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Development of Surveillance System for Indian Military

M.D. Narangale[1], Dr. R.M. Autee[2]

[1]ME Student, Deogiri Institute of Engineering & Management Studies, Aurangabad, Maharashtra, India.
[2]Professor, Electronics & Telecommunication Dept., Deogiri Institute of Engineering & Management Studies, Aurangabad, Maharashtra, India.

Abstract – *This work proposes the surveillance of Military area for security purpose. In the first part of the paper, the application need is described. The second part of the paper presents theoretical model of a system, in which requirement of the system is well explained. In the same, software programming for the system is demonstrated with flowchart. A Python programming is developed and is interfaced with the Raspberry Pi-3 model. In the third part of the paper, experimental work is presented with evidence of closeness of the theoretical work with the practical work.*

Key Words: Raspberry Pi, Python.

1. INTRODUCTION

Surveillance is nothing but monitoring the behavioral activities for human and not only human being but for animals also. The surveillance is nothing but monitoring the activities which are not expected for military observatories. The system is developed without any physical aquitance and can be monitored by keeping a good distance of the object. The surveillance system was developed by Germany in1942 for monitoring activity of space related projects. Further the United States have been used this system to monitor atomic activities with live recording system. In paper [1], an innovative approach is presented for smart video surveillance system with effective control of PTZ camera. In paper [2], architecture of perimeter security dedicated to critical transport system is demonstrated. Paper [3], presents a review of intelligent video surveillance technology related work with classifications of entire systems. An application of video surveillance system is well defined in [4]. In [5], a study of moving object detection in intelligent video surveillance system is presented. A design and implementation of smart home system along with sensor interfacing and its appropriate use is presented in paper [6]. Going through various literatures for development of surveillance system is paid a less attention. Hence an effort has been taken to develop a surveillance system which is cost effective and may be useful for Indian Army purpose.

2. Modeling of a System

The proposed Model of the system is shown in figure 1.This system requires a power supply of 5V. A simple mobile charger can be used to give the supply. Display unit is connected to the board. Another block is of PIR sensor which is used to sense the living object passing nearby its range. The range of sensor is about 5m.The infrared rays coming from the living body falls on the sensor and gives the output accordingly. Camera used is of high resolution connected, which captures the images of living objects when signal received from the Raspberry pi-3 board.

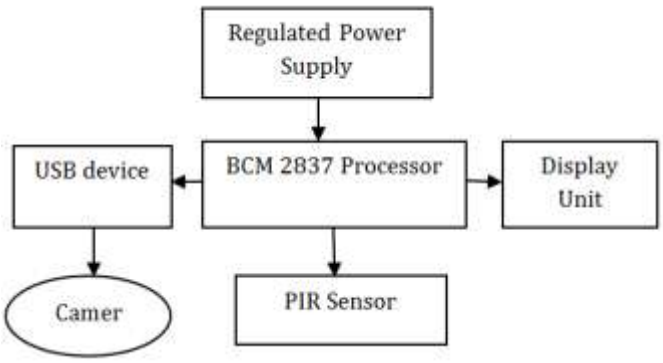

Fig - 1: Blok Diagram

3. System Development

Fig - 2: System Development

The project consists of Raspberry Pi-3 model, PIR sensor, Camera, mouse, key board and monitor. Here PIR sensor is used to sense the living object moving around its periphery gives signal to the camera to capture the image. Camera used is the 1280x1024 resolutions.

3.1 Software & Hardware Development

Raspbian software is used to run the Raspberry Pi board. The standard procedure is used to install the board.

Figure 3 shows the flow chart of the sequence of events occurring in the project. Flow chart describes as follows when any living object passes nearby area of sensor. The infrared coming from living objects senses. In this coding different types of Libraries are imported. GPIO pin 17 and

GPIO pin 4 is allotted to input and output respectively. The GPIO pin 17 is connected to Raspberry Pi-3 board gives the signal HIGH or LOW. It gives HIGH signal when living object passes else gives LOW signal. When HIGH gives signal to camera, Camera captures the image of living object. Sends the mail of image captured with subject "unapproved movement detected on Border". If the signal from GPIO pin is LOW then sensor will be in off condition, then camera will not capture any image.

