

HOME AUTOMATION USING ANDROID AND RASPBERRY PI (LITERATURE REVIEW)

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ABSTRACT

The internet of things (IOT) is the latest emerging internet technology. Home automation using IOT uses computer and mobile devices to control home function. Smart home in the systems improves the standard of living. This system also provides the security for when we are away from home. Many times it becomes tiring to operate the electrical switches manually. Generally this problem is faced by oldely and handicapped persons. The system consists of smart phone or Tab, which has android OS. That controls all home devices. The system can make use of communication methods such as Wi-Fi, Bluetooth.

An 8051 micro controller is used in this system. The Bluetooth and Wi-Fi is used to accept commands and the respond accordingly. This paper focuses on survey of design, flexible and fast monitoring home security system.

KEY WORDS: Raspberry pi, Home appliances, IP camera, Relay, Webpage.

INTRODUCTION

Smart home is not a new term for science society, it is been used from decades. As electronic technologies are advancing, the field of home automation is expanding fastly. There were various smart systems have been proposed where the control is via Bluetooth, internet etc. Bluetooth capabilities are good and most of current laptop/desktops, tablets, notebooks and cell phones have built-in adaptor that will indirectly reduce the cost of the system. But it limits the control to within the Bluetooth range of the environment while most other systems are not so feasible to be implemented as low cost solution. Therefore Wi-Fi is used in smart homes using IoT.

The internet of things (IoT) is the internetworking of physical devices, vehicles, building and other items integrated with the electronics, software, sensors and network connectivity that enables these objects to collect and exchange data. This system is design to control fan, light, motar and sends to mobile as well as alarm gets on and leaking in harmful gas, the smoke caused by fire. There are many different types of home automation system available. In this paper we see the home automation using raspberry pi-3 model.

METHODOLOGY

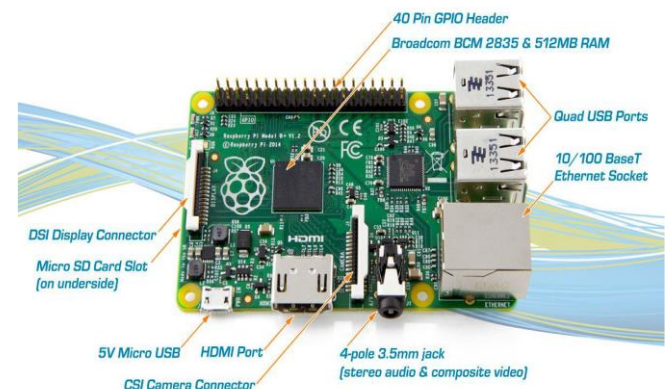
Wi-Fi Router as an interface, Raspberry Pi model

WHAT IS RASPBERRY PI-3

The Raspberry is a credit card sized minicomputer, developed in response to a lack of computer literate young people and make computing widespread in class room; homes to portable, robust connect to real word objects.

Raspberry pi has different sensors to connect the kit and it can evaluate and process the values with programs and software

1) HARDWARE DESIGN



TECHNICAL SPECIFICATION:

Broadcom BCM2837 64bit ARMv7 Quad Core Processor
powered Single Board Computer running at 1.2GHz
1GB RAM

BCM43143 WiFi on board

Bluetooth Low Energy (BLE) on board

40pin extended GPIO

4 x USB 2 ports

4 pole Stereo output and Composite video port

Full size HDMI

CSI camera port for connecting the Raspberry Pi camera
DSI display port for connecting the Raspberry Pi touch
screen display

Micro SD port for loading your operating system and
storing data

Upgraded switched Micro USB power source (now
supports up to 2.4 Amps)

2) SOFTWARE ANALYSIS:

ANDROID DEVELOPER TOOLS (ADT)

The android OS provides the flexibility of using the open source. The inbuilt sensors can be accessed easily. We have built an application with following features.

Android Phone acts as a client and data are sent via sockets programming.

