

# Research Paper on Android based Home Automation using Raspberry pi

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**Abstract** – In today's world automation is playing important role in each and every individuals life. Every individuals want to get the work done fast , save time, put less efforts and make things more and more easier . Smart home automation is a way to have things around your home should work automatically. This automatically will save time. The purpose of this research paper is to control all the home appliances through smart phone. The user can increase or decrease the speed of fan, turn on or off light and many more appliances at home through smart phone or tablet. So this is implemented using Raspberry pi, and relay. The devices are controlled through WIFI or GSM.

**Keywords**– Raspberry pi, Relay circuit, Android, Wi-Fi configuration, User interface.

## I. INTRODUCTION

In today's era of 21st century, many things are becoming automated. As technology is advancing so houses are also getting smarter. The houses are generally converting from normal switches to automatic controlled switches or system which involves wireless control devices. In earlier days conventional wall switches which are located in different parts of the house makes it difficult for the user to go near them to operate. Even more it becomes more difficult for the elderly or physically handicapped people to do so. Automation helps to make the things easier, save time, and reduce efforts.

Now a days many wireless technologies are coming into existence. Home automation based on Internet is one of the most popular home automation systems in today's market. To control and monitor the houses through Internet requires big and heavy computers. It becomes difficult to carry out. For this we are going to use mobile phones or tablet from which we can control the appliances where ever we are. The different wireless communication standards such as Blue-tooth, Zig Bee, and GSM are used by the home automation system to exchange the data. This helps to reduce the installation cost, reduce human efforts and becomes more scalable and flexible. Android based home automation helps the user to provide secure and configurable home automation system.

## II. LITERATURE SURVEY

As per our survey, there exist many systems that can control home appliances using android based phones/tablets. Each system has its unique features. Many companies are providing an advanced and better home automation system.

Following models describes the work being performed by others.

N. Srisanthan explained the model for home automation using Blue tooth via PC. But unfortunately the system lacks to support mobile technology.

Muhammad Izhar Ramli designed a prototype electrical device control system using Web. They also set the server with auto restart if the server condition is currently down.

Hasan has developed a telephone and PIC remote controlled device for controlling the devices pin check algorithm has been introduced where it was with cable network but not wireless communication.

An application is developed by Amul Jadhav in a universal XML format which can be easily ported to any other mobile devices rather than targeting a single platform. Each of these system has their own unique features and on comparison to one another lacks some advancement.

## III. PROPOSED SYSTEM

The proposed system is designed in such a way that it avoids the limitation of existing system. The proposed which is designed are more secure, scalable and flexible. The home automation system is implemented using a raspberry pi, android application from which you can control the devices and relay circuit. The Wi-Fi signal should be strong so that devices can control the appliances. Through relay the appliances can also be controlled. The main purpose of the home automation system is to provide a cheap, secure and open source home automation which can be able to control all the home appliances through android device. The main advantages of home automation are that it provides security and flexibility through the android system, good range of scalability. It will help the user to save his or her effort. It will help to save electricity when not in use.

#### IV. SYSTEM ARCHITECTURE

In home automation many new inventions and many standardized efforts have been made. So the concept of home automation is still young. The architecture incorporate a Wi-Fi , relay circuits , sensors, android application and raspberry pi which is small size computer that is used for the purpose to manage the network and for remote access .With the help of Wi-Fi network the user can communicate through raspberry pi and it can be configured according to our home system. The Wi-Fi signal should be strong and the system is scalable and flexible. The Wi-Fi is the medium to communicate with the devices. It is also configured and makes services secured .Sudo nano tc/network/interfaces are used for configuring Wi-Fi with raspberry pi. The serial data is connected to raspberry pi circuit which is coming from the Wi-Fi. The main part of the home automation is the raspberry pi circuit which is a credit card size computer and performs many functions. For every home appliance, the raspberry pi is configured and the corresponding relay will get switch on and the device will function. Home automation is required to have a very easy installation. The project consists of 4 main modules which are as follows:

