
Real Time Security Surveillance System Using IoT

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ABSTRACT

In recent projects, there is an increase in video surveillance in public and private environments due to a heightened sense of security like, CCTV and RFID. Video surveillance system have many disadvantages like picture is unclear, poor stability, complex structure and it requires lot of storage space to save the video surveillance information and its cost is also high. This system describes the real time security surveillance system using IoT. The system design uses Python language for motion detection algorithm considered as a programming language. This also helps to reduce the storage space and to reduce the cost. For motion detection the algorithm is implemented on low power on chip Raspberry pi 2 And USB Camera. And this also helps to start the live video streaming and detection with moving objects and triggers an alarm when the motion is detected and also sends the photos, videos to the cloud server with the help of USB camera. When cloud is not available then the data is stored locally on raspberry pi and sent when the connection resumes. The camera is mounted on the motor and its movement (Left/Right) is controlled through IoT webpage by the user, thus providing user with enhanced view of the surroundings.

Keywords: Internet of things, USB Camera, Raspberry pi, Motion Detection.

INTRODUCTION

Video surveillance has been developed significantly over the years and is becoming important tool for many organizations for safety and security purpose. Like this system mostly used for social security. It is also used in many fields like public security, bank security and home security. The standard video surveillance can generally acquire close distance monitoring by using PC as a main monitor connected to USB camera with Coaxial cable. Initially, it was implemented by USB cameras connected using coaxial cables. For cost and performance, there is a switch to digital switching systems.

The important tasks are detection and tracking of moving objects for computer vision and particularly for video based surveillance system. Real time security surveillance system is used to design to pay attention to a wide area, so USB cameras with motors are used. In this system, the Raspberry pi chip (including ARM 7 processor) as the main controller or processor. Videos and images are captured from a USB camera, compressed into the MPEG or JPEG format and then sent to the user through the internet using ARM Cortex a7 chip. Then the particular user will receive the compressed images and videos to restructure and recompose video images. This system provides a practical solution for remote wireless monitoring with low cost and low storage space.

LITERATURE SURVEY

- [1] Smart video surveillance system, Zengya Xu, Hong Ren Wu, School of electrical and computer engineering, Platform Technologies Research Institute, RMIT University, Australia. This system gives 3D data which is acquired by the static cameras is used for image segmentation and object detection. This system is used to detect the image points which gives location change because of the motion of objects.
- [2] Real time video surveillance system using motion detection , Chandana S, Department of Electronics and Communication Engineering, Dayananda sagar college of engineering, Bangalore, India. When motion is detected the moving objects is identified using the difference of average of colour in image method. This system is used for surveillance purpose and it's beneficial for surveillance.
- [3] Security model for video surveillance system, Geon-Woo Kim, Jong-Wook Han, Cyber security-Convergence Research Laboratory, Korea Republic. This system recognizes, keeps track of security threats of the real environment which threatens personal safety, and protects the individual which gets video information from CCTV and IP camera. This system identifies a security model for ensuring the safety of intelligent video surveillance system.
- [4] Study on video surveillance system for object detection and tracking , Pavan Kumar Mishra , Uttarakhand Technical University, India. This system basically used for analysis and explanation of object behaviours. It consists of static and moving object detection, video tracking to understand the events that occur in scene. With the help of some useful information like shape and size video surveillance system is useful to detect a suspicious human behaviour.

PROPOSED WORK

In this system, a low processing power chip Raspberry Pi s used as the microprocessor and USB camera used to captures the image of an object in the surveillance area. When motion is detected by the motion detection algorithm, then the camera captures that image and then sends to the user through the email server and also sends SMS alerts to the user mobile automatically through GSM modem. And it records video that is happening in the surveillance area which is directly uploaded to the cloud server (you tube). When cloud is not available then the data stored locally on the raspberry pi and sent when the connection restarts. We can access the live streaming video from camera on any web browser with the internet enabled device. The movement of the camera at the surveillance area is controlled trough IoT platform to increase coverage area.

