An Intelligent Remote Controlled System for Smart Home Automation

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Abstract - *Home automation is an important milestone in achieving smart grid and is ever exciting field that has exploded over the past few years. Advancement in technologies have made homes more convenient, efficient and even more secure. Introducing the Raspberry Pi to the world of home automation provides numerous customizations to turn a regular home into a smart home.*

Raspberry Pi provides a low cost platform for interconnecting electrical/electronic devices and various sensors in a home via the internet network. The main objective of present work is to design a smart home which can be controlled and monitored by the Raspberry Pi.

This paper proposes the design and implementation of Smart Home automation system with surveillance monitoring system using Raspberry pi and PIR sensor for mobile devices. It increases the usage of mobile technology to provide essential security to our homes and for other control applications.

The focus of the project is on helping users to operate home appliances with their own smartphones and to help to live a more independent life as long as possible. The objective of our system is to take care of several domestic systems that may normally be difficult. The proposed idea will allow a user with any android enabled device to run a piece of downloadable software on any mobile device such as a smartphones. This application will allow the user to control a device that is connected to any home appliance that is Pi enabled. The focus of this application will be to direct a security system with webcam surveillance, door sensor notification and a light control system. Sensors will be connected to the home appliances with Pi so that they can be monitored and controlled.

The proposed system would enable the client to monitor his home when a door or a window sensor triggers the alarm. Client monitors his home with webcam and could immediately inform local authority or a policeman. The Client could also check the status of the outside light and turn on and off the light without the need to get out of bed.

These devices would also benefit users with limited mobility that may have a difficult time getting to or even reaching their light switch. These objectives require a large amount of technology. The user interface must be as simple and powerful as possible and operate in a self _organized way.

*Key Words***: Raspberry Pi, PIR sensor**

1. INTRODUCTION

Raspberry pi is a credit- card sized computer .It functions almost as a computer. There are various surveillance systems such as camera, CCTV etc., In these types of surveillance systems, the person who is stationary and is located in that particular area can only view what is happening in that place .Whereas, here, even if the user is moving from one place to another, he/she can keep track of what is happening in that particular place. Also another advantage is that it offers privacy on both sides since it is being viewed by only one person.

The other major advantage is that it is a simple circuit .the operating system used here is Raspbian OS.Raspbian OS has to be installed so that the image can be transmitted to the smartphone functionalities of the components are given below The various components of Raspberry- Pi are • SD Card Slot is used to install OS/booting/long term storage .The total memory of the SD card is about 8GB. • Micro USB Power Port provides 700mA at 5A. • RCA Video Out is connected to display if HDMI output is not used. It is mainly used to carry audio and video signals. They are otherwise called as A/V jacks. • Audio Out Digital audio is obtained if HDMI is used to obtain stereo audio. Here analogue RCA connection is used. • Ethernet Port is used to connect to the Internet. It also plays a role in updating, getting new software easier. • HDMI OUT (High Definition Multimedia Interface) is used with HDTVs and monitors with HDMI input. Also HDMI-HDMI is used here. • BROADCOM BCM 2835: It is otherwise defined as System on chip .It is a 700 MHz Processor. It has a Video core IV GPU. • GPIO allows us to control and interact with real world.

1.1 Literature Review

Concepts for home automation were around for decade before becoming reality and featured in the writing of the19th century.

The Electronic Computing Home Operator (ECHO) was high light in the April 1968 edition of Popular Mechanics and had been expanded from a set of spare electronics.

The ECHO never went commercial and a number of large companies played with the idea of computerizing the Home however it was the birth of the modern era of home automation technology.

The X10 standard was designed to allow transmitters and receivers to work over existing electrical wiring systems by broadcasting messages such as "turn off" and "turn on via radio frequency.

X10 has a number of disadvantages. Issues in wiring and interference. At time of transmission command may lost Supporting product is less. Available commands are in limited scope .Signal transmission speed is slow.

The dot.com boom was small step from PC to PC communication to appliance to PC communication.

With the arrival of Raspberry Pi which is small, inexpensive, portable credit-size single board computer with support for a large number of peripherals and network communication like Ethernet port, USB port, HDMI port, SD card slot. Raspberry pi set of technologies.

1.2 Proposed work

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2. Functional description

The functions of the various components are given below:
A. USB Camera: USB Camera captures the image and sends it to the USB port of the Raspberry Pi board. The camera model used here is USB Camera model 2.0.

B. Raspberry Pi: Raspberry pi is a small credit-card sized computer capable of performing various functionalities such as in surveillance systems, military applications, etc. The various functionalities of the components are given below The various components of Raspberry- Pi are • SD Card Slot is used to install OS/booting/long term storage .The total memory of the SD card is about 8GB. • Micro USB Power Port provides 700mA at 5A. • RCA Video Out is connected to display if HDMI output is not used. It is mainly used to carry audio and video signals. They are otherwise called as A/V jacks. • Audio Out Digital audio is obtained if HDMI is used to obtain stereo audio. Here analogue RCA connection is used. • Ethernet Port is used to connect to the Internet. It also plays a role in updating, getting new software easier. • HDMI OUT(High Definition Multimedia Interface) is used with HDTVs and monitors with HDMI input. Also HDMI-HDMI is used here. • BROADCOM BCM 2835: It is otherwise defined as System on chip .It is a 700 MHz Processor. It has a Video core IV GPU. • GPIO allows us to control and interact with real world.
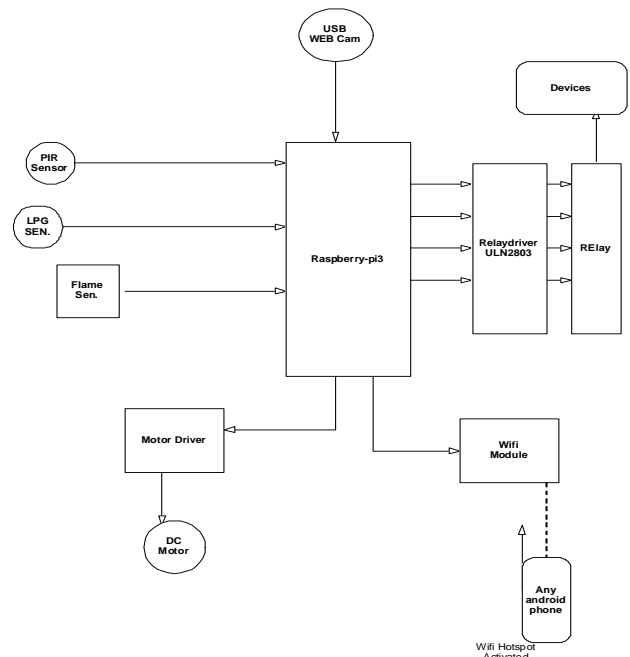

Fig-1. Block diagram for home automation

3. CONCLUSIONS

 Thus we have proposed to design a smart surveillance system capable of recording/capturing video/image and transmitting to a smart phone. It is advantageous as it offers reliability and privacy on both sides. It is authenticated and encrypted on the receiver side; hence it offers only the person concerned to view the details.

Necessary action can be taken   in short span of time in the case of emergency conditions such as elderly person falling sick, military areas, smart homes,offices,industries etc., Future work is to locate the number of persons located

exactly on that area and their position so that accurate information can be obtained on the receiver side.

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