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IoT based Security System using Raspberry Pi

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***Abstract*:- Now a days circumstance, the security frames the most essential segment of our lives. Security of the house or the close what's more, dear ones is critical to everyone. Home computerization was an energizing zone for security applications. This field is improved with new advances such Internet of things (IoT). In IoT, every device carries on a little piece of a web hub and each hub associate and convey. Of late, surveillance cameras are used keeping in mind the end goal to construct security spots, houses, and urban communities. Be that as it may, this innovation needs a person who recognizes any issue in the edge taken from the camera. In this project, an Internet of Things is joined with PC vision so as to identify the characteristics of individuals. For this reason, to execute this framework, a charge card measure PC that uses its own particular camera for the security framework (i.e.) raspberry pi 3 is used. In like manner, Ultrasonic mounted on the Raspberry PI is used to identify any developments. So it gets warning when movement is distinguished, catches the picture and identify the faces. At that point sends pictures to the user by means of using wireless application. IoT in light of wireless application used to see the action and get sees when development is distinguished.**

Keywords: Raspberry Pi, Flooring System, Internet of Things, Security, Sensor, theft, thief, house, camera, IoT.

1. INTRODUCTION

The present situation ensures that the safety and security has become more essential. There is a regressive progress in the security system as the influence of modern technology is reaching its maximum limits. When there is a modern home with minimum human needs, it is said as modern house. Wireless and digital technologies, all together it produces a automated intelligent security system to our home. The automated house security system can be implemented with the surveillance camera and multiple sensors, and the use of these sensors will be defining the characteristics of these sensors. Speed data transmission takes place while using the Wi-Fi to security systems which helps the user to control and monitor the system

The need of video surveillance systems are rapidly increasing in the present day. The things people want to know about their security surveillance system is whether or not they have the ability to connect to it over the internet for remote monitoring. In the past, security surveillance systems had to be viewed by a person who was locked away in a room all day monitoring the systems to make sure that nothing bad happen. The other way was to come back and review the footage but there is chance of damage to the footage.

It can be happened by using Raspberry Pi (Fig 1) and switch sensors to detect the presence of an individual in the absence of the owner. When the motion of the person had been detected the sensor will give an alert message or call to the owner, So that the owner can monitor the footage of the house to detect the individual who entered the house. Advantage of using piezoelectric sensor is, It can withstand high temperature (500°C) comparing to PIR sensor. sensor that is used was small in size and has a rugged construction

2. LITERATURE REVIEW

There are multiple solutions proposed for the security system provided with IoT facilities that have been proposed and invented in the literatures which helps the solid security system improve the quality of service delivery.

Researches in [1] Deepak.S.Kumbhar, H.C.Chaudhari, Shubhangi M.Taur, Shubhangi S.Bhatambrekar make use of the Linux environment – Raspbian OS for implementing the python code. From [2] the feature based Haar cascade face detection classifier algorithm is used for detecting faces, edges and lines. R Gurunath , Mohit Agarwal, Abhrajeet Nandi, Debabrata Samanta from [3] made use of BOT NET to function the controlled IoT devices.

In [4] the transactions on pattern analysis is focussed. Researchers from [5] make use of RFID to sense the signal inputs. Thinagaran Perumal, Chui Y.L, Mohd Anuaruddin Bin Ahmadon, Shingo Yamaguchi from [6] install Naïve Bayes machine learning package for activity recognition purpose. From [7] Piezoelectric RF Resonance voltage is used as amplifier for the IoT devices for reducing power consumption. In [8] Dr. M.L. Ravi Chandra, B. Varun Kumar, B. Sureshbabu propose a smart home system to monitor the surrounding parameters such as temperatures smoke and intensity. Researchers in [9] use PIR sensors for the motion detection purpose. In [10] Dr. M.L. Ravi Chandra, B. Varun Kumar, B. Sureshbabu provides confidentiality by converting the information collected from senors into ciper text.

Fig 1. RASPBERRY PI

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Raspberry pi 3 was the latest version of the raspberry pi computer. The pi wasn't like a typical computer. The size of the raspberry pi is almost equal to the size of the credit-card. One thing to keep in mind is that the Pi by itself was just a bare board.

