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Voice Based Home Automation Using Raspberry PI

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Abstract
IOT is technology that is changing the world in a rapid way. Many technologies are integrated with IOT and lot of technologies have been developed which has created an impact on the present world. In this project we are making use of this technology along with the hardware and required software and developing a smart home where the devices can be controlled by using an android application. Raspberry pi has an inbuilt Wi-Fi module which is used as a communication protocol between the android application and the devices. Here we are using the relay driver to connect the devices. The motto of this project is to develop a smart home which will be helpful for the people to use their devices efficiently. This project can be helpful for the people who cannot do their work efficiently like physically challenged and old age people.

Keywords:*Voice Based, Raspberry Pi, Wi-Fi, Home Automation, Android device, Iot.*

1. Introduction

In the present world people are searching for the devices which can complete the work in an easy and in efficient manner with the less amount of human effort. These types of devices are called automated devices. In this project we aim to develop an automated device that can control the devices in home by using a technology called IOT. Here we are making use of a device called raspberry pi which acts as controller to control and process the commands received by the android application. Relay driver is used to connect the devices to the controller. Here the devices are controlled by using Wi-Fi as communication protocol. In the Raspberry pi we will have an inbuilt Wi-Fi module which acts as communication protocol between the controller and the android application. Here all the devices are controlled through the voice commands which are given through the android application where the suppression of noise is done and the required command is passed to the controller where the command is processed and the required output is displayed on the screen along with the devices for which the command was given to be turned ON/OFF. Here python is used as a main programming language because it is the default language provided by the Raspberry Pi device. Here the OS of Raspberry Pi is loaded into the memory card and then it is installed into the Raspberry Pi. In regards with the security of home is concerned we are dealing with the authentication aspect of the security where the user has to register and then add the required devices they want to control through the application. If the user is already registered then the user must login tothe application and can provide the voice command or tap on the device they want to control. Here the alerts are sent through the messages or emails based on the user registration. In this project we are going to develop an automated device that can control the appliances through voice commands there by reducing the human efforts. By this we are increasing the comfort levels.

2. Literature Survey

Home automation is still an active research field. Most of the Industries are investing in this field and developing it because there is lot of demand for this product. In future

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all the devices will be automated. The automation is the future of technology

Here we look at the recent papers published on this home automation.

Tharanya and Sangeetha presented a voice-basedHome Automation system consisting of a web server application and an android application [1].

Khusvinder Gill et al [2] proposed a system which controls the home appliances using a Bluetooth remote control locally, and uses the Wi-Fi network for remote controlling of the appliances.

Sunehra and Veena implemented a home automation system for controlling of the home appliances by sending the alerts through an email [3].

ElKamchouchi and ElShafee implemented a HAS using SMS service of GSM for remote monitoring and control of home appliances [4].

Nazmul et al proposed a touchscreen and remote control based HAS. Here the devices are controlled using touch screen along with remote through the help of the sensors [5].

In this paper they have proposed a system which concentrates more on the security of the home. They have used the Iot and to control things they have used raspberry pi this project will have a sensor which will signal the alerts in ca of any theft or damage [6]

This paper also focuses on the security of the home.by the usage of many sensor which will detect the motion and send the alerts to the owner. In this project they have developed a system through which the surveillance of house can be done from any part of the world [7].

In this work, they had developed a system through which your house every corner will be monitored with the help of a camera. In this project they had developed a webpage where we have to login if they are authorized, they will be logged in and will be able to control the doors and record the video [8].

In this paper they have developed a system that controls the devices in the home using the web-based application they had a chatbot algorithm which processes the commands and perform the operation the devices can be locally controlled using the Bluetooth as a communication protocol. The internet connectivity is required to control the home appliances through the web application [9].

3. Methodology

In this project we had developed a home which is automated by using an android application and the required hardware components. Here first we will the ask the user to install the android application and register with the required details. After the details entered are verified then you will be able to see the home page where you can add the devices that you want to control by using the voice commands. We are using Raspberry Pi to control all the devices along with the processing of commands which are given through the application. Here the programs are written in the python language as it is the default language set by the Raspberry Pi. Here the devices are connected to the Raspberry Pi using the relay driver. The speed and accuracy are the major objectives along with increasing the comfort levels. The process is that the voice command with noise is suppressed and given to raspberry pi where it is processed and perform the required operation to turn ON/OFF the device mentioned in the command.

A. Theory behind Home Automation

Home Automation is nothing but the conversion of Normal home into a sensible home where the devices are often controlled by using an android application.
This process is often done by the use of controlling devices like Raspberry Pi, Connecting Devices like Relay Driver, and by using Wi-Fi as communication Protocol.

B. Area of Working

• To improve the comfort levels.

• In hospitals this will be helpful as all the devices are often controlled by using mobile application.

• To provide security to the house and therefore the devices within the house.

• Within the legal industry there's tons of demand for the house automation and security.

4. Design, Implementation and Algorithms

The difficulty is that for the aged people and disabled people it'll be difficult to regulate all the house appliances efficiently.

To overcome this difficulty, we are planning our project in such how that it'll be helpful for the disabled people and old people.

