Home automation using Raspberry Pi

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***Abstract*—In the present scenario, Home automation is the control of any electrically and electronics device in our home and office, whether we are there or away. There are thousands of products available that allow us to control over the devices automatically with using raspberry pi model by remote control. This Home automation system discussed here provides the user with remote control of various lights and appliances in their home. This system is designed to be low cost and expandable allowing all devices to be controlled.**

Index Terms— Home appliances, Raspberry pi, Relay

I. INTRODUCTION

Home automation is the control of all electrical devices in our home, office and society. There are different types of home automation system available. These systems are designed and purchased for different purposes. It also provide a user friendly interface on the host side, so that the devices can be easily setup, monitored and controlled. In smart home systems, the internet is also use to ensure remote control. For years, the internet has been widely use for the processes such as surfing on the pages, searching information, chatting, downloading and installation. By the rapid developments of new technologies, monitoring, controlling services have been started to be served along with internet as an instrument providing interaction with machinery and devices. The main reason to develop this system is to save time and man power along with maintaining security and convenience

There are method by which we can implement home automation system .Some of the method are listed below:

1. Home Appliances Control Using a Remote Control
2. Home Appliance Control Using Internet and Radio Connection

1) Home Appliances Control using a Remote Control:

The lights, fans can be automatically turned on/off with the help of a remote where there will be a sensor instead of going near to a switch board and putting on/off the switch. Companies like Legrand and Gold Medal already started these kinds of control system and they are at present available in the market.

2) Home Appliance Control Using Internet and Radio Connection:

In this system, the control of home appliances can be done from a remote are with an option from a local server, using the Internet and radio connection. This system is accomplished by personal computers, interface cards, radio transmitters and receivers, microprocessors, ac phase control circuits, along with window-type software and microprocessor control software.

Wireless Browser Based Device Control Using Raspberry Pi:

In this paper the appliances controlling through the web browser integrated with the ARM11 microcontroller. The Raspberry Pi is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools. It does not include a built-in hard disk or solid-state drive, but uses an SD card for booting and long term storage. In this system, we use the raspberry Pi model as a controller. The Raspberry is a credit card sized minicomputer. There are different types of raspberry pi model available in the market, Such as Model A, Model B, Model B+ out of which we uses Model B+.

II. RELATED LITERATURE

As electronic technologies are advancing, the field of home automation is expanding. There were various smart systems have been proposed where the control is via Bluetooth, internet etc. In Wi-Fi based home automation system is presented. It uses a PC based web server that manages the connected home devices. The system supports a wide range of home automation devices like fans, lights, other home appliances. A similar architecture is proposed in where the actions are coordinated by the home agent running on a PC. The easiest way to prepare your document is to use this document as a template and simply type your text into it.

III. BLOCK DIAGRAM AND WORKING

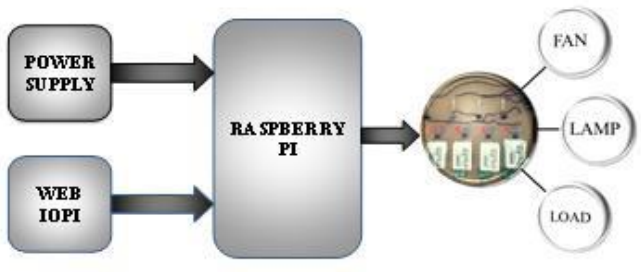

Fig. 1. Block Diagram Home automation using Raspberry Pi

Figure 1, shows the basic block diagram of the system. With the help of this system we can monitored and controlled the various equipment that are connected to the relay circuit via the input from raspberry pi model. Whenever the system is turned on, the current lighting data of the home are read and written to

the data base and then transferred to the user interface. So, one can easily know the current situation of rooms and change in the state of the lights.

Hardware Components:

1. Raspberry pi
2. Relay circuit

1) Raspberry pi:

For this paper, you will need a Raspberry Pi board. The version of the board or the, but keep in mind that you will have to connect it to your local network, so you will need a Wi-Fi dongle if you are using the A model which doesn't have an Ethernet port. In this paper, we used a Raspberry Pi model B with the Wi-Fi dongle.

The Raspberry Pi is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools. The Raspberry Pi has a Broadcom BCM2835 system on a chip (SoC), which includes an ARM1176JZF-S 700 MHz, Video Core IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded to 512 MB.

Now also to check that your Raspberry Pi is connected to the Internet. Again, this will depend on your configuration (Ethernet or Wi-Fi) and your router, but is usually really easy. If you are using the Ethernet connection, simply connect a cable to your router and it should work automatically.

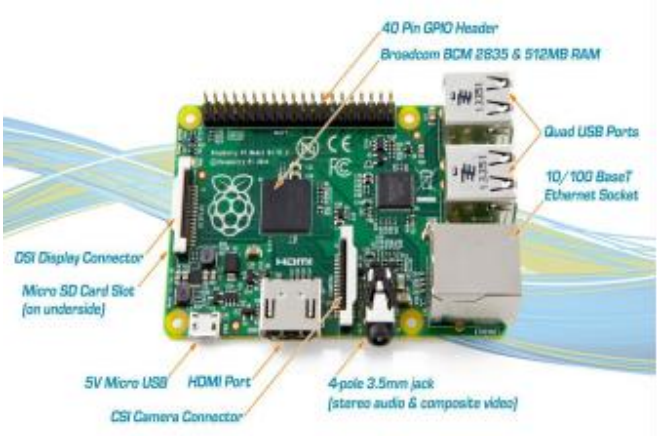

Fig. 2. Raspberry Pi

2) Relay Circuit:

A Relay is electrically operated switches, which allow low power circuits to switch a relatively high voltage or current on/off. For a relay to operate a suitable pull in and holding current should be passed through its coil. Relay coils are designed to operate from a particular voltage often its 5V or 12V.

Advantages:

- Low cost and expandable allowing a variety of devices to be controlled
- Saves money and energy
- This system contain Raspberry pi as a controller so the system contain all the advantages of it.
- This is noise free system.

Limitations:

- Human error
- Reliability
- Requires Internet Connection

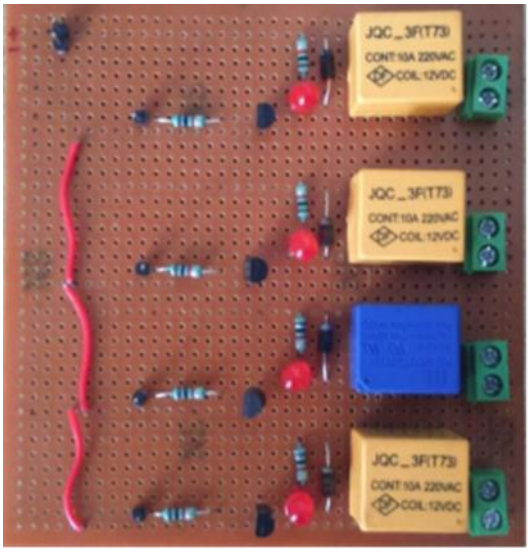

Fig. 3. Relay Circuit

IV. Conclusion

This home automation systems are required because human can make mistakes and forgot to switch off the appliances when there is no use and in this case, they are useful to utilize the power effectively and also in a secured manner.

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