

Smart House Model using Raspbian 2 Technology

Meenaakumari.M, Balaji.S, Ramya.S.

Abstract: Technology is changing day by day with advances in each and every walk of life. The topic of interest in this paper is related to such advancement in security. Now a days there is an increasing demand of security in home as there are lot of cases reported on thefts and an authorized entering of houses. Here we deal in automating home systems with mobile based application. The technology used is raspbian software 2, which required infrared radiation sensors a memory card and an Operating system. Raspbian is selected as OS for this project as it will be easy for beginner. As for the processing part, infrared radiation sensors we have to copy a file named new out of box software before copying the OS on the memory. Once the Operating system is implemented some software's for programming. This also includes options to send short message service to the host about the things happening in the infrared radiation sensor living place and also send recorded messages when the user is away from home with the help of speech plug-in and a file transfer protocol to use the Raspbian software. This model can be also used anywhere like work place where the patrol man through his Smartphone can give access to people when he is in his rounds. Thus version consists of the frenzy button manage and tracking of domestic home equipment and protection.

Keywords : smart house model, frenzy button via cellular phone, passive infrared sensor, short message service messaging, infrared radiation sensor, un authorized person detector, light emitting diode array..

I. INTRODUCTION

1 The smart house system is based on an Raspbian software 2, that has a 1GB RAM, 899 MHz central processing unit which is over clocked at 1 GHz without damaging the board. A CMOS digital camera is located on the front door of the residence so that you can take the photograph of the individual at the door. If the person is a stranger and if trying to enter forcefully there are options for the user to either open the door or lock the door from the Smartphone. [1-8]

2 It is like a domestic wherein the lighting fixtures came on after nightfall, doorways open for them, etc. There is likewise a want for surveillance in the modern-day world, as well as active management.

This model can be designed and used for lot of applications as it has many general purpose Input/output ports.

It also involves automatically turning on lights when dark, opening the door when the owner comes etc. [9-13]

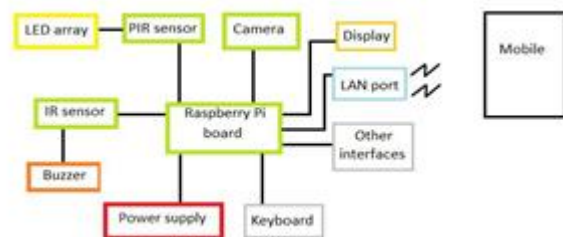
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It can be programmed through the user over sort of programs like security, surveillance, lighting fixtures, strength control, get right of entry to manage, enjoyment etc...



The present age of fast life. Everyone wants to do things in a simpler, easy way [14]. Nobody wants to physically go and do things but rather try to do things remotely. Here also we use the same idea, The user can see the visuals of his/her home from his mobile and see if what is happening there through cameras connected. [16] This also includes getting alerts on your mobile and hence the user can act according to the situation. Not only that if any elders are there in the home or any kids are there in home we also can have a watch on them. Hence the use of home automation is far beyond the idea of security, automation but much more.

II. PROJECT EXPLANATION

A. Proposed System

In this system there is a passive infrared sensor fixed to the door. It has a half circle radiation and can sense up to 1-2 meters. This sensor has extra advantages than the normal sensor as it has an ability to locate characters even though they arrive from the aspect.

If someone arrives in a variety of the detectors, it sends a pulse and it turns on a light emitting diode array and the digicam. This light emitting diode is furnished to offer excellent mild for the digicam to take a great picture. Once the digicam is on it takes the pictures of the characters found in front of the door and sends ansms to the consumer along with the photograph and sent the image to the users smart phone through file transfer protocol server. [17]

There are also infrared radiation sensor sensors connected which will detect any stranger entering the house and give trigger and will also sent message to user's phono so that he can take action. Once the individual is diagnosed by way of the user then he'll permit him to go into the residence. [18]

B. Components Used

In this system there are various components elements used which are given below:

C. Raspbian software



Fig.2 Raspbian software 2 Board-Model B

There are forty General purpose Input/Output pins which may be used as each virtual input, virtual output and to manipulate and interface with numerous different gadgets within the real global. besides that there four USB ports, 1 HDMI port, 1 Ethernet port, 1 2.5mm Audio jack, micro universal serial bus energy supply. There also are options to attach a digicam and a show.[19]

D. Raspbian software camera



Fig.3 Raspbian software

E.Motor Drive.

The module used on this project is a five MP fixed-awareness CMOS digicam is used to take excessive- definition moving images and photos. A 17cm cable is attached with the digital camera that's interconnects the camera with the Raspbian software program board Input5V is applied at pin 8,16 and pin 1,9 are on , the pins 4,5,12 and 13 are connected to gnd.

F.Working:

The automobiles are managed with the help of the inputs given from the Raspbian software program to the IC. For the 1st motor,input is given in pin no 2,7 connected at pin 3,6. The inputs for the second motor in pin 10,15 is connected at pin no 11,14 . The binary data 0 or 1 are given as input data from the Raspbian software.[20]



Fig.4 Passive Infrared Sensor

The passive infrared sensor is used to identify the movement. It recognizes the change of a character someone or a thing which has in or out of the sensors range and therefore they sent a cause. Passive infrared sensor, Passive Infrared, Pyroelectric powered, or infrared radiation sensor movement sensors are primarily made from a Pyro electronic powered sensor (which is proven inside the parent five the spherical metallic can with a rectangular crystal within the center), it could discover infrared radiation from people. It works on the precept that the entirety emits a low stage of radiation and the warmer the object is, the extra radiation is emitted.

