

Smart Surveillance using Face Recognition System

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Abstract: This paper deals with Smart surveillance camera monitoring system using Raspberry pi zero. Surveillance is an important aspect when it comes to security. Both commercial and other facilities require monitoring systems using high quality cameras. The current technologies require RFIDs which are costly and hence the security domain in all becomes expensive and hence there was a need to work on this. This paper describes the use of low cost single on board computer Raspberry Pi zero. This new technology is cheap and uniquely used for image processing. It also makes use of mobile technology to provide security to our homes and to control applications. This proposed security system captures information and transmits it via a Smart Phone with internet.

Keywords: Raspberry Pi zero, Face Recognition, GSM.

1. Introduction

Fast development in the technology has improved the risk of intrusion. Using security cameras allows a person to monitor his/her property. The majority of organization and administrations are making use of such security cameras with the intention to save their property from terrorists and illegal entry. Nowadays, the security cameras have become much more advanced, reasonable, smaller and straight forward.

A. Benefits of Video Surveillance

1. **Availability:** In olden days the surveillance camera monitoring systems were utilized only in the shopping centers and malls. Now-a-days, you can notice surveillance cameras anywhere from small shops to holy buildings as they are highly efficient. As a result, they provide greater public security with minimum cost.
2. **Real time monitoring system:** Traditionally big organizations have always had the benefits of video surveillance manned by security professionals. In the past times, the capturing and transmission of the images requires more time. But, the modern technologies let the users to periodically monitor their facility and reply to alarms immediately.
3. **Prevent Theft and Illegal Activities:** The primary purpose of installing surveillance cameras is protecting the facility from robbers, criminals, petty thieves and unscrupulous elements from indulging in theft, illicit and criminal activities. Security cameras are installed in almost all

facilities and other public areas. These cameras monitor suspicious activities and alert the owners about real-time thefts.

B. Why Smart Surveillance?

In our busy life we don't have much time to monitor and to keep a watch on everything. From every family most of the members are working, it is difficult to monitor each and every member of the family and the facility. It's 21st century and we need to think smartly to make our life better, easier and secure, so instead of sitting at once place for longer why not carry the security in our pocket.

2. Literature survey

Dr. M.L. Ravi Chandra proposed the "IOT Enabled Home With Smart Security" using Raspberry Pi3 for all processing and various sensors such as LM35 a temperature sensor, Light Dependent Resistor, PIR sensor with a magnetic door switch, smoke sensor are interfaced to pi General Purpose Input Output port pins through Analog to Digital Converter module along with a camera and LAN connection is interfaced presenting security to the home and also providing a facility to the user where one can continuously monitor the surrounding parameters inside the house[1].

The paper "IOT based Smart Security and Home Automation System" focuses on building a smart wireless home security system which sends alerts to the owner by using Internet in case of any trespass and raises an alarm optionally. The System can also be utilized for home automation by making use of the few set of sensors. This low cost system with minimum requirements takes care of both home security as well as home automation [2].

3. Implementation setup

A. Components required

- 1) Raspberry pi zero wireless
- 2) Raspberry pi camera module
- 3) GSM module
- 4) Raspbian lite

1) Raspberry pi zero wireless

The Raspberry pi resembles a tiny circuit board and is a popular Single Board Computer(SBC). The Raspberry pi zero

consists of a single mini HDMI port, which is a reduced form of the full HDMI port on previous Raspberry pi devices. Despite this, it's still capable of outputting video at 1080p and 60fps. The Raspberry Pi comes in an even smaller form factor. The introduction of the Raspberry Pi Zero allowed people to embed an entire computer even in the smaller projects. This guide will cover the latest version of the Zero product line, the Raspberry pi zero-wireless, which has an on-board WiFi module. While these directions should work for most any version and form factor of the Raspberry Pi, it will revolve around the Pi Zero Wireless. There are two micro USB ports, one of which handles the Raspberry Pi Zero's power (just use a standard phone charger), while the other acts as a USB out for hooking up a keyboard, mouse, WiFi dongle.



Fig. 1. Raspberry pi zero wireless

2) Raspberry pi camera module

The Raspberry Pi Zero camera module can be used to capture the high-definition video, as well as photographs. The camera module is very popular in the home security applications, and in wildlife photography works. The camera module is made up of a small (25mm by 20mm by 9mm) circuit board, which is connected to the Raspberry Pi's Camera Serial Interface (CSI) bus connector via a flexible ribbon cable. The camera's image sensor has a native resolution of five megapixels and has a fixed focus lens. The software for this camera supports full image resolution up to 2592x1944 and video resolutions of 1080p30, 720p60 and 640x480p60/90.



Fig. 2. Raspberry pi camera module

B. Working of smart surveillance camera

This system implements Face recognition using Raspberry pi camera module to identify intruders into a particular household by comparing authorized faces in the database and alerting the owner by making a call. Alerting mechanism is implemented using Raspberry pi GSM board. The entire product will be implemented using Raspberry Pi zero and IOT Raspberry Pi security camera.

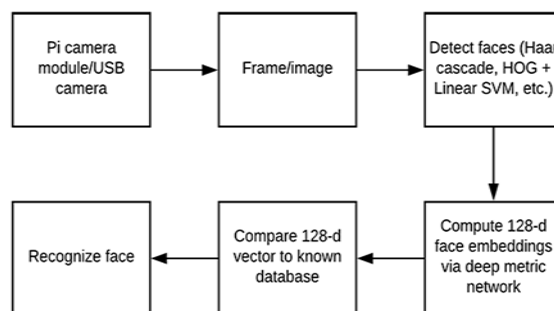


Fig. 3. Working of smart surveillance camera



Fig. 4. Example image

4. Proposed system

The system proposed here captures all the features included in the traditional system with an additional feature of authorizing an object and alerting the user by

- Sending an e-mail
- Call the user

This leads to the user being less paranoid about who enters their house and so that they can be more aware of the activity and hence be constantly vigilant without force.

5. Conclusion

A variety of face detection algorithms for smart surveillance camera systems are developed. But most of the systems do not absolutely detect the moving objects and faces because it lacks some clarity in the image and it requires large memory to store the faces. We are developing face detection system using Raspberry pi zero that will be helpful for detecting the moving object and faces. By using Human Face Detection system, the facility will be more secured as it will send alerts regarding threats happening as soon as possible.

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