International Journal for Modern Trends in Science and Technology
Volume: 02, Issue No: 11, November 2016
ISSN: 2455-3778
http://www.ijmtst.com

Home Appliances Controlling using Raspberry Pi on Webpage

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To Cite this Article
B. Shireesha, Mushkinbi Eruri, "Home Appliances Controlling using Raspberry Pi on Webpage", *International Journal for Modern Trends in Science and Technology*, Vol. 02, Issue 11, 2016, pp. 140-142.

ABSTRACT

Today we are living in 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 over the devices automatically with using raspberry pi model either by remote control or even by webpage. This Home automation system provide the user with remote control of various lights and appliances within their home. This system is designed to be low cost and expandable allowing a variety of devices to be controlled. Home automation and benefits will be focus on and how this can be achieved through the use of the raspberry pi.

KEYWORDS : *Raspberry pi, Home appliances, IP camera, Relay, Webpage*

I. INTRODUCTION

This system provides a wireless remote control solution for controlling the lights and fan via Wi-Fi capable hand held devices such as Smartphone, adding convenience and also reducing electricity wastage. While this concept is not new, all of this only appeals to tech savvy user, due to the complexity, feature and price, which are not important for this project target user. In this project, appliances such as light and fan that connected to the Main Control Unit (MCU)still can be controlled remotely from a computer screen or a smart phone [1-4]. This is performed by using a very simplistic Graphical User Interface (Graphical User Interface, GUI), which is easily used and understandable for the target user. This system can also be equipped with the monitoring function by including a web camera to the MCU for a live video feed, or from wearable electronics wore by the user which for example include heartbeat sensor.

II. RELATED WORK

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 [7], 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. In Wi-Fi based home automation system is presented. It uses a PC (with built in Wi-Fi card) 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. 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.

III. IMPLEMENTATION

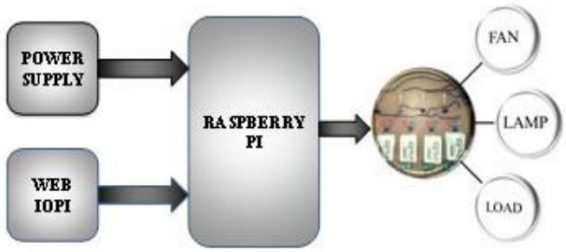

Fig 1: System Block Diagram.

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 as well as from the WEBIOPI. 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.

3.1 HARDWARE COMPONENT

1. Raspberry pi
2. Relay circuit

1. Raspberry pi:

For this paper, of course you will need a Raspberry Pi board. The version of the board or the model (A or B)doesn't really matter, 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. It does not include a built-in hard disk or solid-state drive, but uses an SD card for booting and long-term storage. [1].

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. If you're using a Wi-Fi dongle, the easiest solution is to use the GUI that comes with Raspbian to find your wireless network and enter your WEP/WPA password.

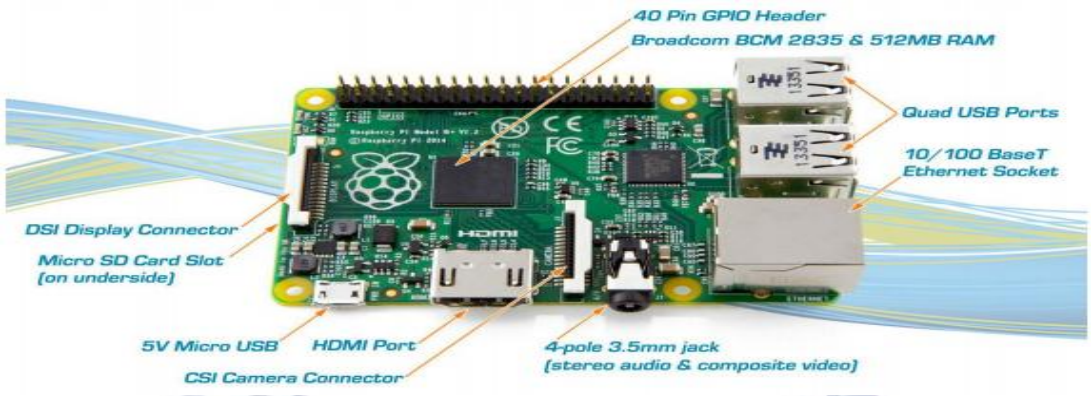

Figure 2. Raspberry pi.