Input: It can vary between a 4 to 8.8 volt inputs, but 5.2 volt is ideal voltage.

Output: It has a 4-volt pulse as an output.

When motion pulse is detected, the lengths are determined by resistors and capacitors on the PCB which differs from sensors to sensors.

Sensitivity: It can range up to 11 to 13 feet (2.9 meters) and detecting range is 109° x 69° .

G.Infrared radiation



Fig.5 IP Sensor

The sensor has a set of transceiver ie, an infrared radiation sensor, light emitting diode and a photo diode.

The detection range is about 3-80cm depending on the components used in the sensor. The infrared radiation sensor works at an input voltage of 5V. When the detector identifies an object, it sends a pulse signal, and it keeps on active until the obstacle is in its range.

III. SPECIFICATION OF THE COMPONENTS USED PASSIVE INFRARED SENSOR

In this module we have the inactive infrared sensor as appeared in the above outline 5. At the point when the program is kept running in the terminal the sensor enacts and checks for any development. It faculties in the event that an individual comes in its range and, at that point it initiates the camera. At infrared radiation sensor Ready is shown in the terminal and when the sensor distinguishes some impediment in its showcases Motion recognized.

Motor Control Module

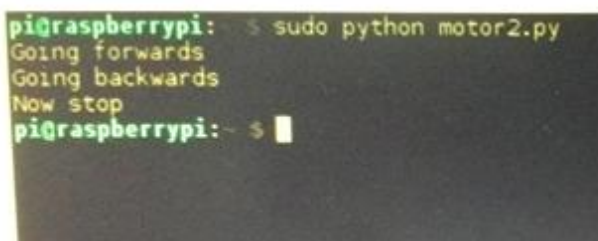


Fig.6 Output for Motor Driver infrared radiation sensor circuit

A program is run in the terminal to control the infrared radiation sensor direction of rotation of motors. At infrared radiation sensor it displays going forward and runs in forward infrared radiation sensor direction and after some time it displays going backwards running in the opposite infrared radiation sensor direction. The rotation of motors is controlled by the IC.

H.Remote Control Module



Fig.7 Remotely controlling the Raspbian software from acellular system

Remote management of Raspbian software is done by connecting by SSH connection protocol .It is done by giving the IP address of the Raspbian software to the Application and the terminal commands are run along with the application.

I. Messaging via API

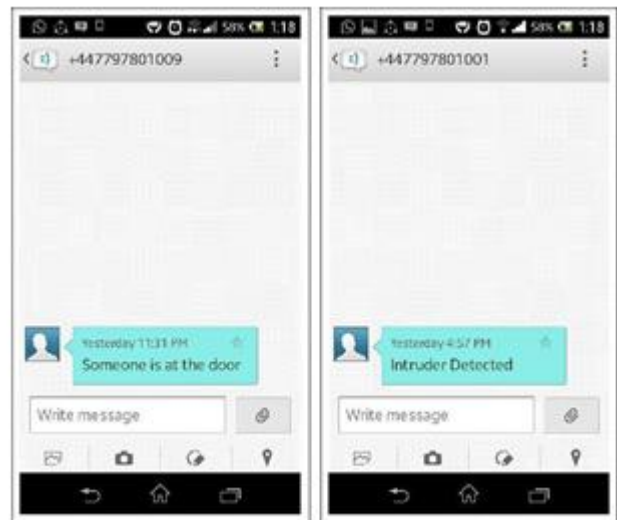


Fig.8 Messages send from the API

J. Module Testing



Fig.9 Working of the PASSIVE INFRARED SENSOR

As appeared in figure 11 we check the reaction time of the sensor, initiation of the camera, how the picture is taken and show. Red light in the camera demonstrates it is dynamic.

Fig.12 Testing the Motors

In figure 12, it is checked how the motors reacts to the signal transmitted from the cellular mobile and the same moment they are activated.



Fig.10 Connections done on PCB

Subsequent to finishing the parts and testing them, we bind these to the PCB board and associate them, as appeared in figure 13.

K. Framework Functionalities

- Door lock and open caution
- Video spilling mode.
- Appliance control mode.
- Sending pictures to identify

L. Equipment Necessities

A. Server device

- Raspbian software 2 B+ module
- 5 Megapixel CMOS Camera.
- Passive Infrared Sensor.
- Infrared Radiation Sensor.
- Light Emitting Diode array.

M. Main Module

- An Android device with minimum of 1024 Megabytes of RAM and a 3 GHZ processor.
- 300MB of free space.

N. Software necessities

Server device

- Raspbian
- Python.
- Scratch.
- Espeak.

O. Host device

- Minimum required OS – Android Gingerbread 2.3.2
- File Transfer Protocol client.

- A control unit to control the pi using SSH server.

P. Algorithm

Step1. Passive Infrared Sensor senses the person.

Step2 This initializes the LED array for best flash to get a better image.

Step2. Keeping the LED array ON. The camera captures the image of the person after the passive infrared sensor is triggered.

Step3. After capturing the picture, the picture is transmitted via file transfer protocol server of Raspbian software to the owner's mobile.

Step4. Then a message is dispatched to the proprietor's mobile by using Message API, this indicates him that some person is on the door and an photograph is likewise dispatched to him via file transfer protocol.

Step5. The proprietor checks the images to identify the intruder.

Step6. After conforming, the proprietor sends a message using the application to either open the door or a speech message to the person waiting.

IV. CONCLUSION

This proposed project work gives protection and numerous approaches to manipulate the devices inside the residence. It makes residing secure and can be effortlessly available via portable gadgets like cellular telephones. It always asks the administrator instructions earlier than every step and as a result easily manipulates the activities.

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