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IOT BASED SMART SURVEILLANCE MONITORING AND CONTROLLING SYSTEM

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ABSTRACT: This paper deals with the implementation of Smart surveillance monitoring method using Raspberry-Pi and PIR sensor. It can be used at homes, industries etc, where the audio and movement of objects are recorded by a Camera and transmit the data to the Server using Internet of Things. Raspberry Pi has two main mechanisms interacting with each other; one is the Web Application that executes on the mobile device browser and server-side scripts that run in a cloud which will be operated by the Raspberry Pi Hardware module. Hardware implementation has been done for the proposed model and it will be applicable for monitoring home, industry, office etc. in the absence of user.

Keywords: Internet of Things, PIR sensor, Smart phone, Web Camera

1. Introduction

The concept of Internet of Things (IoT) is that everyday 'things' objects have communication capabilities with each other [1]. The Internet of Things (IoT) is used for many applications like smart cities, smart grids, smart home and asset management etc [2], [3], [4], [5], [6], [7]. The application of IoT to manage and monitor the electrical power consumption of an organization which prevents wastage of electrical energy is described in [8].

Raspberry Pi is a small sized single board computer developed in the UK by Raspberry Pi foundation. The research and development activities carried towards low cost and low energy devices such as Raspberry Pi, has paved the way to many monitoring applications in various domains. A wireless sensor system towards an important environmental issue of water quality by using Raspberry Pi and Arduino is described by [9]. Design and Implementation of smart home surveillance system, where the implementation of monitoring system is made for home surveillance is described by [10-11]. Remote home surveillance system with the help of internet, mobile and camera is presented in [12].

The above literatures does not deal with IOT surveillance monitoring and controlling both. The main

objective of this paper is to present the design and implementation of Smart surveillance monitoring system so that unauthorized intruder will be locked inside the room. Embedded implementation of the proposed model has done using Raspberry Pi.

2. Proposed System

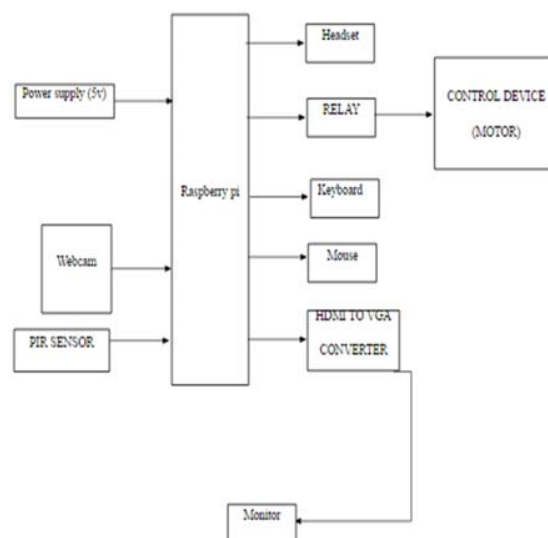


Fig. 1. Block diagram of the proposed surveillance system.

The block diagram of the proposed surveillance system is shown in Fig. 1. We have considered the raspberry Pi for IOT data transfer. Whenever an intruder enters the area under surveillance, the PIR sensor detects and sends a signal to the raspberry Pi to take a snap of the area with the help of the Web Camera then the instantaneous image is transferred to the user mail via internet. The controlling of the hardware connected to the Raspberry Pi is done by using the IP address of the device. The user interface provides the user to control the motor, so that door will be closed and the unauthorized intruder will be locked inside the room. The data like photos and videos are sent to a cloud server. If the cloud server is not available, then the data like photos and videos are stored

temporally on the Raspberry Pi and send to the cloud server when the connection resumes again. Advantages of the proposed system are : (1) surveillance of the room can be observed by the user, when the user is moving from one location to another location (2) it offers privacy (3) it is a simple circuit (4) we can monitor this module wherever from the world.

Hardware requirements

- Raspberry pi 2model B
- web camera
- PIR sensor
- Power cable

Software requirements

- Raspbian OS
- Python programming language
- Linux OS

3. Result and conclusion

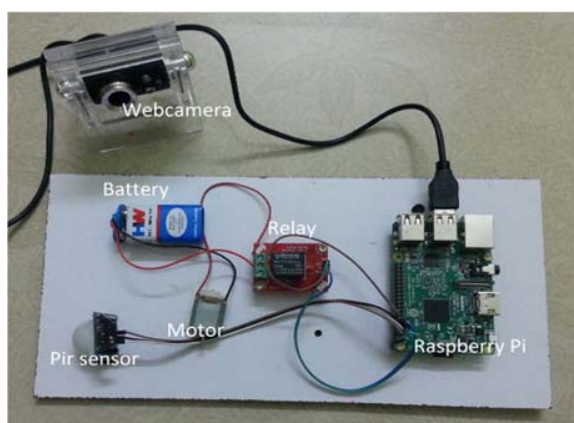


Fig. 2 Block diagram of the Hardware setup.