- Raspberry pi
- Android Application
- Wi-Fi
- Relay circuit

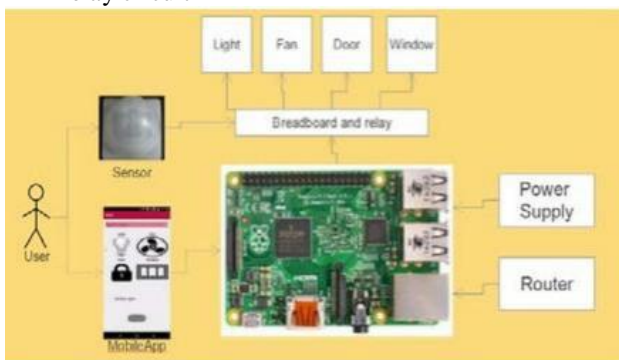


Fig. 1. Architecture of the system.

#### V. DEVELOPMENT PLATFORM

This section describes the technologies used for developing the android based home automation. The platform used is android to create user interface application from that the user can control the home appliance. In software part we are using android to create user interface. In hardware part we are using raspberry pi and relay circuit.

##### 5.1 ANDROID

User interface is created using android so that the user can easily controlled the home appliances. The android mobile phone is used control the home automation system. There are various UI components and layout

controls that allows to build the graphical user interface. Android also provides other UI modules for special interfaces such as dialogs, notifications, and menus. The interface should allow user to view device status and to control device.

##### 5.2 Raspberry pi

The Raspberry pi is small credit card size computer whose cost is less but it performs much function. It is a small single board computer. Raspberry pi automates home appliances and allows user to control them easily through Internet from anywhere over the world. Our proposed system it is controlled by the modified version of Debian Linux optimized for the arm architecture. The raspberry pi is the core of the home automation system are using model B, 700 MHz ARM processor with 512 MB RAM. The setting up of rasp pi consists of selecting raspbian OS from noobs package. The noobs package consists of raspbian, Linux, pidora, open ELEC, risc OS operating system. After the OS selection we need to configure raspberry-pi using Rasp i-config command. We can enter into rasp i desktop using start x command. To interface raspberry-pi with the external world we can use WebIOPi. WebIOPi is a web application which allows to control Raspberry Pi's GPIO. It Support REST API over HTTP and CoAP .it can also handle more than 30 devices including ADC, DAC, sensors. The webIoPi interface allows better control of rasp. The following is the figure of Raspberry pi.

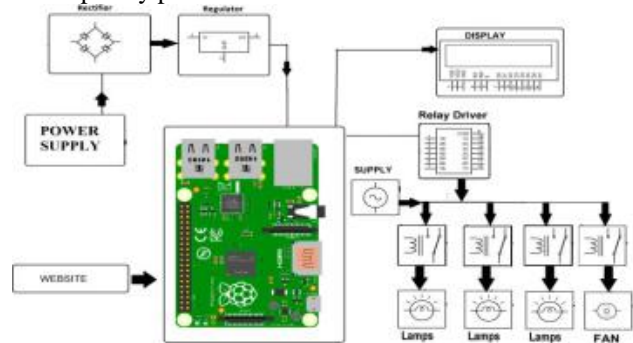


Fig.2. Raspberry pi with devices.

##### 5.3 Relay

A relay is like a switch which is electrically operated. Relays are used to control a circuit with low power signal or where several circuits must be controlled by one signal. The relay circuit is given the output which is generated by the raspberry pi. Due to this the relay will turn on and the device will work. NPN transistors are used in relay. According to the purpose of our application the relays can be selected.

#### VI. CONCLUSION

The android based home automation provides easy and attractive interface and makes the system more flexible and secured. We are using mobile devices to integrate with the home automation system. Wi-Fi is used to

communicate between the raspberry and the android application to control the devices. The three main modules are raspberry pi, Wi-Fi, relays. We have hidden the complexity of the project by making the application simple

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