One must also require a power supply, a monitor or TV, leads to connect to the monitor-typically HDMI, and a mouse and keyboard.

3. PROPOSED WORK

The IoT based Security System using Raspberry Pi system views the entire floor for movement. Once its detects the movement an alert over IoT will be generated. This system is secure which is connected with IoT when we go out of home, the system is to be turned on, then only whoever try to enter inside the house information will be passed over the IoT. This system is powered by Raspberry pi which is included in the security system , Whenever someone enters in the house, and their movement will be immediately sensed by the sensor which passes on the signal to raspberry pi controller. The controller processes the request if it is a valid request and then it turn on the camera which is linked to the controller to the area where motion was detected and then sends it over the Internet for the user to check the footage. Sensors are implemented in the home such a way that they are not visible. These sensors will be linked to the raspberry pi processing unit. When the motion is detected by the sensor it will generate an input signal. Once input signal is generated it will be transmitted to raspberry pi unit and validates the request. Based on the input signal, camera linked to the raspberry pi will capture the video. Video frames is collected from the camera and transmitted to the owner over the internet by using Wi-Fi module.

- Collecting input signal from the sensor to Raspberry pi Controller.
- Generating rotation in the servo motor based on the signal received from the raspberry Pi

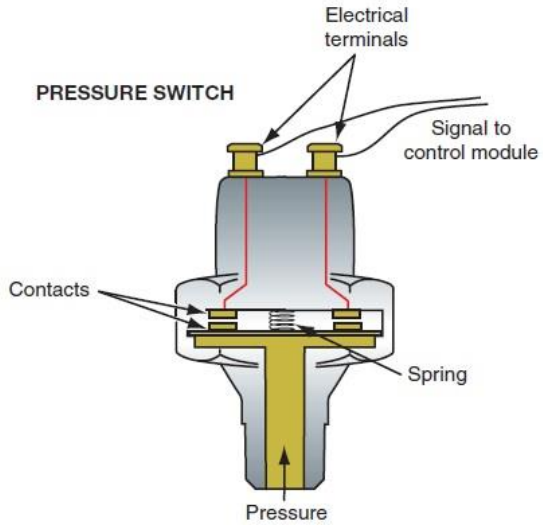

Fig 2. SWITCH SENSOR

- Capturing Video frames and transmitting to the user over network and enabling alarm.

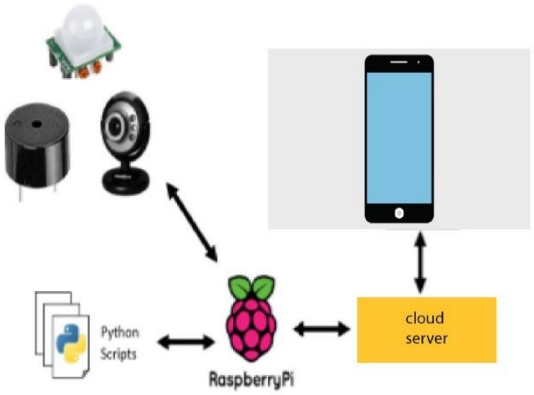

Fig 3. CONSTRUCTION

Once the System receives the signals, the alert about an intruder is sent to the owner's device.

Here, the camera will be recording till the full time interval has been set and it will minimize some video part where there is no motion is available and the remaining contents will save in the memory.

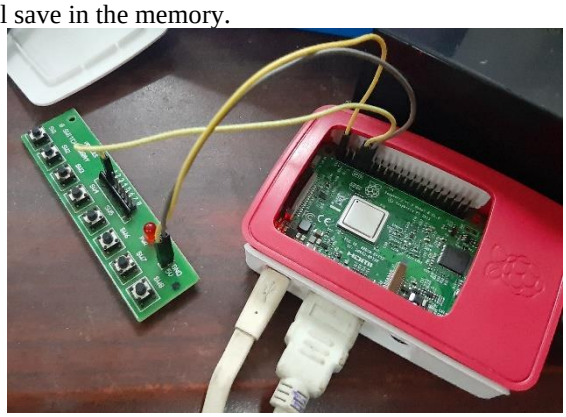

Fig 4. SWITCH WITH RASPBERRY PI

Here is a connection of raspberry pi with the switch sensors with the help of connecting wires.

