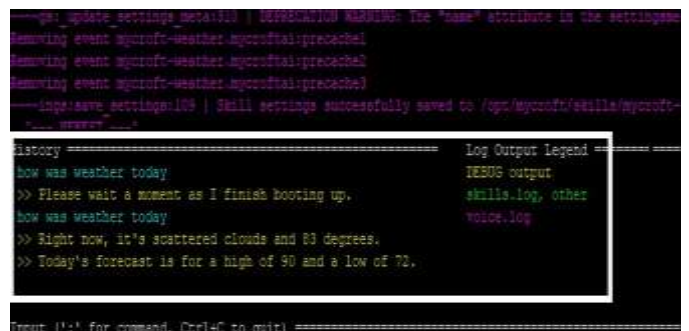


Fig. 7: Output

V. CONCLUSION

This project has various aspects like entertainment, computation, face recognition and security. Also it is a unique combination of inclusion and productivity.

Inclusion because it is enabling visually impaired and aged people to use the basic feature of a digital personal assistant and it is also enabling productivity because for the normal person tackling the most basic tasks while he/she is busy doing any other important work.

VI. FUTURE SCOPE

In future we can add servo motors to the robot which can be used as the robot arms. By using voice control we can use the robot for pick and place applications.

In addition to this prototype we can also use it for multiple face detection as it currently supports only single face detection.

Also calculator can be improved to solve complex calculations as currently it works for division, multiplication and subtraction.

By adding Wi-Fi switches, PIR sensors, Door/window sensors we can make an ordinary home a true smart home. E.g. We can turn on/off devices from anywhere at any time by using Wi-Fi switches in our Personal assistant. For e.g. user can give command to the personal assistant to turn on water geyser at a specific time in morning and it will turn on the geyser at that time using Wi-Fi switch connected to the geyser.

REFERENCES

- [1] S. Khattar, A. Sachdeva, R.Kumar and R.Gupta, "Smart Home With Virtual Assistant Using Raspberry Pi", IEEE conference, 2019
- [2] P. Singh, P. Nayak, A. Datta, D. Sani, G. Raghav, R. Tejpal6, "Voice Control Device using Raspberry Pi", IEEE conference, 2019
- [3] H. Shanavas, P. Reddy, M. Doddegowda, "A Personal Assistant Robot Using Raspberry Pi", IEEE conference, 2018
- [4] A. Gupta, R. Johari, "IOT based Electrical Device Surveillance and Control System", IEEE conference, 2019
- [5] R. Kodali, S. Soratkal and L. Boppana, "IOT based control of Appliances", IEEE conference, 2016
- [6] S. Dasgupta, D. Vincent, "Developing a PDA to Control Device using Proposed Algorithm", IEEE conference, 2017