

Intelligent Surveillance System using Internet of Things

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Abstract: The human intrusion detection system is designed to prevent unauthorized person gaining access to authorized area. Monitoring of areas of high security value is needed in today's security sensitive world. Such monitoring requires 24 / 7 security for longer duration and a high degree of stealthiest. In this paper we have proposed a mechanism using Internet of Things for monitoring intrusion. Sensor placed triggers the camera, which starts live video streaming if any intrusion is detected. The main advantage of our system is to alert the organization along with the image that captured during live video streaming, which will be stored for every 5 seconds. To make this system still smarter the entire system will be provided by multi power sources.

Keywords: Sensor, camera, Raspberry pi, IOT,

1. INTRODUCTION

Today's advancement of internet and modifications of the networking technologies, networking is enabled on everyday objects through Internet Of Things (IOT). Environment is made respond to human behavior automatically by intelligent surveillance system. Our system has been designed to improve the standard of living.

Surveillance is close observation especially of a suspected. Proposed Intelligent surveillance system needs the use of both control system and information technologies to reduce the need of human in authorized area, which help users to view their authorized network from anywhere on internet and mobile devices. Users have control to operate the intelligent surveillance system from anywhere.

CCTV technology makes use of huge hardware disk storage in order to store the recorded video. Our system is designed to overcome the usage of huge external hardware resources and at the same time effective alert will be sent to the user during any intrusion in authorized area. To build this intelligent surveillance system we make use of Raspberry-PI processor, Genuino MEGA 2560 microcontroller board, PIR sensors, Display board, and mobile application. The special features about our system are multi powered, and human intrusion is detected by PIR sensor and provide alert to the users only when intrusion is caused.

2. RELATED WORKS

Khanna et al., [1] stated that Wireless security is the prevention of unauthorized access or damage to mobile using wireless networks. This enables systematic solution for home and enhances cost effective solution through controlling home appliances remotely against intrusion in the absences of home owners. This system was introduced to prevent increasing crime note as well as prevention to unseen intrusion. This system works on different wireless communication like wifi, Bluetooth, etc., Remote controlling of home appliance and intrusion detection in absence of home owner and auto configuration that automatically adjusts the software on running hardware capacity are its main advantage of the system. Sadeque Reza Khan et al., [2] implemented low cost home security system. In spite of increasing crime and intrusion the

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necessity for home security arises. With the help of technological advancement, the home security software has been automated which enable the home owner to relax against the treat of crime and intrusion. The system was designed to send immediate notification to the owner and security services like fire stations in case of unforced seen risk arises. Immediate notification was done through activation of GSM module which is accomplished via use of some module and controller and thus one or more alert SMS sent to the home owner and corresponding security services.

Jain, S. et al., [3] had done interactive home automation through E Mail. With its increasing demand, Home application is gaining more advantages in this technological world local networking or remote controls are pillars for the home automation. The study was based on developing an application on home automation through Raspberry Pi by reading the subject of Email The algorithm for the system is developed in python environment which is the default programming environment provided by Raspberry Pi. Mehek Potnis, et. al., [4] had done home security system using GSM modem with the use of ATMEGA16 and GSM SIM. The work was based on sending messages through GSM SIM which was used to control devices remotely, immediately when user gets alert on intrusion.

3. PROPOSED SYSTEM SPECIFICATION

Most of the security applications are offline, they consume huge hard disk storage capacity for video streaming and this makes them to use lots of power. They do not help in real time tracking of any intrusion. They are inbuilt with light bulb with light dependent resistor, LED on ordinary phototransistor as a sensor. This sensor which in turn cannot be used in outdoors as it has triggering false mage sensed from other sources of light.

The proposed system is designed by activating the code through authorized person through application on smart mobile. The application monitors any human intrusion with the help of PIR sensor and which in turn alert the authorized person by sending notification on smart mobile application through internet. Simultaneously the videos are captured by triggering camera through Raspberry Pi and then it is uploaded in cloud server so that the authorized user can monitor his authorized area from anywhere and our application enables the user to turn the camera to 270° from remotely. The proposed system also takes snapshot of the area for every 5 seconds and sends the photo to user along with the alert notification this in turns helps the user to take necessary action against intrusion. As preventive measure, when we get alert of intrusion, automatic door lock and releasing gases to faint the intruder will be done to make delay in accessing sensitive area.