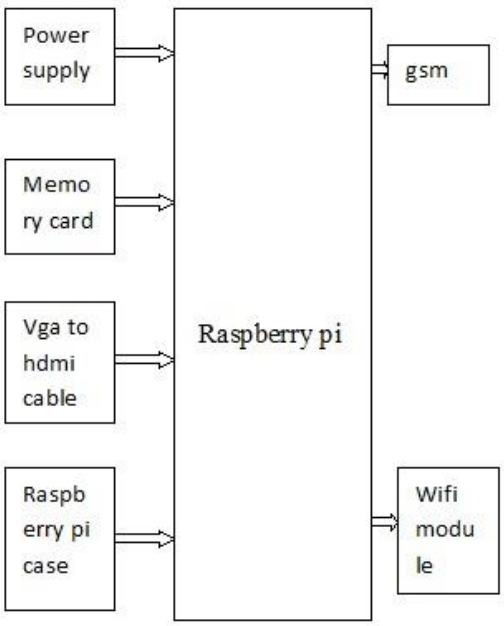

Fig 5. BLOCK DIAGRAM

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4. DRAWBACKS IN EXISTING SYSTEM

- PIR Sensors on walls for motion detection sensors can be avoided by using Infrared (IR) blocking clothes or hiding behind objects.
- It is insensitive to very slow motion of the objects.
- It does not operate greater than 35°C.
- Since PIR sensors sense heat signatures in room, they are not very sensitive if the room itself is warm. Hence PIR sensors not able to detect human beings in the summer in some countries like INDIA.
- It works effectively in LOS (Line of Sight) and will have problems in the corner region.

5. PROPOSED SYSTEM

- In proposed system user can make use of the switch sensor which is placed under the floor tiles. These switch sensors are better in efficiency since they can sense the pressure on the tile. Other such sensors are placed on the walls and faces obstacles.
- The work of sensors (i.e.) PIR sensor and IR sensor which were used in existing system can be done by using the switch sensor.
- It is highly sensitive and can detect even small pressure that is applied on the floor.
- The temperature is not a constrain since switch sensors mainly focus on the pressure.
- The corner regions may not be an issue in case of the switch sensors because the overall pressure on the tile is measured.

This system can widely be used at any places where security is the main concern.

In many aspects the proposed system is efficient and provides accurate. In the Raspberry Pi, we can execute the python script of motion detection and face recognition using OpenCV.

6. DISCUSSION

As considered with the proposed system there exists framework with GSM. In order to executing this framework there exists a major issue which is having system in the mobile also in the framework that work for screen and the security. There comes various issues in the process of video observation framework, that is peculiarities are not recognized naturally and it acts as a considerable measure of the storage rooms which is expected to spare the reconnaissance of data whereas Wirelesss accesss point is an application to the system.

7. RESULT

Internet of things usd in the light of wire application helps to see the action and distinguished development. Computer Vision provides the face detection and is used for recognition of people which is a most fascinating kind of application for the Internet of Things. Computer Vision combinations exhibits greater level of security system in the IoT platform especially for intelligent homes as they have capacities which perceive a person in the incorrect places since the human might be a bad human for environment.

8. SUMMARY

This IoT based smart surveillance system is been developed with aim to design in such a way in which it can fulfil the needs of the user or an organization for particular surveillance area.

The entire system performance can be efficiently measured in terms of the sensor accuracy, Face detection and recognition accuracy.

From the obtained video key frames are being detected using the background subtraction algorithm and created by Singular Value Decomposition in order to obtain the high resolution images.

Face region is performed by segmenting from the key frames by using the Viola Jone's algorithm. Recognition is implemented using the multi key point descriptor.

Future work can be included like additional features with electronic device control, the power management which is a major concern in most systems could be added along with the home automation system. Additional sensors and actuators can also be added to the proposed system.

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