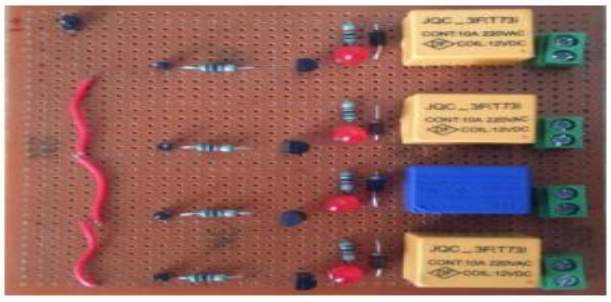

Figure 3. Relay circuit.

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. The function of relay driver circuit is to provide the necessary current energize the relay coil, when a LOGIC 1 is written on the PORT PIN thus turning on the relay. The relay is turn off by

writing LOGIC 0 on the port pin. In our system four relays are used for device control. [5].

Advantages

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

IV. Experimental Work

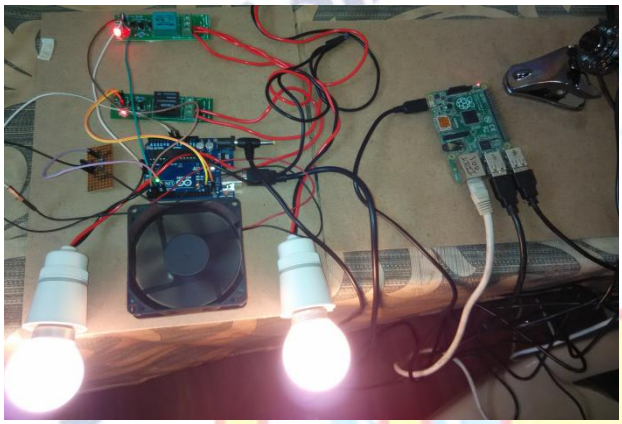

Fig 4: System experimental Circuit.

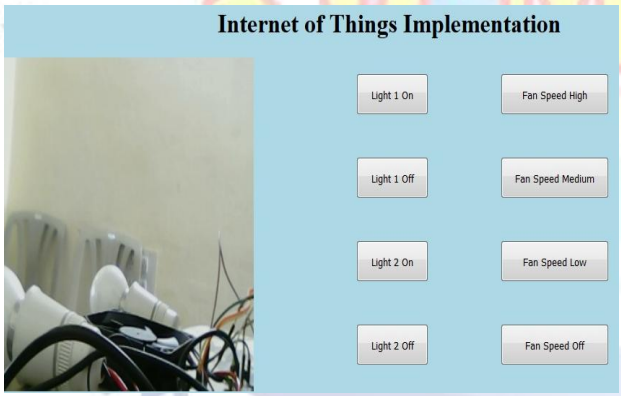

Fig 5: Internet of Thing Implementation.

V. Conclusion

This Paper demonstrate the possibility of implementing a system that will helps the elderly and also people with disability, and not just normal home owner. Furthermore it can also be used in the increasingly popular Small-Office-Home-Office (SOHO) environment. When the user touches the icon from the GUI on their android Smartphone [10], lights and fans will switch ON and OFF uniformly and fan's speed can also be remotely controlled. For more reliable system for future use, several improvements could be introduced. Inclusion of infra-red(IR) transmitter which can support several different protocol, will enable the MCU to control appliances with IR or RF remote control, such as television, radio and air conditioner, which eliminates the need of carrying several different remote control around. Another function which could be added is the timer function. The timer can control the appliances time to 'ON' and 'OFF'. This will give expandable option to the consumer in controlling their home appliances. Furthermore, addition of sensors, magnetic door locks and alarms may enhance the function of this project even more. Finally, this project provides a flexible and customizable design and implementation for much application with low cost thus, not limited to home automation only.

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