Novel Security System

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Abstract

In order to further maintain peace and provide security to people now a day, Closed-circuit television (CCTV) surveillance system is being utilized. This study focused on the design and implementation of a Novel security system with night vision capability using Raspberry Pi (RPI) and Open CV. The system was designed to be used inside a warehouse facility. The system uses PIR sensor which has human motion detection capability, when any human motion is detected it is fed as an input to raspberry pi and raspberry pi instructs camera to click images and these images are send to the user mail, that can provide precaution to potential crimes. The credit card size Raspberry Pi (RPI) with Open Source Computer Vision (Open CV) software handles the image processing, control algorithms for sending captured pictures to user's email via Wi-Fi.

Keywords: Raspberry Pi, LDR sensor, PIR sensor, USB camera, WI FI dongle, email notification.

1. Introduction

Closed-circuit television monitoring system has now become an indispensable device in today's society. Supermarkets, factories, hospitals, hotels, schools, and companies are having their own CCTV system for 24/7 monitoring. It gives real-time monitoring, provides surveillance footage, and allows the authorities have evidences against illegal activities. It is believed that CCTV can deter crimes. Although surveillance camera records video and helps the authorities to identify the cause of an incident such as crime or accident, it is just a passive monitoring device. The researchers developed an active security system in which when PIR sensor detects any human motion raspberry pi instructs the camera to captures images and raspberry pi send the alert message with the captured images to the user email as any event happens through WI-FI.

When dealing with the real-time image processing, Open Source Computer Vision (OpenCV) software, a powerful library of image processing tools, is a good choice. The library is written in C and C++ and runs under Linux, Windows and Mac OS. OpenCV is a free software that can help optimize code for basic image processing infrastructure.

2. LITERATURE SURVEY
Technologies and resources
2.1) Home Security System

"Home Security System" presents the idea of the android phone is the advantage of the system as it is carried by everyone and used at any place at any instant as compared to personal computer. Internet will be the main communication media between the android phone and the home security system. The system has some drawbacks like it need continuous internet connection and there may be hardware failure which will harm the system .The user must be able to

handle the android phone so that he can effectively use the system.

2.2) PIR Based Security Home Automation System with Exclusive Video Transmission

"PIR Based Security Home Automation System with Exclusive Video Transmission" presents the idea of home automation with video transmission through robot. In the smart phone the live streaming is visible. Robot has temperature sensor where if the temperature increases there will be buzzer indication alerting the owners of the house. The Robot is on and left in the house, where the security of house is assured.

3) Research of Intelligent Home Security Surveillance System Based on Zigbee

"Research of Intelligent Home Security Surveillance System Based on Zigbee" present the idea of remote monitoring system was developed for home security. The system can send abnormal images and warning messages through MMS and SMS receive remote instruction and monitor household appliances. The experimental result shows that the system can attain surveillance of home safety with availability and reliability.

4) A Remote Security System Based On Wireless Sensor Network and GSM Technology

"A remote Security System Based on Wireless Sensor Network and GSM technology" presents the idea of low power consumption for home security alarm system developed by applying wireless sensor and GSM technology. It can detect the thief, leaking of gas, and fire, and send alarm message remotely. The hardware of this system includes single chip C5081F310, wireless sending and receiving chip CC1100, as well as the GSM module and can send the alarm short message when some dangerous condition has been detected

5) PROPOSED SYSTEM DESIGN IMPLEMENTATION:
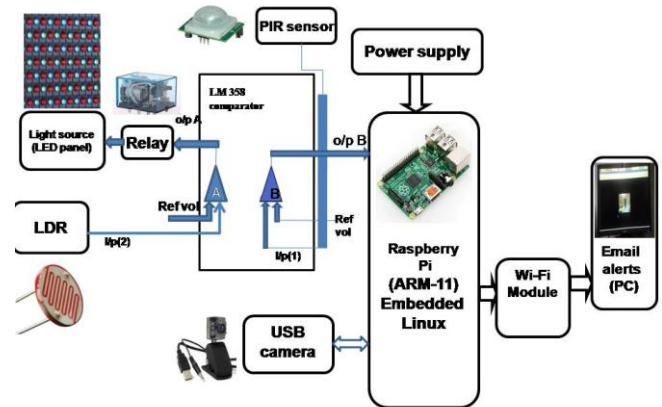
From the above figure the device which is able to perform the task is Raspberry Pi processor. It is the heart of the system which appears like single board credit card size computer. Raspberry pi is the central platform for sending alerts to the user email with the captured images. The PIR sensor used here detects any live human being presence. When Human motion is detected, it is fed as an input to the LM358 COMPARATOR which compares current input with reference voltage (which is 2.5v) and give output to raspberry pi. When current input greater than reference voltage then raspberry pi instructs the camera to click the images. The Processor takes responsibility for sending alert through email with a text as "There is some activity in your home see the attached picture". The images are sent to the mail using Wi-Fi wireless communication network. To perform this task, Raspberry Pi processor is programmed using embedded 'Linux'.

5.1 System flow chart

In this paper the alerting sensors with low-power consumption are placed near those home windows and doors where an intruder must pass through. Also paper proposes a sensor based low cost security system Applications in which Passive Infrared (PIR) sensor has been implemented to sense the motion of human through the Detection of infrared.
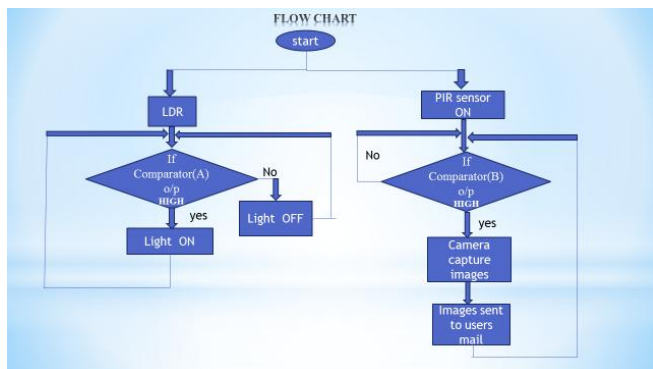
To optimize the flow chart I have separated it in to two parts on the left side LDR and on the right side PIR sensor. Two comparators (A and B) are used , LDR output given as an input to comparator (A) and PIR sensor output to comparator (B) after comparison, if comparator output is high on the right side images are clicked and mail is sent and on left side light source is ON .

