Home appliance control system Using Raspberry pi 3 and arduino

K. Ravi kumar[1],Sk.SameerAli Saheb[2], Y. Sai Chaitanya[3], Sk.Habeeb[4]

[1]Assistant Professor, [2,3,4]Student,
Department of Electronics and Communication,
Lakireddy Balireddy College of Engineering, Mylavaram, India.

Abstract:

The goal of this project is to fabricate a model where the appliances in the house are controlled by methods for a web interface where every one of the gadgets is associated with the web. The gadgets generally utilized as a part of the house are lights, fans, and some different hardware. We fundamentally assembled the model remembering a capacity that is controlling and checking. The concentrated control for apparatuses is done through associating them with Raspberry Pi and Arduino. We can control the home appliances from anyplace on the planet. The status of the home appliances is seen through VNC viewer in the portable mobile or laptop.The proposed model of the home automation framework is executed and tried on equipment and it gave the correct and expected outcomes.

1.INTRODUCTION

Home automation system is the advanced technology to reduce the human labour. The rise in growth of these technologies influence us to use smart phones to remotely control the home appliances. The idea of home automation system is a significant issue for researchers and home appliances companies. Automation system not only helps to decrease the human labour but also saves time and energy. Early home automation systems were used as labour saving machines but now a days its main objective is provide facilities to elderly and handicapped people to perform their daily routine tasks and control the home appliances remotely. In wireless based home automation system different type of technologies such as ZigBee, Global System for Mobile (GSM) , General Packet Radio Service (GPRS) , Infrared, wireless fidelity (Wi-Fi) and Bluetooth are used, each technology has their own pros and cons. Raspberry pi and Arduino based home automation is used to do multiple tasks at a time. It is easy to implement and installing the devices. It gives expected results exactly and fast.

The proposed method presents the design and implementation of a robust, low cost and user friendly home automation system using Raspberry pi and Arduino. The design of proposed method is based on Raspberry pi, Arduino board, Relay Boards, IC's and smartphone application. Raspberry pi is interfaced with Arduino board and home appliances are connected with Raspberry pi board via relay. Smartphone application is used for serial communication between smartphone and IP address of Raspberry pi which is further connected with Arduino board. Proposed method has ability to not only remotely control the appliances but it also monitors the status of appliances. Nowadays most of conventional home automation systems are designed for elderly, handicapped people or for any special purpose. The proposed method is not only suitable for elderly and handicapped people but it also provides a general purpose home automation system, which can easily implement in existing home. this system will create a comfortable and safe homeatmosphere. Design decisions, implementation details, and testing procedures are thoroughly discussed, and the resulting functional system is described.

2. LITERATURE SURVEY

[1] Gill : projected aZigBee-based home automation system. This system consistsof a home network unit and a gateway. The core part of thedevelopment is the interoperability of different system in thehome environment. Less importance is given to the home automation.

[2] Kovatsch : introduced the IPv6 and 6LoWPAN, a single network server for classical as well as emerging aspects of home automation, but the installation cost of this HA is high. Wireless solutions like ZigBee and 6LoWPAN (IPv6) are deployed since no cables have to be laid. The technology is a

never ending process, therefore, day by day, technology makes home automation system cheaper, reliable and more user-friendly. [3]Piyare :purposed the design of HA based on a stand-alone Arduino BT Board, which is the cell phone-based home automation system. There are few issues involved when making a smart home system. The system should be scalable so that new devices can easily integrate into it. [4] Ramlee : implemented remote control function by smartphone and Bluetooth technology that provides help and assistance to the physically disabled person. Bluetooth concept is suitable for control of devices within the home. But these do not meet the security requirement of home. [5] Yuksekkaya : implemented the concept of The Global System for Mobile Communications (GSM), the internet, and voice in wireless home automation system, which used the microprocessor and Short Message Service (SMS) control method by GSM module.

[6]Suryadevara : carried out work on monitoringelectrical parameters of household devices such as voltage and current, subsequently here calculated the power consumed by apparatus. The power management in a home can be improved by this technique, which makes proper utilization of electricity in the home.
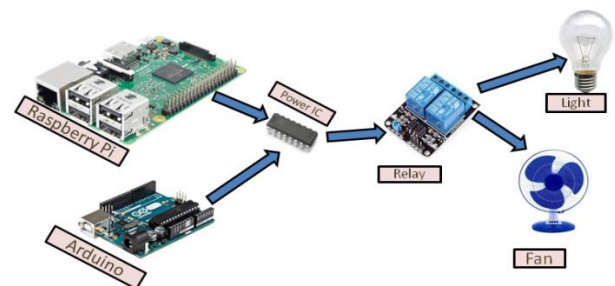
3.PROPOSED METHOD
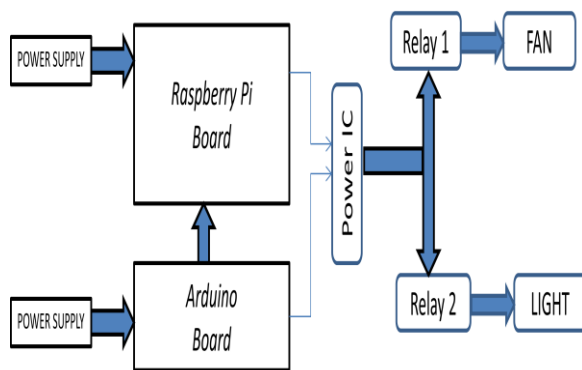
Fig 3.1 Block diagram of Proposed method