Basically the main goal behind this system is to provide security to home and banks. The hardware module includes Raspberry Pi, USB Camera, DC motor, GSM modem, and MAX 232IC. The block diagram of proposed system is shown below.

The low processing power chip Raspberry pi is connected to USB camera through the CSI (camera serial interface).This also can be used to capture HD videos as well as still images. MAX232 IC is a hardware layer protocol converter IC commonly known as RS-232 serial communication interface. This system includes receivers and pairs of drivers. The driver changes the TTL and CMOS voltage levels into RS232 voltage levels. Which are used for serial communication between Raspberry pi processor and GSM module? The high voltage and high current are required to control the rotation of DC motor. The main controller normally operates on 3.3v to 5v supply and 2.5 mA current provided by I/O pins. But the DC

motor operates on 12v, 30 mA supply, so the interfacing of DC motor directly with microcontroller may affect the functioning of microcontroller due to the back electromotive force of the DC motor. For this reason L293D H-bridge circuit is used. It is a special circuit implemented using the 4 transistors for controlling the direction of DC motor. If we give logic bits 1,0 then current flow from VCC to motor positive after motor positive to motor negative and then flows to ground. Then motor rotates one direction .We may change the logic bit 0,1 then current flows from VCC to motor negative after motor negative to motor positive and then flows to ground.

Finally, the human movement is detected by the Motion Detection algorithm, the system buzz an alarm detecting the presence of unknown person in a surveillance area and simultaneously sends an alert SMS to the user through GSM modem and send captured image to the registered email of the user later recorded video send to the cloud server that is happening in the surveillance area. Using IoT we can monitor surveillance area to cover more distance. The setup of Python Open CV script will automatically deliver video data streaming to cloud server. Here 5MP USB camera module is used that can be capable of 1080p high definition video modes and still image, and it can connect Raspberry Pi directly with CSI (Camera Serial Interface). Hence it can support 2592x1944 image stills.

