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Personal Google API Assistant System using Raspberry Pi

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Abstract - *Visual deficiency could be a condition individual loses the visual observation. Autonomy may be a building technique in accomplishing objectives and dreams in life. Flexibility and self-dependability for the visually impaired and blind individuals has forever been a problem. The work aims at the event of a personal assistant that helps users interact with home appliances with the help of speech and gesture commands to produce a more interactive and user friendly living experience and integration of assorted tools and elements developed throughout the execution of the model. In this paper, it is discussed about design & development of an IOT system that includes sending voice commands and getting output in form of audio as well as visuals.*

***Key Words*: Technology, IoT, automation, personal assistant, python.**

1. INTRODUCTION

The major part of automation which supports to IoT is that the Raspberry Pi. The Raspberry Pi collects information from sensors or takes in speech or gesture commands IoT is the combination of two words: the internet and things. The internet suggests that connectivity, a factor cover not solely electronic devices however additionally includes living things and non-living things and therefore the word "of" connect these two words to make an IoT. Additional IoT provides the idea of ubiquitousness[1]. Due to its diversification, it is necessary to grasp what IoT is, defines IoT as "An open and comprehensive network of intelligent objects that have the capability to auto-organize, share info, data, and resources, reacting and acting in face of things and changes within the environment"[2].and interprets them to manage household devices like fan, light, heater, door, and opening and shutting of curtains. For example, if there's no presence of a automatically turned off for that specific room.

1.2 Advantages of Home Automation Systems

In recent years, wireless systems like Wi-Fi have become more and more common in home networking. In home and building automation systems, the use of wireless technologies gives several advantages that could not be achieved using only a wired network.

2. PROPOSED SYSTEM

It is based on use of Python code for the automation system and NodeJS along with other suitable development tools will be used to create web interface so that the system can be made accessible from anywhere in the Globe. It will be possible to know status of the electronic components of the house as all information will be available right inside the web interface.

Its planning to create an Android Application to make it easier to control the Devices. The Raspberry Pi, being the center of the system, will be connected to an Internet enabled router and will host web server on its platform. The web server will host web interface and will communicate with Android Application for the control of devices. Recently Google released its Assistant API for the Raspberry Pi. This means that makers, hobbyists and educationalists can now build the Google Assistant into project using the Pi. Here it provide intelligence to devices powered by Google. Using USB mice and Speakers for input and feedback system.

2.1 Layout and Working of IoT Design for Blind

First provide input through the help of Mike, there after the raspberry pi will easily pass information about the questions that have ask with the help of the Internet and Google Assistant. The primary purpose of Internet is to facilitate the sharing of information. After perform the working of Google Assistant, it gives the information which is ask by the user. Output will given as audio with the help of speaker and as graphics with the help of webpage. In this way the model architecture will work.