In proposed method we are interfacing Arduino with Raspberry Pi. When power is supplied to Raspberry Pi the web address of Raspberry pi is connected to mobile or laptop. A mobile application which is developed on thingspeak is used to communicate with the Raspberry pi. Then Raspberry Pi sends output signals to Digital Power IC. The output data from the Digital IC is given to relays provided. By connecting home appliances to relay board we can control home appliances remotely from any where in the world. The status of the home appliances is seen through VNC Viewer in the mobile or Laptop by using the Web address.
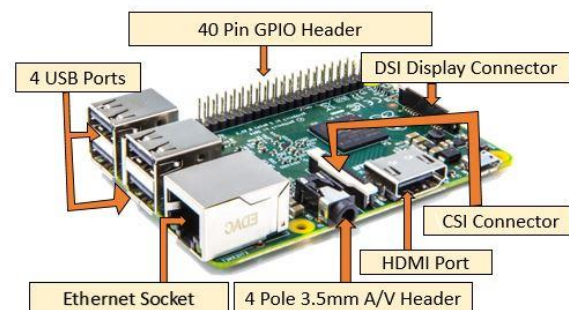
4.HARDWARE DESCRIPTION

Fig 4.2 Working layout of Proposed method

The main objective of this project is to establish a working prototype of the home appliance communication system. To interface arduino with raspberry pi.This has been done by using the RASPBERRY PI 3 and ARDUINO UNO.

RASPBERRY PI

Fig 2.3 Raspberry Pi 3 model

The Raspberry Pi is a device which consumes 700mA or 3W or power. It is powered by a Micro USB charger or the GPIO header. Any good

Smartphone charger will do the work of powering the Pi. The Raspberry Pi does not have any onboard storage available. The operating system is loaded on a SD card which is inserted on the SD card slot on the Raspberry Pi. The operating system can be loaded on the card using a card reader on any computer.GPIO pins can be configured to be input or output, GPIO pins can be enabled/disabled, Input values are readable (typically high=1, low=0) Output values are writable/readable.
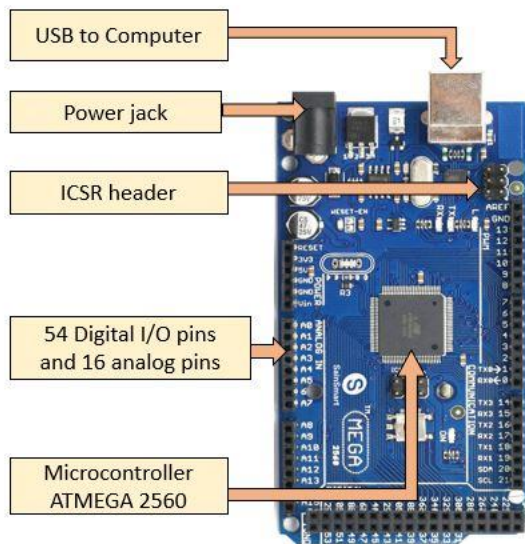
ARDUINO

Fig 2.4 Arduino UNO Board

Arduino is a small microcontroller board with a USB plug to connect with the Raspberry Pi that can be wired up to external electronics, such as motors, relays, light sensors, loudspeakers, microphones, etc. They can either be powered through the USB connection from the computer or from a 9V battery. They can be controlled from the computer or programmed by the computer and then disconnected and allowed to work independently. Arduino is an open-source design for a microcontroller interface .In this Project Arduino is interfaced with Raspberry Pi in order to perform multiple tasks at a time.

RELAY BOARD

Fig 4.4 2 port Relay board
The outputs from the Digital power IC is given to 2 port relay Board which is externally supplied with power. The relay board acts according to the commands supplied by the Digital IC.