Images and videos captured by the surveillance camera will be sent to cloud server through wireless network and with help of control trigger program. Whenever the cloud server gets data or any changes occur, it will reflect the changes to user mobile with the help of mobile synchronization. The proposed system is designed to be operated by using two different power supply such as AC power Supply and Solar. To charge battery connected to the devices, the system enhances auto change over power sources and it also alerts the user if there is any difficulty in power sources to work. Our proposed system is shown in the Figure 1.

4. HARDWARE AND SOFTWARE SPECIFICATION

The Raspberry Pi

The Raspberry Pi 2 Model B is the second generation Raspberry Pi. It replaced the original Raspberry Pi 1 Model B⁺ in February 2015. Compared to the Raspberry Pi 1 it has A 900 MHz quad-core ARM Cortex-A7 CPU and 1GB RAM

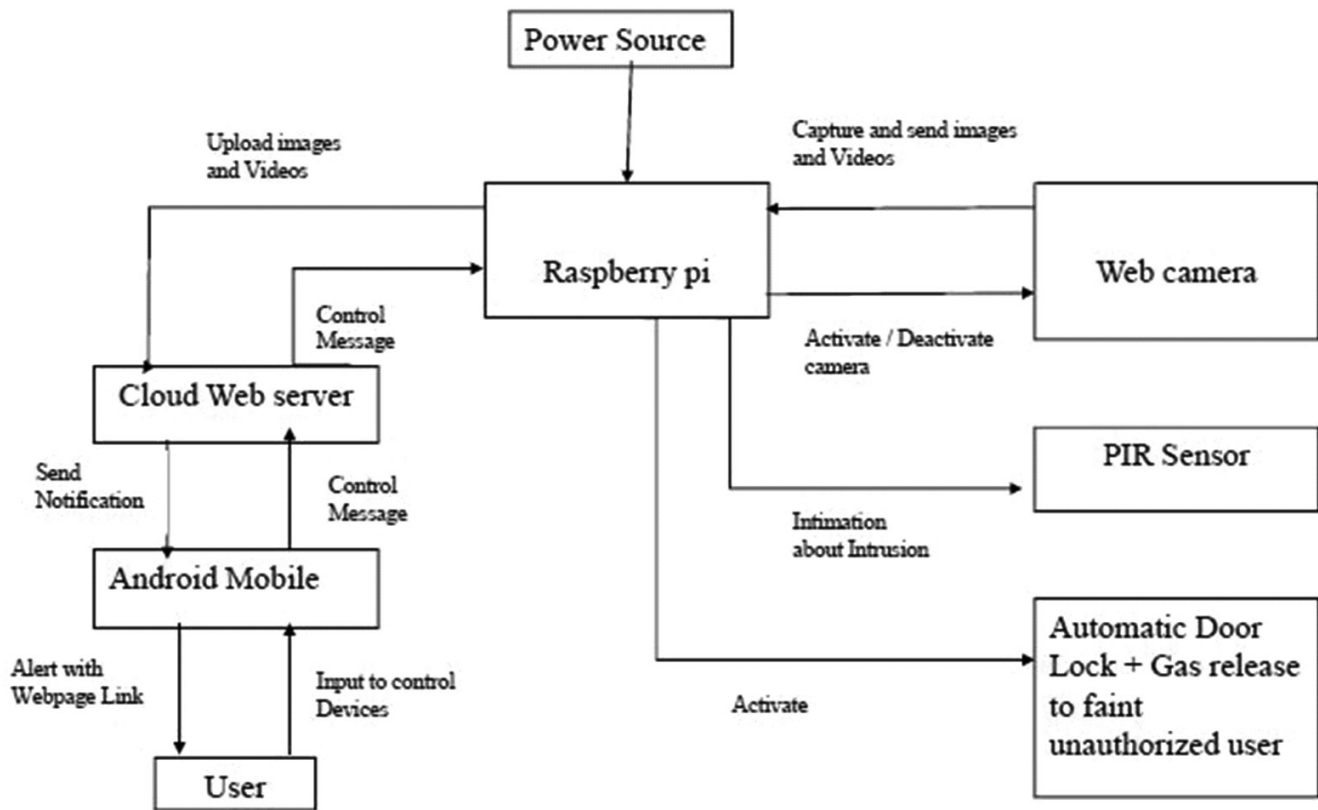


Figure 1: Proposed System Block Diagram

It has an ARMv7 processor, it can run the full range of ARM GNU/Linux distributions, including Snappy Ubuntu Core, as well as Microsoft Windows 10. The Raspberry Pi 2 has an identical form factor to the previous (Pi 1) Model B⁺ and has complete compatibility with Raspberry Pi 1. It offers more flexibility for learners than the learner (Pi 1) Model A⁺, which is more useful for embedded projects and projects which require very low power.

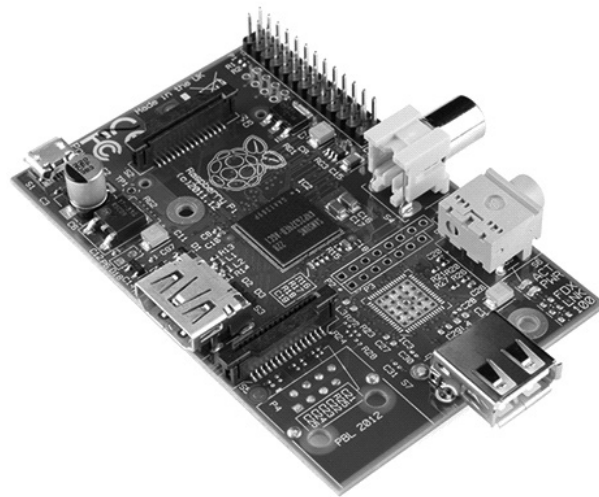


Figure 2: The Raspberry Pi

PIR Sensor

A passive infrared sensor (PIR sensor) is an electronic sensor that measures heat radiation of wave lengths in a band around 10 microns. This results in good sensing when there is small changes in environmental

temperature. Connecting PIR Sensor to the Raspberry Pi GPIO pins. One pin is for +5 volts, one pin is for ground and the other is the sensor pin (the middle pin on our Pi). This sensor pin will receive power whenever motion is detected by the PIR module.