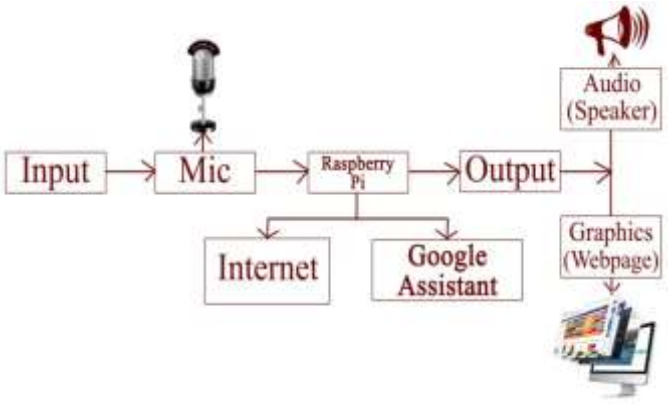

Fig. 1: IoT Module Diagram

3. DATA FLOW DIAGRAM

The Flow chart of proposed system is shown below,

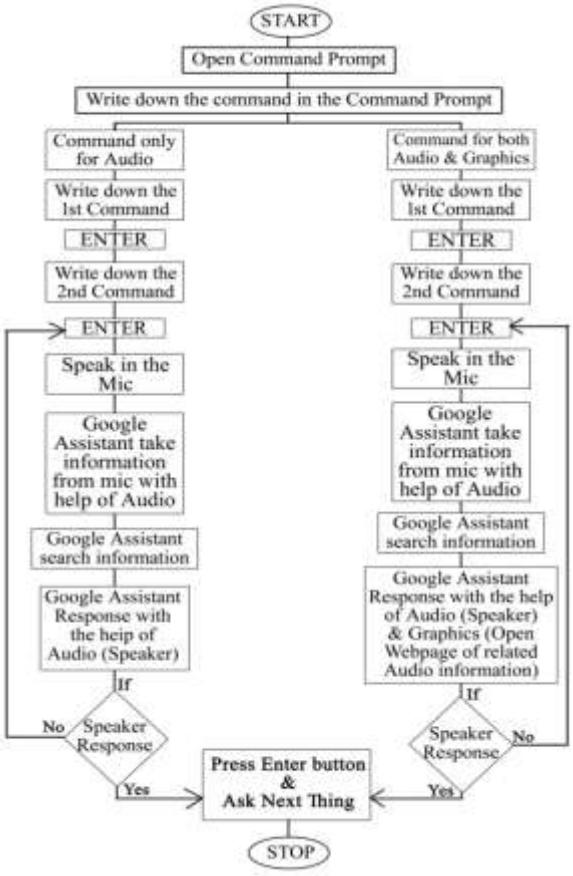

Fig.2: Flowchart Showing Execution Phases of Proposed System

Process of dataflow start, with command prompt. Now user have to write command here. In this two parts fall. First, to give commands to listen to audio only, and secondly to show command with audio and graphics(with the help of webpage).

User just use the command for audio output. Add first command in the command prompt. Then press the Enter key. After that, add second command and press the enter key again. After that speak in Mike, Google will take the information and search the information with the help of Google Assistant and it will give the answer to user with the help of speaker and if you do not answer, then you will have to press Enter and again user will ask the question. If Google Assistant give the correct answer to users question then press the enter button and ask the next question.

Now the second dataflow has to go, here user will not only use audio but also gives the information in the form of graphics (with the help of webpage). Add first command in command prompt. There after press the Enter key and add second command and press enter key again. After which speak in Mike, Google will take the information and search with the help of Google Assistant. Google Assistant will give the answer to user with the help of speaker (audio) and graphics (webpage) related information of that user ask to the Google Assistant. If you do not answer, then you will have to press Enter and again user will ask new question. If Google Assistant give the correct answer to users question then press the enter button and ask the next question. In this way Google assistant works.

4. SOFTWARE TESTING

Testing is an important phase of software development life cycle. It includes all those activities that are involved in converting old traditional system to the new system. The implementation phase of system development is concerned with translating source code into destination specification. Testing begins “in the small” and progress” to the large”

Every Pi usually has a CPU, RAM, various ports, Wifi and Bluetooth. This model in the image, which is RPi 3 model, requires about 1 Amps of power which you can supply through the Micro USB slot using old cell phone charger. Under powered will shut down immediately which can cause some serious damage it so be sure to read the manuals first. Also, it may have to Amp up if using pendrives The 4 USB ports can be used to connect wireless keyboard and. HDMI port is included so that you can connect it to a monitor, mouse.

The 1.2GHz 4-core CPU is enough to perform light tasks and play games like Minecraft Mobile Edition. However, throwing in a heat sink will allow to watch videos (IN OSMC) for a longer time. In layman terms, consider Pi as a naked yet powerful version of Intel’s stick PC.