5.RESULTS
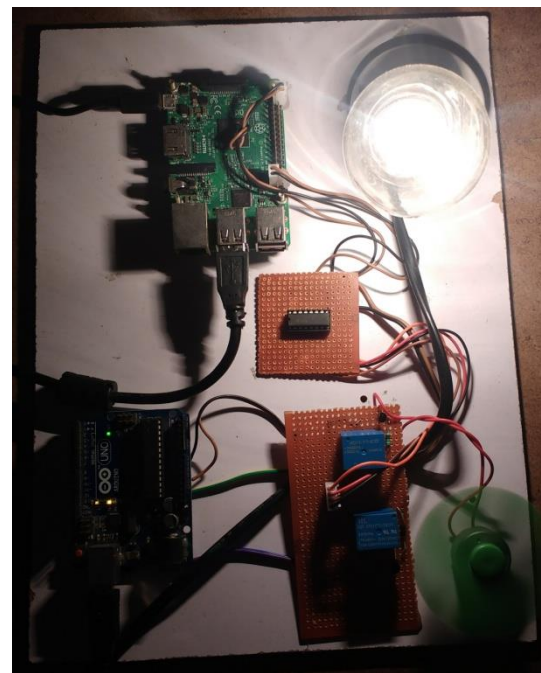The following pictures shows the results obtained from the project.
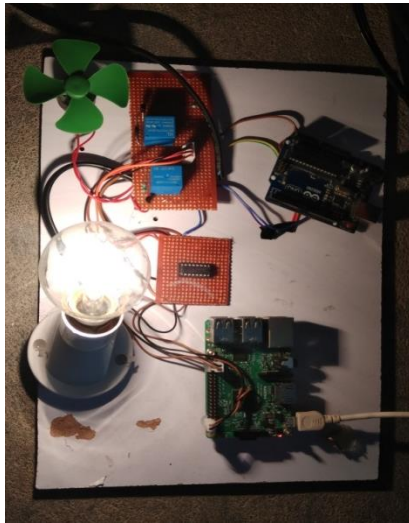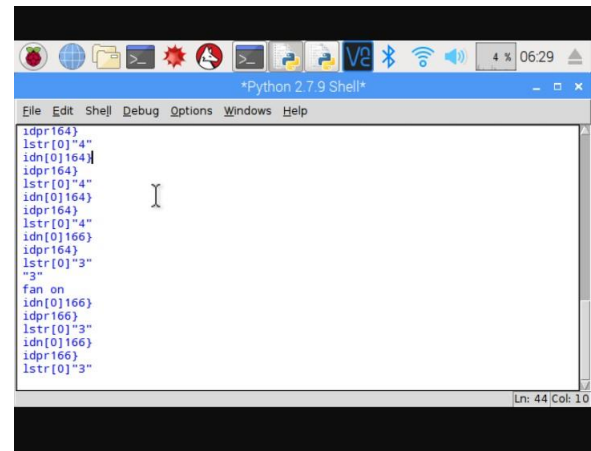

Fig 5.1 ON Condition of both fan and light.

Fig 5.2 ON Condition of only Light
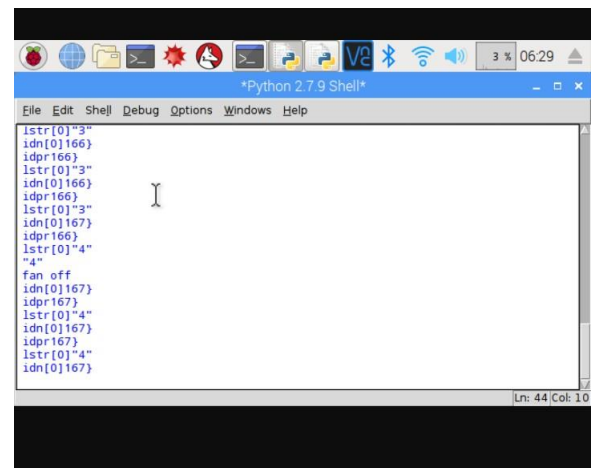
Fig 5.3 On Condition of only Fan

Results viewed on VNC viewer

Fig 5.4 Status of fan on viewed in VNC viewer

Fig 5.5 Status of fan off viewed in VNC viewer

6.CONCLUSION

We have undertaken the project to enable the control of devices in home automatically from a different location with the help of a web server that is connected to the devices in home through the processors called Raspberry pi and Arduino boards. We have successfully implemented the control of fans and lights in any room through their operation from any location in web interface page. All this is made through the interfacing of Raspberry, Arduion, Mobile application and web pages using internet. This way a small prototype of home automation system is made.

7.FUTURE SCOPE

This project has a lot of future scope. When further development is made, there may be chances that we control the temperatures in the microwave and refrigerator from a different location using same web interface. Even there may be development such that the replacement of vegetables and fruits in the refrigerator can be made automatically sensing their state of freshness. Gesture control home appliances, Automatic status update to the authorised person Automatic switch on and off of appliances based on people present in the facility Automatic security updates when unauthorized person breaches into facility. All this may be made possible by developing the existing home automation systems.

8.REFERENCES

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	K. Ravi kumar, E-mail:2k6ravi@gmail.com, Assistant Professor, ECE, Lakireddy Bali Reddy College of Engineering
	Sk.SameerAli Saheb, sameeralishaik7@gmail.com BTech ECE, Final Year, Lakireddy Bali Reddy College of Engineering.
	Y. Sai Chaitanya, sai.yendluri@gmail.com BTech ECE, Final Year, Lakireddy Bali Reddy College of Engineering.
	Sk. Habeeb, Shaikhabib8184@gmail.com BTech ECE, Final Year, Lakireddy Bali Reddy College of Engineering.