



MOTION DETECTION USING RASPBERRY PI

Akshatha S¹, KAVYA H WAGLE², MAYOOR N K³, SHWETHA NAYAK⁴, SHWETHA R J⁵

^{1,2,3,4}Computer Science & Engineering, MITE Moodabidri.

⁵Assistant Professor, Dept. of Computer Science & Engineering, MITE Moodabidri, Karnataka, India.

Abstract: This proposed system depends on light on the security issues that modern day world, business and homes world that relates the implementation of detecting a motion using Raspberry Pi that could be an effective solution to address the concerns regarding security systems. The objective of this project is to provide operation of PIR motion sensors to detect the motion and to send the notifications through telegram messenger to the user. With the availability of high-speed networks like 3G, 4G and convenient mobile industry and smart phones has seen an extreme growth as to provides various services accessible to the people.

Keywords: Raspberry Pi, Detection of Motion, LED, Raspberry Pi Camera, PIR Sensor, wires, breadboard

1. INTRODUCTION

The main discussion in the modern-day world today is to provide security for home and business. An approximate of 4,000,000 robberies and housebreaking are reported every year in the United States and all over the world, out of which 70% are credited to steal valuable things of public and private properties. There is growth in number of people going to work that limits the amount of time they spend at home and leave their home, security is unsafe. Since Raspberry Pi is a small-sized computer that has the ability to plug into a laptop, computer monitors and any other display devices which can be connected to a mouse and keyboard for operation.

Raspberry Pi uses an operating system which is called Raspbian Operating System and can be very suitable to run an application in different programming languages like Python and Scratch. Since Raspberry pi is a small device, but in terms of its functionality it is approximate to a laptop or a desktop. The Raspberry Pi can also connect to the internet either through Wi-Fi or ethernet port. Raspberry PI can also perform different activities on laptop/ desktop such as internet browsing, creating a spreadsheet, gaming and word processing. Passive Infrared Sensors, which refers to a PIR Sensors which is a small device that is used to detect the motion. The PIR Sensors is cost-efficient and requires low power which last long and provides high performance devices. They can be introduced into larger devices such as cameras and other video capable devices to detect objects. These devices have the ability to detect levels of Infrared radiation which is the key principle behind detection of motion.

2. LITERATURE SURVEY

Priya Patel.[1] proposed an approach for Smart surveillance system and Monitoring system using Raspberry pi which is operated on android device used by users remotely. IOT application for remote controlling is used by system to send the notification to the android device when an intruder detected inside the area. It is required to implement and develop a cost-effective web camera-based surveillance system for remote cost monitoring. Authorized user can access to their monitoring system remotely through internet with the use of smart phone and its application.

Adimulam Padmanabham.[2] proposed an approach for an IOT Approach for Motion Detection using ARMBased System on Chip, the main motive behind this approach is detecting the motion using Raspberry pi that runs on Frame Difference Algorithm, in which camera will capture the motion when there is a difference between past frame and present frame, then this image will be transferred to the specific folder in the Raspberry. The user will get a mail when motion is detected before transferring images to a specific folder.

Arun Raja[3]. proposed a security that activates the system that records a video when a motion is detected and is uploaded to the external server and notifications is sent through text messages and text messages are reported.

Swapna Jadhav[4]. in this approach pyroelectric infrared (PIR) sensors are used. The system is suitable for small personal area surveillance like parking entrance, personal office cabin, bank locker room. Inside the room or personal area surveillance when the motion is detected through PIR sensor the image is captured through camera and that will be stored temporarily in the raspberry pi. Internet of Things based application can be used remotely to get notifications and view the activity when the motion is detected. System works self-sufficient without the PC previously scheduled.



3.METHODOLOGY

The performance of these project depends mainly on two cases:

- Image Capturing
- Video Capturing

Image Capturing: The image capturing depends upon detection of motion using PIR motion sensor that captures the image using Raspberry Pi camera and send those images as an attachment through telegram messenger to the user.

Video Capturing: The video capturing mainly depends upon motion that is detected using PIR motion sensor by recording a video for a time interval of 10 seconds and converting those videos from h264 format to MP4 format for convenient purpose.

The fig 3.1 says that Raspberry Pi is given a Power supply of 5V. When PIR sensor starts to detect the motion, if the motion is detected then it will capture the image and starts the recording of video. The recorded video and images get saved in the storage. After saved images and video, sends a telegram notification to the users simultaneously. If motion not detected then again go to previous block.