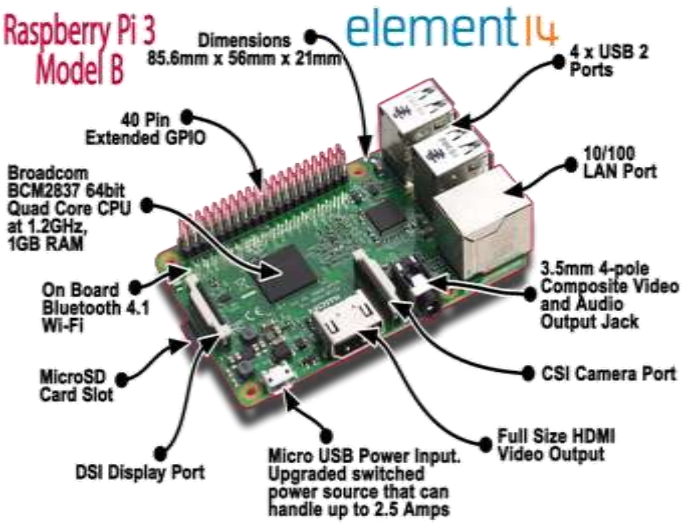

Fig.3: Raspberry-Pi Kit

5. IMPLEMENTATION

Raspberry Pi is a computer (a small and cute computer indeed) it can run a full version of Linux and Windows 10 IoT on it. There are many other operating systems. Following figure shows the actual Raspberry Pi kit which is being used in the project for automation.

As per the description given above project system look like this, in which only keyboard, mouse, mic, bluetooth, wifi, speakers and monitor is attached with the system; no CPU structure is present here.

