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Advanced Control Web Based Home Automation with Raspberry Pi

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ABSTRACT: Today we are living in the 21st century. It is necessary to control the home from desire location. Home automation is the control of any electrically and electronics device in our home and office, whether we are there or away. There are hundreds of products available that allow us to control the devices automatically with using the raspberry pi model by the webpage. This Home automation system provides the user with the webpage of various lights and appliances within their home. Home automation and benefits will be a focus on and how this can be achieved through the use of the raspberry pi. The mobile device will communicate with a home automation network through an internet gateway, but cannot directly communicate with the devices in the network. In this project, the android devices would control the home appliances using the internet and raspberry pi as the server system. The relay circuit board will be interfaced by the raspberry pi. This relay circuit board will control the home appliances.

Keywords: Raspberry pi, Home Appliance, Relay Webpage.

I. INTRODUCTION

The aim of this project is to develop a system that will provide a control of home appliances by using web page when the home host not at home. This paper is mainly concerned with the automatic control of light or any other home appliances using the internet. It is meant to save the electric power and human energy. This project is made with the help of the raspberry pi.

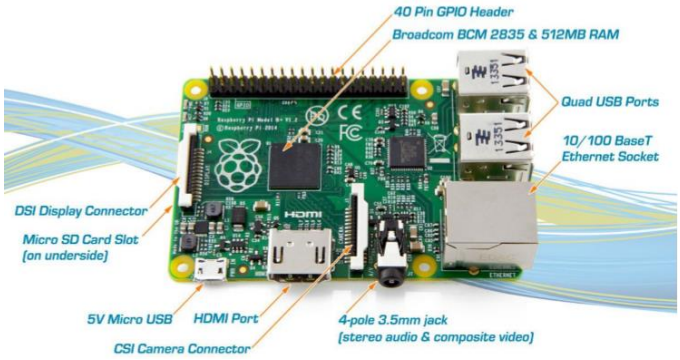
For this paper, of course, you will need a Raspberry Pi board. In this paper, we used a Raspberry Pi model B with the Wi-Fi dongle. The Raspberry Pi is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer 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. It does not include a built-in hard disk or solid-state drive but uses an SD card for booting and long-term storage.

The raspberry pi board contains a processor and graphics chip, program memory (RAM) and various interfaces and connectors for external devices. The raspberry pi can be used for many of the things that your desktop PC does. However, one key aspect that makes the raspberry pi so brilliant for schools is its ability to execute "Python" coded programs. This allows us along with the General Purpose Input Output (GPIO) pins to create programs. Python is a programming language that lets you work more quickly and integrate your systems more effectively. Raspbian is the desired operating system for the raspberry pi.
Due to the advancement of wireless technology, there are several different of connection are introduced such as WIFI, and each of the connection has their own unique specifications and applications.
Among the four popular wireless connections that often implemented in HAS project. WIFI is being chosen with its suitable capability. The capabilities of WIFI are more than enough to be implemented in the design. Also, most of the current laptop/ notebook or smartphone come with built in WIFI adapter. It will indirectly reduce the cost of this system.

II. RELATED LITERATURE

The smart home is not a new term for science society, it is been used for decades. As electronics technologies are advancing, the field of automation is expanding fastly. There was various smart system have been proposed where the control is via Bluetooth, the internet etc. Bluetooth capabilities are good and most of current laptop/desktops, tablets, notebooks and cell phones have built in adapter that will indirectly reduce the cost of the system. But it limits the control to within the Bluetooth range of environment while most other systems are not so feasible to be implemented as low-cost solution. In WIFI based home automation system is presented 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. Other papers such as also presented internet controlled systems consisting of a web server, database and a web page of websites for interconnecting and handling the devices.

RASPBERRY PI



Features:

- It has a programmable processor.
- It has on-chip memory.
- The raspberry pi 3 is the third generation raspberry pi.
- Bluetooth 4.0
- 4 USB port,40 GPIO pins , full HDMI port.
- Ethernet port, camera interface, display interface.

III. BLOCK DIAGRAM

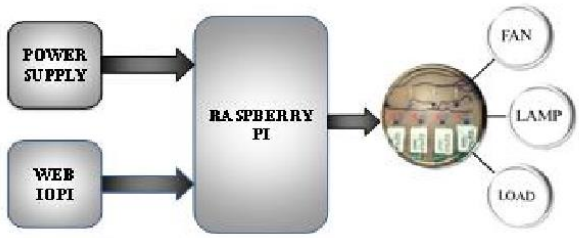


Figure 1. Block Diagram

IV. WORKING

Figure 1 shows the basic block diagram of the system. With the help of this system, we can monitor and controlled the various equipment that is connected to the relay circuit via the input from the raspberry pi model as well as from the WEBIOPI. Whenever the system is turned on, the current lighting data of the home are read return and to the database and then transferred to the user interface. So, one can easily know the current situation of rooms and change in the state of lights.

PROBLEM DEFINITION

People who are disabled, handicapped or deaf can't operate the appliances in the home or they can't reach those things. So Home Automation is not done by the efficient way. It becomes difficult and insecure. To minimize these above-mentioned problems a simple home automation system designed in which the modem of Wi-Fi interfaced.

APPLICATIONS

1. This technology is used in lightning control it is useful for saving energy by auto on/off in houses.
2. Domestic application.

ADVANTAGES

1. Low cost and expandable allowing a variety of devices to be controlled.
2. Saves money and energy.

3. All in one user-friendly system.
4. This system contains raspberry pi as a controller so the system contains all the advantages of it.
5. This is noise free system.
6. We can operate devices using the internet from far distances too.
7. Easily connected to the web services.
8. It's less time-consuming.

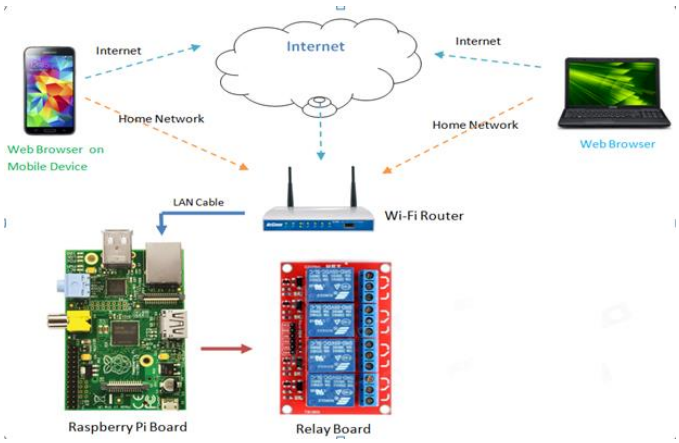
LIMITATIONS

1. Human error.
2. Reliability.

V. SYSTEM DEVELOPMENT

System Architecture:-

The System Architecture of the system is given below



CONCLUSION

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

ACKNOWLEDGMENT

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