1. Switch Mode
2. Voice Mode
3. Video Mode

Switch mode uses the radio buttons that are used to control the home appliances. The radio button sends the status of the switch. Voice Mode is used to control the home appliances using voice command. Using the Inbuilt microphone of Smartphone, the application creates an intent that fetches the speech data to the Google server which responds with a string data. The string data are further analyzed and then processed. Video Mode shows the video stream of the room. The captured video is streamed at the android application. All the devices are connected to a common network. Smartphone, raspberry pi and IP camera are connected to the common network Router is used to create a common network. Wi-Fi Adapter is used to connect raspberry pi to the network. Raspberry pi is used to Maintain the server. The pi collects the data analyses it and further activates GPIO pins as necessary. The GPIO pins of raspberry pi are connected to the relay. Relay Switch are used to connect the home appliances.

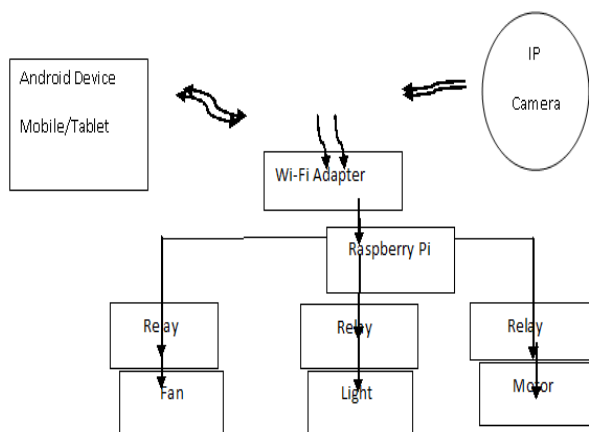
IP Camera

This security camera can offer you the freedom to get your home or business Surveillance via network anytime and anywhere. It comes with alarm function, when Somebody appears on the camera under alarm function, it will take a picture or sound The alarm and email the pictures to you immediately. IP camera can be used in various Places, such as warehouse, office, supermarket, and doorkeeper and so

IP camera is incorporated with following features.

1. Inbuilt Microphone and Mic. These provide two way communications Between remote user and the person standing in front of camera.
2. Alarm Service setting provides the features of alarm while detecting Unauthorized movement of user.
3. File Transfer Protocol Setting and Email Setting Provides the features of Emailing the video stream or images at the regular interval of time.

Block Diagram of System



3. Application Description:

Application Consists of Graphical User Interfaces. It consists of following different Activities.

1. Start Mode Activity
2. Option Mode Activity
3. Voice Mode Activity
4. Switch Mode Activity
5. Video Mode Activity

3.1 Start Mode Activity:

In this mode, all the rooms of the home are displayed. The user can select the necessary room from the option to control the appliances connected to specified room.

3.2. Option Mode Activity:

This mode provides the user for the option to control. The user can select either switch mode or voice mode to control the appliances.

3.3. Voice Mode Activity:

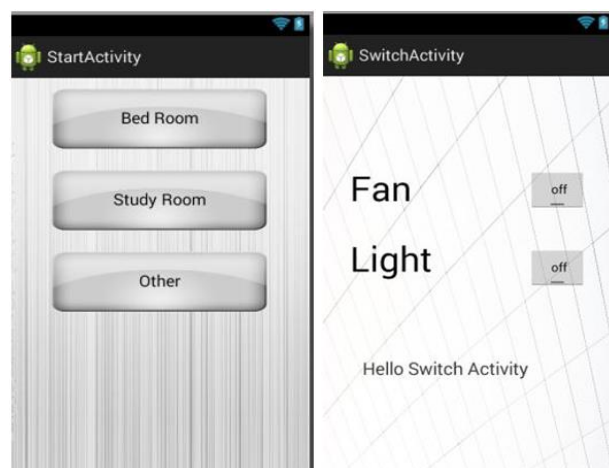
This mode provides the user to give the speech feedback to the application. The speech data are processed and required appliances are controlled.

3.4. Switch Mode Activity:This mode provides the user with on/off buttons to control the required homeappliances.

3.5. Video Mode Activity:

This mode displays the video of the IP cameras connected at the rooms of the home.

Figure



CONCLUSION

By using Smartphone with android and Raspberry pi model we can automate the home appliances. The cost requires for hardware and software is not more so we can easily prepare or configure the system for automation. The video feedback is received in the android app which streams the video of IP- Camera. It uses the Wi-Fi router as interface between the Smartphone and raspberry pi. In this way, automation process is carried out. This is a simple prototype. Using this as a reference further it can be expanded to many other programs.

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