Here to develop the android application we are using android studio where the layout along with the required parameters areadded by using JDK. Python is used to program in Raspberry Pi as it is the default language provided. PHP is used to link it to the database where the required credentials like username, password and devices that are controlled are stored.

C. Objectives

• Develop an automated system through which the devices can be controlled in an efficient way.

• Controlling the devices through an android application.

• Makes it suitable for disabled, elderly and sick people.

• Controls all the home appliances.

• Simplifies the use of technologies.

• Improve comfort levels.

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D. Implementation

In this project we are implementing a system where voice commands are given through an android application. Raspberry pi acts as a controller where the devices are connected through relay driver.

First the voice commands are given through the android application where the noise suppression is performed and the command is processed by the raspberry pi and perform the required operation given through the command.

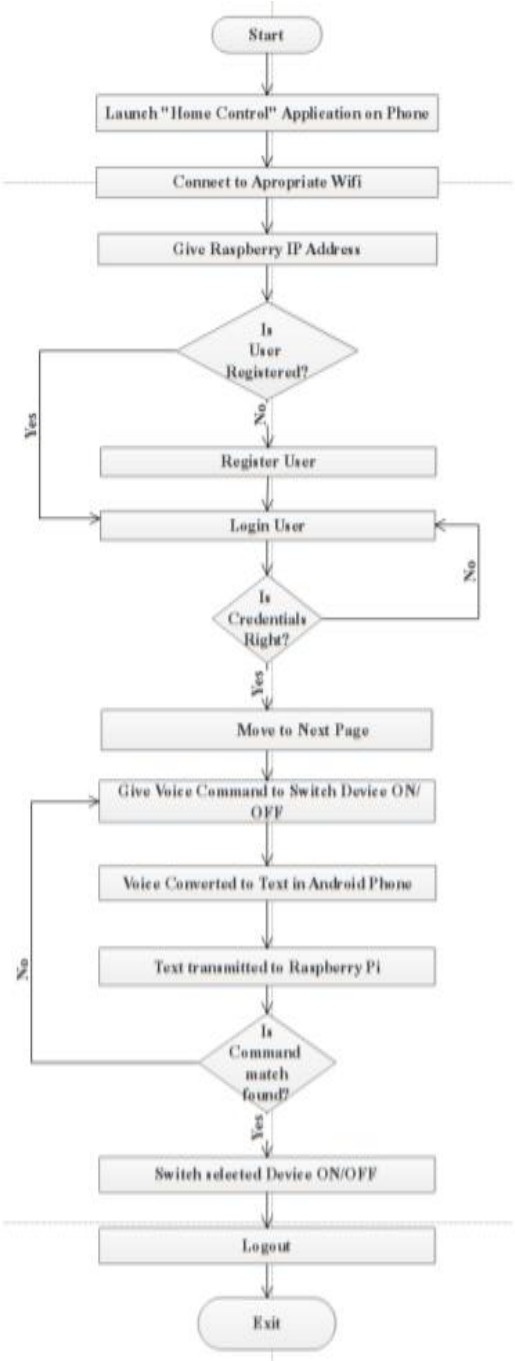

Figure 1: Working flow of the project

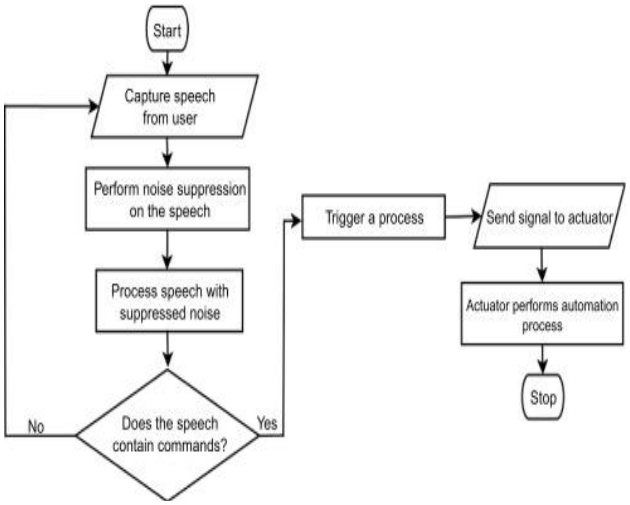

Figure 2: Performing noise suppression

5. Results and Discussions

Figure 3: Overview of the project

Here we are providing a smart home environment at an affordable price. Here we are providing an application through which all the devices in home can be controlled through the voice commands.

E. Expected New Applications

- Controlling the devices based on the hand movements.
- HVAC (Heating, Ventilation and Air Conditioning)
- Better Alert management system.
- Quality of the image will be more while recording.
- Improved Home safety and security.
- Natural Language-based voice assistants.
- Enhanced safety and security at home.

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6. Conclusion

This project will provide information about controlling the devices through voice command through an android applicaton.

This project provides a smart home environment where the devices are controlled through voice commands there by increasing the comfort levels. This project will be helpful for the Physically challenged people and old age people. Through this project we will be able to control the devices efficiently with less human effort there by creating an automated environment.

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