Optimized Security System using Raspberry Pi

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Abstract:
In the present day scenario, the security forms the most important part of our life. Let it be in any form of life. This concept can be used to optimize a camera based security system based on the Raspberry Pi zero w, that is extremely user-friendly and cost-effective. In this paperwork a system is being developed to connect the pow supply and connect to internet. In a case that one is not at home and a visitor is at his doorsteps then the authorized person will be notified about the visitor via E-mail and the person can see the live video and see visitor from the web through the camera from anywhere and the system will take a picture of the visitor and keep a record by sending an attachment through Email. If the authorized person wants to give a message the visitor it can be sent easily through the wifi and it will appear in a screen on the front face of the door. With the help of this system evidence of the visitor can be kept as email if any emergency case or situation occurs.

Keywords: Raspberry pi zero w, Camera, Email, Notification, Internet, Power Supply.

I. INTRODUCTION:
Security is one of the most important factor of human life. Human want to secure everything as possible as he can. In today's fast paced world, it has become difficult to monitor our workplaces and homes for security. Thus, there is an increased need for camera surveillance systems. By using these systems, it is possible to continuously monitor the workplaces and homes for security purposes. The goal was to design and implement a security system based on Raspberry Pi zero w.

Raspberry pi is a credit-card sized computer. It functions almost as a computer. A Raspberry Pi Zero with smaller size and reduced input/output (I/O) and general-purpose input/output (GPIO) capabilities was released in November 2015. By 2017, it became the newest mainline Raspberry Pi. On 28 February 2017, the Raspberry Pi Zero W was launched, a version of the Zero with Wi-Fi and Bluetooth capabilities. The Raspberry Pi hardware has evolved through several versions that feature variations in memory capacity and peripheral-device support.

The Raspberry Pi Zero W extends the Pi Zero family. Launched at the end of February 2017, the Pi Zero W has all the functionality of the original Pi Zero but with added connectivity, consisting of:
- 802.11 b/g/n wireless LAN
- Bluetooth 4.1
- Bluetooth Low Energy (BLE)
Like the Pi Zero, it also has:
- 1GHz, single-core CPU
- 512MB RAM
- Mini HDMI and USB On-The-Go ports
- Micro USB power
- HAT-compatible 40-pin header
- Composite video and reset headers
- CSI camera connector

II. PROBLEM & SOLUTION

In surveillance, CCTV camera is costly because of the use of computer. It reserves too much space for continue recording and also require manpower to detect the unauthorized Activity. But compared to the existing system, Raspberry pi system is much cheaper with better resolution and low power consumption feature. This system is suitable for small personal...
area surveillance. i.e. personal office cabin, bank locker room, parking entrance. The small form factor, integrated Wi-Fi and low price, make the Pi Zero W the perfect computer for running low-power jobs, particularly where space is an issue. Today's fast paced world, it has become difficult to monitor our workplaces and homes for security. Thus, there is an increased need for camera surveillance systems. By using this systems, it is possible to continuously monitor the workplaces and homes for security purposes.

To implement this system we required OpenCv Module, A open source library of programming functions mainly aimed at real-time computer vision. Python code which interact with the Raspberry Pi and camera module using OpenCv.

Let's break whole setup into 3 major part:-
1. Functional Description
2. Connection of camera with raspberry pi
3. Python Code for image detection and Live video

III. FUNCTIONAL DESCRIPTION

In the we will talk about the core component required for this setup. Following are the core component:-
A. Camera
B. Raspberry Pi Zero W

IV. CAMERA

Figure.1. Raspberry Pi Camera
- Dimensions: 25mm x 20mm x 9mm
- 5MP resolution
- 2592 x 1944 pixel static images
- 1080p30 video
- This module is only capable of taking pictures and video, not sound.

V. RASPBERRY PI ZERO W

The Pi Zero W has been designed to be as flexible and compact as possible with mini connectors and an unpopulated 40-pin GPIO, allowing you to use only what your project requires. At the heart of the Raspberry Pi Zero W is a 1GHz BCM2835 single-core processor, the same as the B+ and A+, with 512MB RAM. Raspberry pi is a small credit-card sized computer capable of performing various functionalities such as in surveillance systems, military applications, etc. e Raspberry Pi is a popular Single Board Computer (SBC) in that it is a full computer packed into a single board. Many may already familiar with the Raspberry Pi 3 and its predecessors, which comes in a form factor that has become as highly recognizable. The Raspberry Pi comes in an even smaller form factor.

We need to give the power supply to run the normal raspberry pi. HDMI port is also available to give the monitor purpose.

VI. PYTHON CODE FOR IMAGE DETECTION AND LIVE VIDEO

Final and the most important part is to run the python code for cctv purpose. We required the OpenCv for this. We are using Python 2.7 for this project. OpenCV is a library of programming functions mainly aimed at real-time computer vision

VII. CONCLUSION

Security is one of the most important factor of human life. Human want to secure everything as possible as he .The security system has been aimed to design in such a way that it can fulfil the needs of the user for surveillance area. It has countless applications. This system capable of 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

VIII. FUTURE WORK

One application should be developed the controlling power of raspberry pi from the window. User can also view captured
image remotely on this application. Live video streaming can be added as per the user requirement. Power management should also be there and system went on sleep mode when it is no longer in active mode. The small form factor, integrated Wi-Fi and low price, make the Pi Zero W the perfect computer for running low-power jobs, particularly where space is an issue.

IX. REFERENCES


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