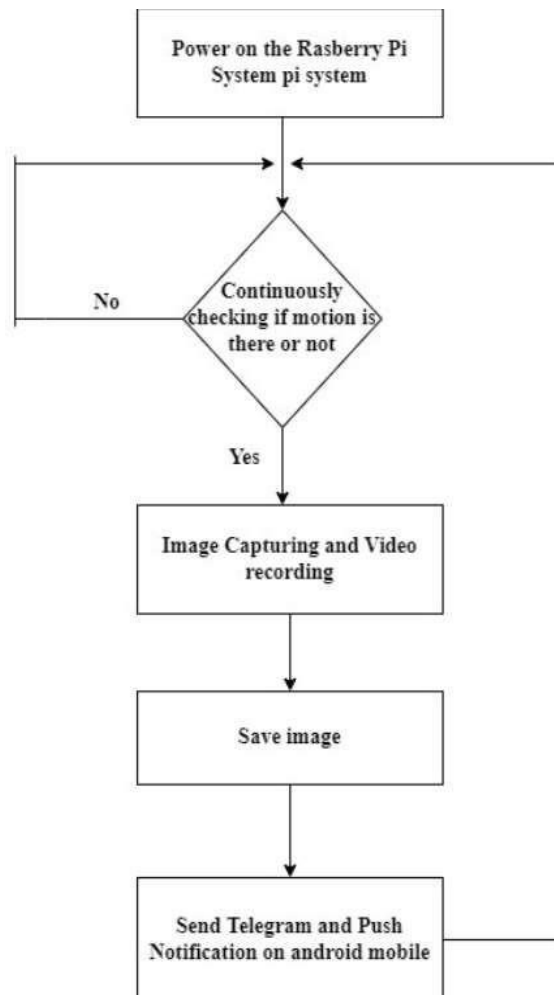


Fig 3.1 Dataflow diagram

The block diagram fig.3.2 shows the connections of different modules through raspberry pi. Raspberry pi will be placed in provided surveillance area, noticing the activities that are connected with components like power supply, PIR sensor, camera module. The monitoring and controlling the area can be done through android application from any part of the world. The system consists of camera module that is used to capture the image from the given surveillance area when an intruder is detected and then sends the notification message to the user through Telegram messenger. The user can view this image anytime in their devices with the help of telegram and on monitor or laptop from stored images.

Camera Module: Using pi camera module version 1, the device captures the image and saved on raspberry pi.

PIR Sensor: The sensor will detect the motion in surveillance area.

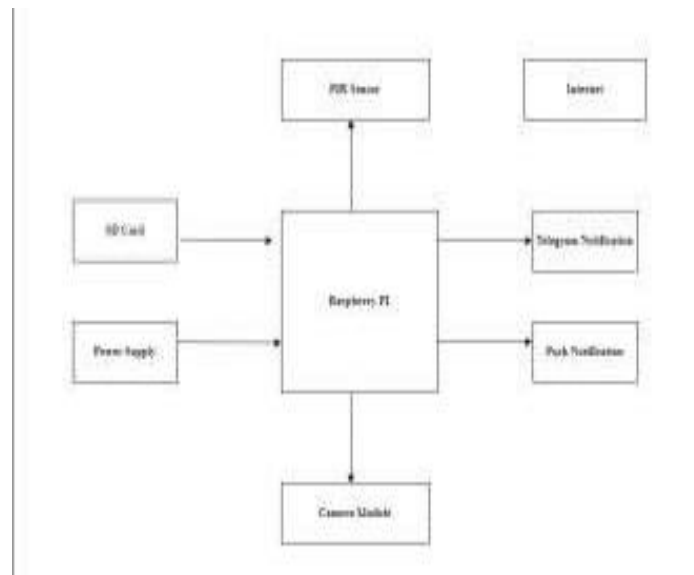


Fig 3.2 Block Diagram

3. CONCLUSIONS

The IoT based motion detection is completed successfully using Raspberry pi and various internet sources. It is dependable and expandable motion detection system that is easy to implement and cost-effective. This makes life of human easy and comfortable. It is possible to operate the system to detect the motion from any part of the world. Smart security systems aim in providing the awareness about the things that happens in our surroundings and help people to protect themselves from possible danger. The solution described in this paper is effective while also being low maintenance and cost-effective. The Raspberry Pi also has the benefits of high scalability.

REFERENCES

- [1] Richardson, M., & Wallace, S. (2012). Getting started with raspberry PI. " O'Reilly Media, Inc."
- [2] Patel, P. B., Choksi, V. M., Jadhav, S., & Potdar, M. B. (2016). Smart motion detection system using raspberry pi. International Journal of Applied Information Systems (IJ AIS), 10(5), 37-40 Abaya,
- [3] Abaya, W. F., Basa, J., Sy, M., Abad, A. C., & Dadios, E. P. (2014, November). Low-cost smart security camera with night vision capability using Raspberry Pi and OpenCV. In 2014 International conference on humanoid, nanotechnology, information technology, communication and control, environment and management (HNICEM) (pp. 1-6). IEEE.
- [4] Prasad, S., Mahalakshmi, P., Sunder, A. J. C., & Swathi, R. (2014). Smart surveillance monitoring system using Raspberry Pi and PIR sensor. Int. J. Comput. Sci. Inf. Technol, 7107-7109.
- [5] Kaur, B., Pateriya, P. K., & Rai, M. K. (2018, April). An illustration of making a home automation system using raspberry Pi and PIR sensor. In 2018 International Conference on Intelligent Circuits and Systems (ICICS) (pp. 439-444). IEEE.
- [6] X. Cai, F.H. Ali, And E. Stipidis, "Mpeg4 Over Local Area Mobile Surveillance System", 2002
- [7] Internet of Things', 2012 Second International Conference on Instrumentation, Measurement, Computer, Communication and Control, 2012.
- [8] Serkan Akbas, Mehmet Akif Efe & Suat Ozdemir "Performance Evaluation of PIR Sensor Deployment in Critical Area Surveillance Networks", 2014 IEEE International Conference on Distributed.
- [9] Kumar, K. K., Natraj, H., & Jacob, T. P. (2017, April). Motion activated security camera using Raspberry Pi. In 2017 International Conference on Communication and Signal Processing (ICCSP) (pp. 1598-1601). IEEE.
- [10] P. Sanjana, J. S. Clement, and S. R., "Smart Surveillance Monitoring System Using Raspberry PI and PIR Sensor.," 2014.