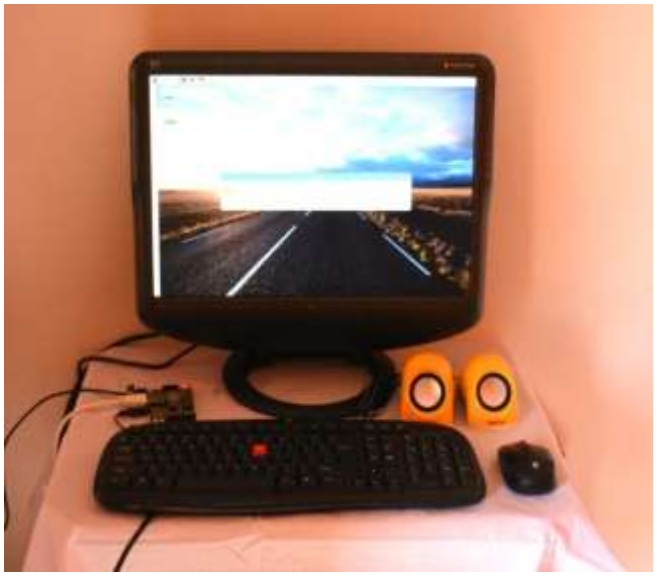

Fig.4: Project Setup Environment

5.1Main Screen

Following figure shows the initialization of the system

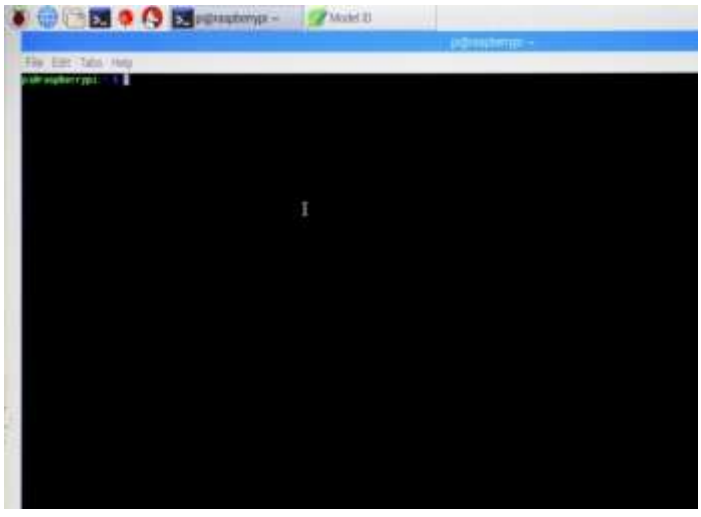

Fig.5: Command Execution Environment

5.2 Running Command

Enter The Following Command: Source/env/bin/activate

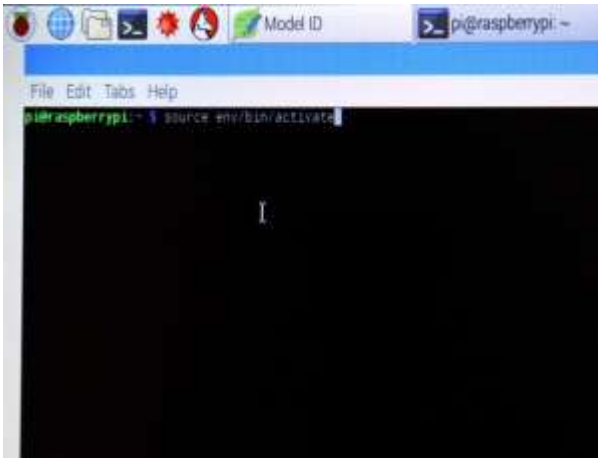

Fig.6: Actual Command Execution

5.3 Executing Commands Only for Audio

After entering previous command, system enters in the environment, then we initialize Googles Sample assistant for taking input requests and producing only for audio output.

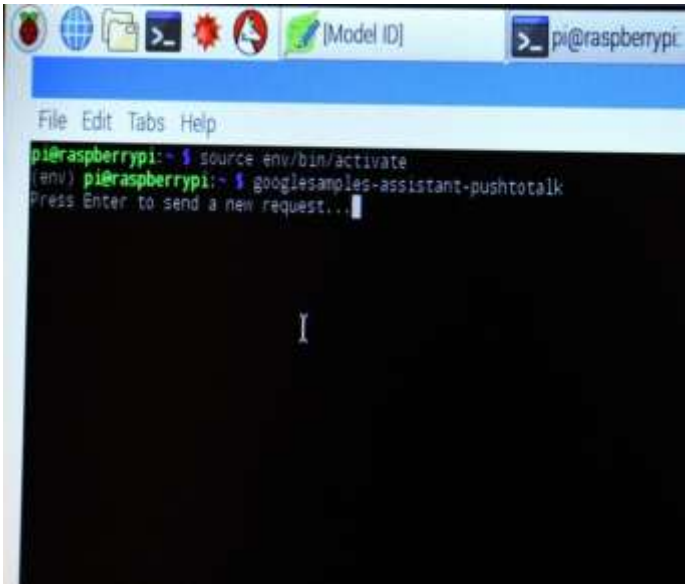

Fig. 7: Command Input only for Audio

5.4 Result of Execution of Audio Command

After initialization we have to provide voice command for input as visually impaired people can't access hardware devices easily, so we provided voice command as input.

For ex: what is data structure?

After taking input, it processed and output was generated in form of voice only.

Fig.8: Audio Output

5.5 Executing Command for Audio and Graphics

To get Graphical output from the system we have to run following command for audio as well as webpage related to that audio in the monitor in the screen

Google samples-assistant-pushtotalk --project-id assistant-30944 --device-model-id assistant-30944-pi3-google-assistant-s2oi1d --display