Figure 3: PIR Sensor

Input Processing

Images captured by the camera will be given to the Raspberry pi for processing. In processing, images are cropped and classified using edge detection and classifier algorithms to find out whether the intruder is human or not. This increases the accuracy of the intrusion detection. Based on the detection result from Raspberry pi, the alert about the intrusion will be given to the authorized user's android mobile.

Solar Panel

A solar cell, or photovoltaic cell, is an electrical device that converts the energy of light directly into electricity by the photovoltaic effect. Solar cells packaged of photovoltaic modules, which is known as solar panels. A single solar can produce only very limited amount of power.

5. CONCLUSION

This paper proposes an intelligent surveillance system for human intrusion of unauthorized area using Internet of Things (IoT). In this system the Raspberry pi triggers the surveillance camera whenever there is an intrusion otherwise the camera will be passive. This reduces the power consumption of devices. If intrusion occurs, the Raspberry pi sends a message with a picture to the authorized person's mobile device immediately. This helps the user to take necessary action on the fly from remote place. The system components use power supply from solar panel. These advantages of the system make the proposed system an efficient and intelligent surveillance system for unauthorized area.

6. FUTURE WORK

This proposed system provides intrusion alarm in real time, so user immediately aware of the intrusion. But, if the intruder wears mask, then it is difficult to detect. In such case, we can use automatic door locks and releasing of gas to faint the unauthorized person to delay access of authorized area. This can improve the system utility further.

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