EMBEDDED SURVEILLANCE SYSTEM USING PIR SENSOR AND RASPBERRY PI

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Abstract- In this the generation the people through out of the world is facing common problem is home, bank, offices, ATM theft. And also murders, smuggling, happens around in our society. Surveillance is very important and useful to play according to 20th century. Because the biggest crime around in big cities. And its happens routine to control and find the criminal activities, the usage of surveillance to watching over and tracking people from a distance by the using of electronic equipment like as a CCTV cameras. Thus we have a designed Embedded Surveillance system using PIR Sensor and Raspberry pi. Those components are using this project PIR SENSOR to detect the motion and the find the person. And raspberry pi device using the capable of capturing images, recording video, and the send information throughout an email by the user having an email in the python environment.

Keywords; Raspberry pi, Raspberry pi camera, PIR Sensor, python.

INTRODUCTION:

The security is a scenario in which objects, animals or people are provided with unique identifiers and the ability to transfer data a over a network without requiring human to human interaction. Security is the communication of anything with any other the communication mainly transferring of use table able data, for example a sensor in a room to monitor and control the temperature. Exciting is sensor less capturing system based on raspberry pi based controllers. We can’t able exact motion without PIR Sensor. So we have to designed the embedded surveillance system based on PIR sensor and raspberry pi. It can also find the persons located the persons with help of the infrared sensor. And we can able to detect, recognize, Tracking system using Raspberry camera captures the information and send it throughout to the email automatically to an user by using the python environment. We can able to alert the people using the IOT technology.

SURVEILLANCE SYSTEM:

Surveillance System is the Detection and tracking of moving objects. An extra measure of security used in security system many places. used in security systems and with good reasons and the same time improve the security of people, buildings and valuables. Electronic equipment, such as closed-circuit television (CCTV),[1] Surveillance is very useful to governments and law enforcement can also used inside and outside schools and private residences, Monitor threats and prevent investigate criminal activity provide critical evidence for police, to reduce the traffic congestion on highways. In keep track of your employes performances[2].
Advantages of Surveillance:

- Remote control is possible
- Can share data between others
- Can monitor whatever from this world

**System architecture**

The system architecture is Embedded Surveillance system using PIR Sensor and Raspberry pi and its system using the process If someone visit our office, shopping mall, super market, Bank, etc. And to provide security to surveillance a person who is enter and exit and who is stationary person at located in that particular area can only view what is happening in that area. If the user is moving from one place to another, if he/she can keep tracking of what is happening in that particular area. Its captures the image by using raspberry pi device and sent out through an alert mail with the image to the user.[3]

**Hardware requirements**

- Raspberry Pi 4
- Raspberry camera v2.1
- PIR Sensor
- SD Card
- Connecting Wires
Raspberry pi 4

- Raspberry pi 4 is a system on chip (SOC) and tiny credit card sized device. It’s uses the surveillance applications and security system. We can connect external monitor, keyboard, CPU, Mouse use it as computer. And the released June 2019 the various function also used in raspberry pi and the components are SD Card Plot, Micro USB Power Port, GPIO, HDMI.

![Raspberry Pi 4 Diagram](image)

- Raspberry Pi 40-pin general purpose input and output [GPIO], H.2649 (1080p60 decode, 1080p30 encode), H.265 (4k p60 decode). Quad core Cortex -A72 (ARMv8) 64-bit Soc@1.5GHz, Boardcom BCM2711. 2/4/8GB LPDDR4-3200SDRAM, Bluetooth 5.0, BLE, 2.4 GHz and 5.0 GHz IEEE 802.11ac wireless. 2 USB 2.0 ports, 2 USB 3.0 ports. Gigabit Ethernet.

- 2 × micro-HDMI ports (up to 4k p60 supported), Micro-SD card slot for loading operating system and data storage. 5V DC via USB-C connector (minimum 3A*). 5V DC via GPIO header (minimum 3A*).

Raspberry pi camera:

- Raspberry pi camera is the high quality to use this project and captures the image and recording video and their send through out an user having an email. And the 8-Megapixel Sony IMXEL219 image Sensor custom designed on the board of raspberry pi camera. In terms of still images the capable to storing and featuring fixed focus lens.
In the raspberry pi camera official support to raspberry pi camera board and also jetson nano and its sensor is a sony IMX219 8-Megapixel Sensor, and camera specifications are CCD size ¼ inch aperture(F):2.0, Focal length: 3.04mm, Angle of view(diagonal):62.2 degree, 3280x2464 still picture resolution support 1080p30,720p60 and 640x480p90 video record, Dimension:25mmx24mmx9mm.

In normal IR cameras will take curious reddish pictures by daylight for lacking of IR filter in the CCD, the RPi IR-CUT camera can take better pictures in correct color by daylight and still features the ability to see in the dark.

SD Card format

In this project we use SD Card format. Those SD Card that are 16 GB or 32 GB less come formatted as FAT32. Cards above 64 GB are formatted to ex FAT file system. If you are formatting SD Card using Raspbian.OS, choose storage and formatting the SD Card all the files and the captures the information and store it transmits it.

PIR SENSOR

PIR Sensor stands for (Passive Infrared Sensor) they are called passive because they don’t generate or radiate any energy for detection purpose they work entirely by detecting by detecting the energy that is radiated by other objects including humans and animals the basic principle of working of barrier sensor is that any object whose inner temperature is above the absolute zero degree emit heat energy in the form of IR radiations. They are sensors designed to detect the motion and tracking objects. It just works by detecting the energy by the other objects the module designed cover named Frenzel lens which focuses the infrared signals onto the passive sensor.[5]
Software requirements

- Raspberry pi .os
- Python
- Mobaxterm

Raspberry pi.os

- **Raspberry pi os** In this project we use software Raspberry Pi. Os According to my project and our operating system the raspberry pi image in my case is windows. After that open the installer and install the software and choose the operating system raspbian lite only for console work after the selecting the operating system I will select SD card is selected click on write the entire operating system and creating two files to connect our wifi system.
Python

Python 3 for Programming the Surveillance Security System logic and Functionalities. and its supports variety of basic data types, open source general purpose language, supports object oriented programming, automatic memory management, great interactive environment, code grouped modules and packages. And their applications web scraping, Testing, Data Analysis, Web development. So in this project we connect our strong Wifi system to secure our surveillance security system.[6]

Mobaxterm

In this project particular IP address to connect our raspberry pi over SSH, and will connect our raspberry pi through SSH client. So we use Moba extern SSH client to connect raspberry pi and so I will a start new session now here I will put the IP address of the raspberry pi. And I will use specify the default username of raspberry pi operating system and use to connect default password of raspberry pi.
Circuit diagram

- vcc 2
- gnd 6
- data 11
• these pins are connecting wires to the raspberry pi usb port to pass through Alert message to that particular mail.

Fig (9) Circuit diagram

Flow chart processor

Fig (10) Flow chart process
Conclusion

To Secure the today’s Embedded Surveillance system using PIR sensor against the home theft, murders, smugglers. The main purpose of this project is surveillance technologies have to the potential to exponentially increase our ability to detect the investigate and law enforcement to find criminal activities and reduce the loss, Theft and vandalism. The main advantages of surveillance to detected the person of face recognition are used to public places and private places to identify the person. In the future we don’t need man security to protect our offices, homes, ATM etc.

References


[4] SD card wiki.com