The basic hardware setup of the proposed system is shown in Fig. 2. It consists of a Raspberry Pi, relay, motor, PIR sensor. The Raspberry Pi communicates with all the other devices attached to it. The PIR sensor detects when an intruder enters in the range of it and sends that information to the Raspberry Pi. After that, the Raspberry Pi sends a signal to the web camera to take a photo. The photo taken by the web camera is temporarily stored in the local storage of the Raspberry Pi, then Raspberry Pi sends a mail to the corresponding mail id with an attachment of the image taken.

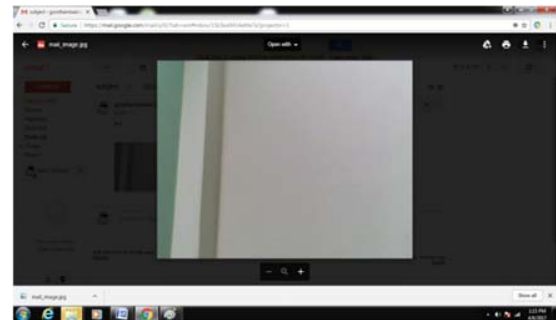


Fig.3 Preview of the Mail received

Fig. 3 shows the output of the image which is received by the mail. The image is transferred via internet to the mail given in the program. The image shows the background of the wall which is captured by the web camera. The pixels need to be adjusted for the proper display of the output.

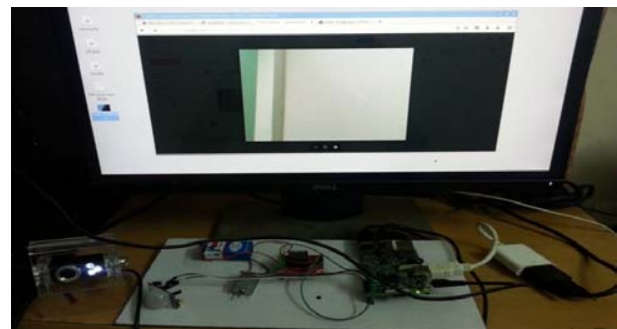


Fig. 4 Sample of the image taken by the Web camera.

Fig 4 shows the capturing of the image taken by the web camera alongside the hardware. The setup is necessary for capturing and processing the image via internet.



Fig.5 User interface Motor controlling circuit through IoT.

Fig.5 shows the user interface Motor controlling circuit. The image shows the interface through which the motor can be turned on and off. The user can control the motor from anywhere through IoT, so that door will be locked when intruder is inside the room. This can be easily controlled from anywhere by knowing the IP address of the network connected to the Raspberry Pi.

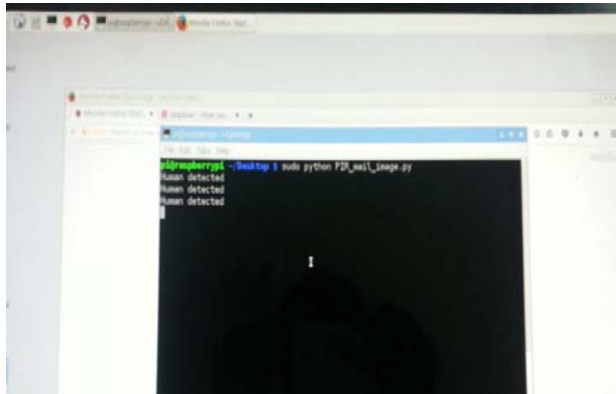


Fig.6 Output after intruder is detected.

Fig.6 shows the output of program when an intruder enters the range of sensor.

4. Conclusion

The proposed method provides a low power and low cost solution for monitoring the human presence and controlling the device from anywhere in the world. This is useful for monitoring home, industry or office etc, in the absence of the user. This can be easily controlled from anywhere by knowing the IP address of the network connected to the Raspberry Pi, so that door will be locked when intruder is inside the room.

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