ARM 11 PROCESSER:
### Raspberry pi processer (ARM-11):
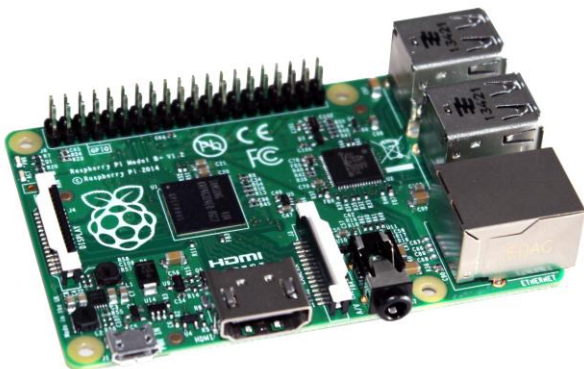
The Raspberry Pi has a Broadcom BCM2836 system on a chip (SoC), which includes an ARM1176JZF-S 900 MHz processor ,Video Core IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded to 512 MB. It does not include a built-in hard disk or solid-state drive, but uses an SD card for booting and long-term storage. The external ports used in this project are 2 USB ports, one for USB camera and other for connecting a WI FI dongle. We also have two other ports for any other connections and an Ethernet port for Ethernet cable connection.

5.2 USB Web Camera:
A **webcam** is a video camera that feeds its image in real time to a computer or computer network. Unlike an IP camera (which uses a direct connection using Ethernet or Wi-Fi), a webcam is generally connected by a USB cable, FireWire cable, or similar cable.

5.3 LIGHT DEPENDENT RESISTOR
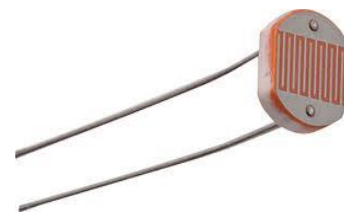
A photo resistor or light dependent resistor is a component that is sensitive to light. When light falls upon it then the resistance changes. Values of the resistance of the LDR may change over many orders of magnitude the value of the resistance falling as the level of light increases. It is not uncommon for the values of resistance of an LDR or photo resistor to be several mega ohms in darkness and then to fall to a few hundred ohms in bright light.
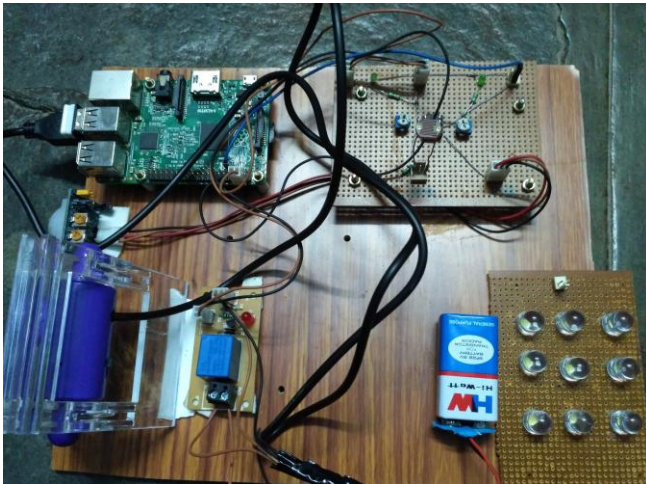
5.4 PIR SENSOR
PIR stands for Passive Infra-Red. A Passive Infrared sensor (PIR sensor) is an electronic device that measures infrared (IR) light radiating from objects in its field of view. We are using PIR sensor for human motion detection.

All objects emit black body radiation. It is usually infrared radiation that is invisible to the human eye but can be detected by electronic devices designed for such a purpose.

6. SYSTEM HARDWARE

In this hardware PIR sensor and a USB camera is connected to raspberry pi. Light dependent resistor to check the intensity of light and a comparator is used for comparison. We are using a relay to switch on the light source when light intensity is low. Normal LED panel used here as a light source.

7. RESULT:
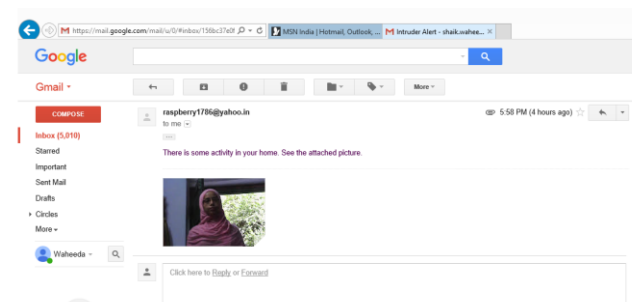
The output received to the user mail is in this form. We can see a text and image received with date and time.

8. Conclusion

In this paper, we were able to design and implement a Novel security system which is used at day and night time. The system is implemented with the help of raspberry pi, low cost USB camera and PIR sensor. The total cost of this project is much cheaper. For the researchers, safety is the primary concern and they believe an integrated smart security system will be a significant help in the security.

9. ACKNOWLEDGEMENT

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11. AUTHOR(S) PROFILE

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