BLOCK DIAGRAM

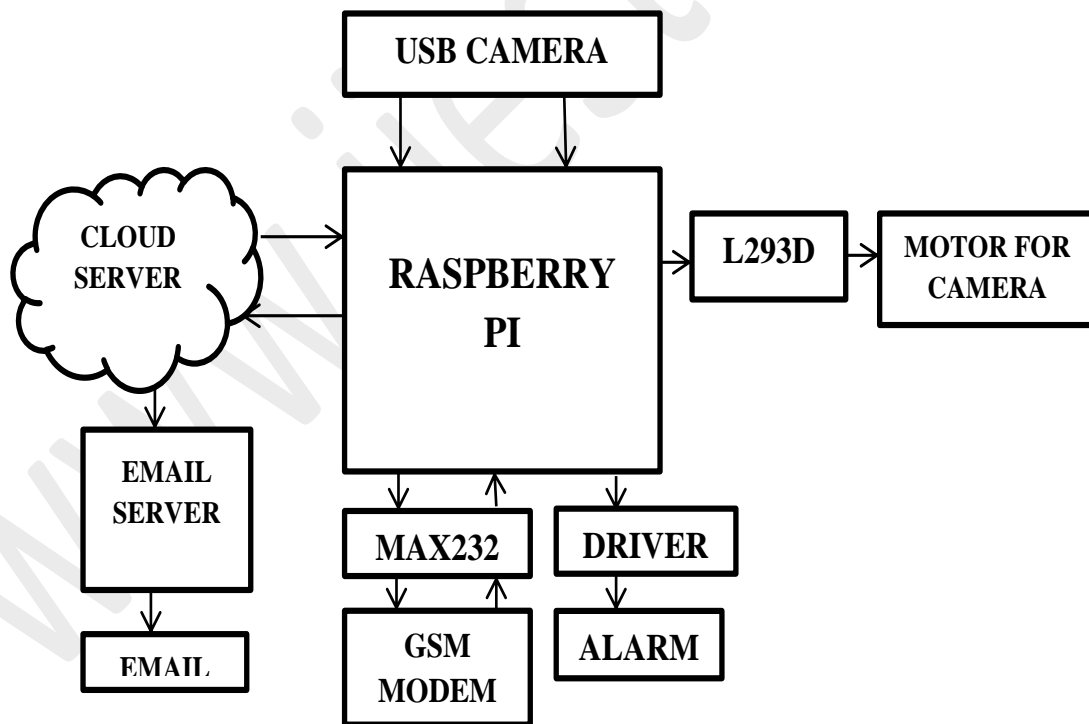


Fig. 1 Block Diagram

FOWCHART OF ALGORITHM

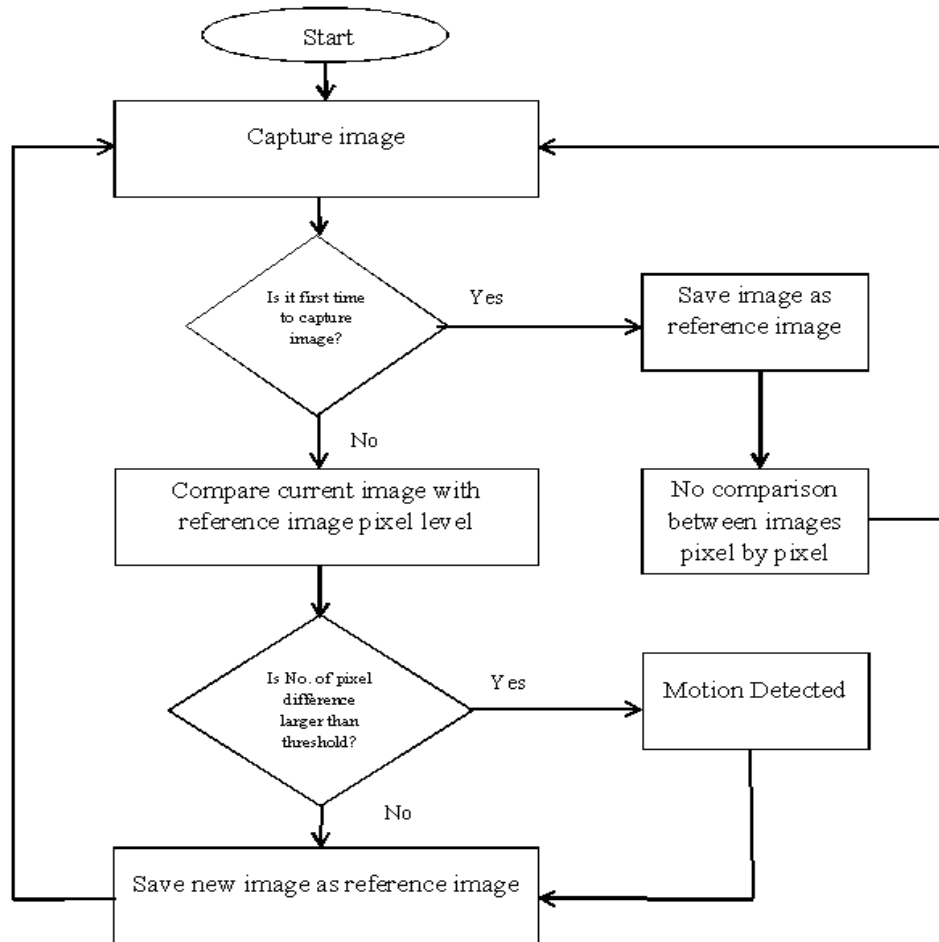


Fig. 2 Flowchart of Algorithm

CONCLUSION

This system is a less costly IoT based surveillance security system. This system also provides home security, bank security and other safety applications. By implementing Raspberry Pi chip, GSM module and USB camera is used to detect and gives alert and also observing the movements which are convey to the user. And it also gives the alert to the neighbourhood to prevent more damages caused by burglary. To store the captured images and videos the cloud server network is used.

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