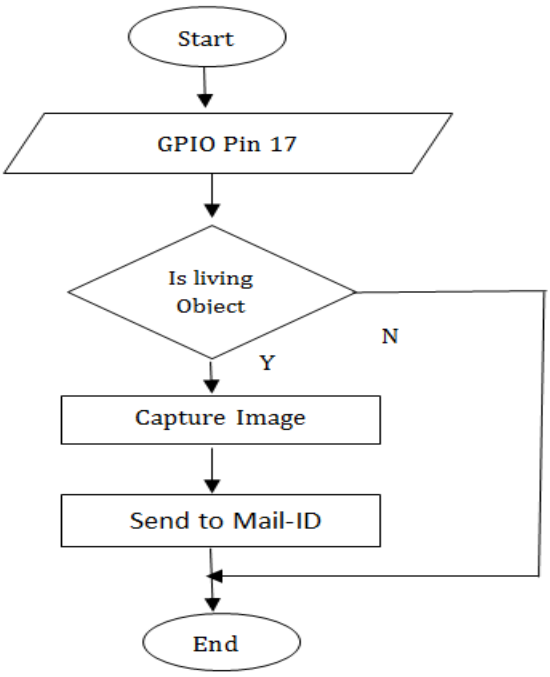

Fig -3: Flow Chart

In this project Python language is used to write the program. Python is a simple language, easy to learn, case sensitive, easy to read and portable. To run this project the coding is done in the following manner.

4. Result and Discussion

Here two mail-ids are created as follows.

1) mdnarangale@gmail.com

2) mnarangale@gmail.com

mdnarangale@gmail.com is the mail id from which captured image attached with the subject is sent.

mnarangale@gmail.com this mail-id is at control room of LOC to check the un approved movement. On this mail image will be received. After detecting the images immediate action will be taken against that person. Fig. 3 shown below is the composing mail request to servers mail address with "unapproved movement detected on Border" as a subject.

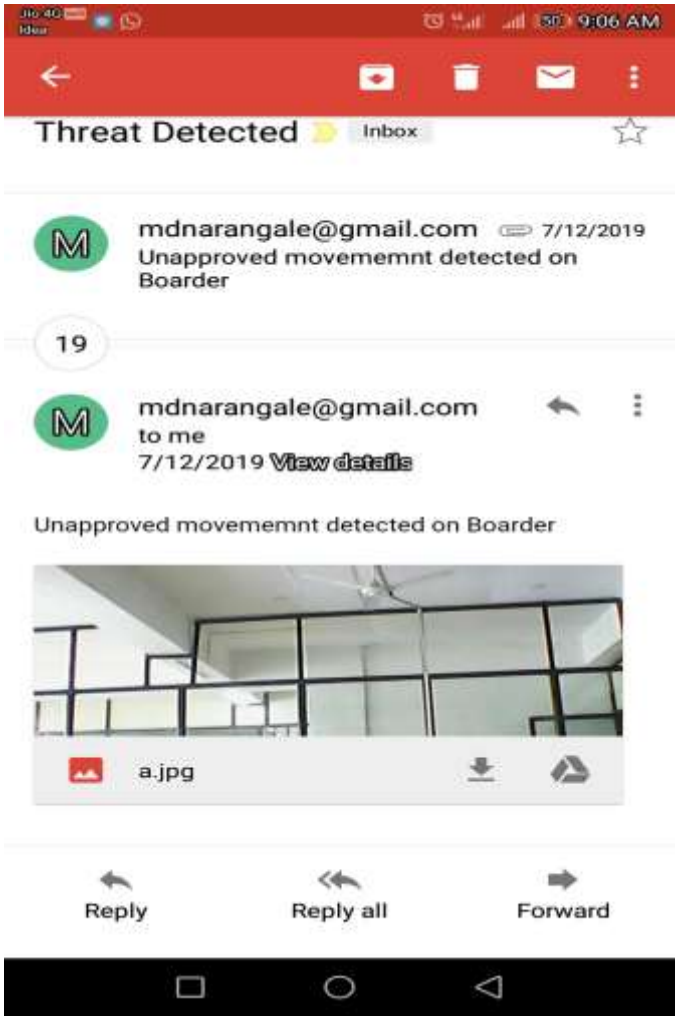

Fig -4: Reply from Raspberry Pi

Figure 4 shows the actual result sends from mail-id mdnarangale@gmail.com to mail-id present at control room i.e. mnarangale@gmail.com.

Fig -5: Sample

Advantage of this project is it is sustainable at any critical conditions of environment i.e. cold and hot temperature. Also this project requires less power as it runs when there is any unapproved movement occurring. Also it maintains privacy at every side. Image will send to mail-id of control

room with a fraction of time it is one of the most useful advantage of this project.

5. CONCLUSION

In this paper, the model of real time surveillance system is presented which is useful to monitor the remote areas or critical no mans lands areas where monitoring is tedious task due to number of problems like temperature conditions, living conditions, security problems for the Military etc. The benefit of this project is it saves money as well as time of the military. As it uses Raspberry Pi-3 board which is less costly as comparative to other boards. The sensor senses the living things and immediately sends the signal and camera captures the images sends to control room. So the immediate action can be taken against the unapproved movement occurring at the line of control.

It saves battery as the camera will on when the any living object moves from the sensor and captures the images and stores it or send to mail-id. It also requires less storage as it takes image when the living objects moves from nearby area on another time it will be off.

PIR sensor is used to sense the lively things and raspberry Pi is used for system development.

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