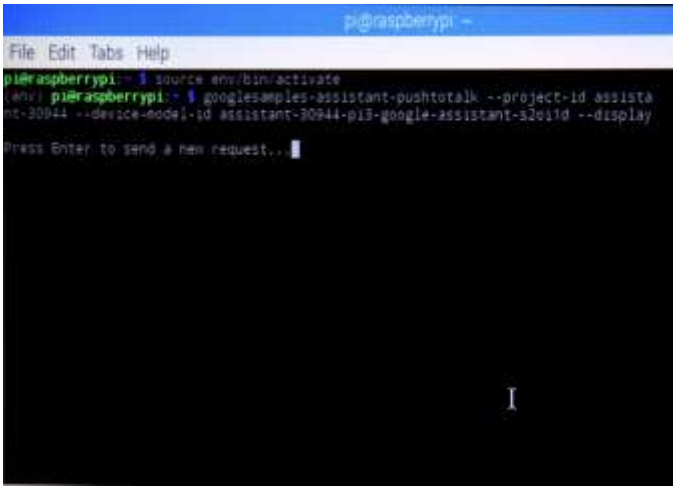

Fig.9: Command Input for Audio and Graphics

5.6 Result of Execution of Audio and Graphics (Webpage) Command

After initialization we have to provide voice command for input as visually imparted people can't access hardware devices easily, so we provided voice command as input.

For ex: what is data structure?

After taking input, it was processed and output was generated in form of voice & graphics i.e. webpage

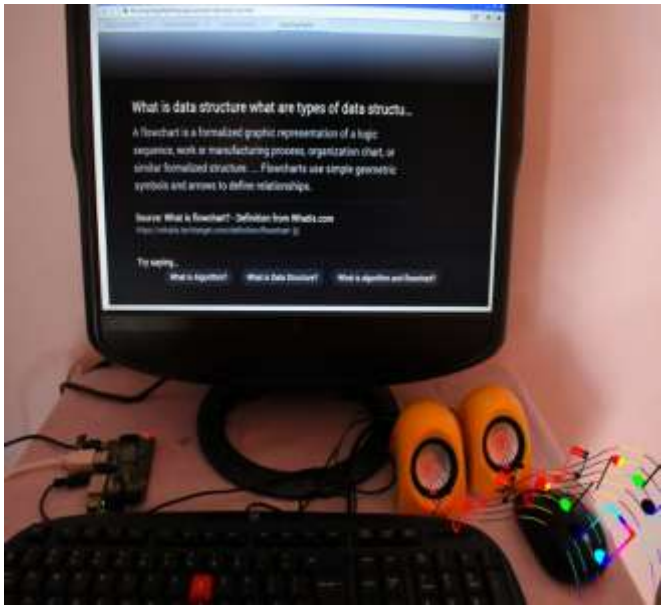

Fig. 10: Output with Graphics

6. RESULT ANALYSIS

Considering the requirements defined (user-centric, performance, usability, usefulness and economical feasibility), it can say that the system addresses most of them. Concerning this last requirement, it is clear that the cost of this solution can be reduced considerably if specialized hardware is used, e.g., an infrared camera instead of a Wiimote. The availability of the solution was partially addressed in the current version of system. Although the system is potentially able to manage large areas, its main limitation is the use of Bluetooth that has a short communication threshold. However this limitation can be overcame just using WiFi communication. The user individualization and the support for multiple users were not formally considered in the current version of the system; however they were considered in the navigation model.

The only concern could be the system performance when a large number of these components are managed simultaneously by a simple computer. Particularly the network throughput could represent a bottleneck negatively affecting the performance, and therefore the usability and usefulness of the system. This issue can be addressed by distributing the coordination process over more than one computer.

7. CONCLUSION

This work presented the prototype of a micro-navigation system that helps persons with visually impaired to ambulate within indoor environments. The system uses

few components and accessible technology. The results of the preliminary tests show that the solution is useful and usable to guide the user in indoor environments. However, it is important to continue testing the solution in real environments, involving visually impaired people to obtain feedback that allows us to improve the proposal in the right direction. This solution not only allows a user with visual disabilities to ambulate into an indoor environment while avoiding obstacles, but it could also help them interact with the environment, given that the system has mapped all the objects found therein.

8. FUTURE SCOPE

Although the developed prototype and the pre-experimentation phase met all the expectations, more rigorous experiments must be designed and conducted to identify the real strengths and weaknesses. Particularly, various non-functional requirements such as privacy, security and interoperability must be formally addressed.

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