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Smart Eye for Security System

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Abstract: *Nowadays home security systems are among the major areas for research. Here, in this paper we have discussed a method to incorporate PIR sensor with face recognition and verification approach. This concept is about Smart Eye, which describes the design and implementation of sensor camera with facility for verification of captured record. Moreover, this system provides the user with reliable and efficient home security system with warning indicator. This approach may be further utilized to enhance the speed and automation of security issues of home security systems.*

Keywords: *Smart Eye, PIR Sensor, Face Recognition, Home Security, Indicator.*

I. Introduction

In today's time, there is lack of guarantee in each and everything, even security of life. So, the concern of security for humans are at priority for major sections. The tendency of adaptation for security systems are increasing rapidly in day to day life. We may observe that these days crimes rates are increasing exponentially. Although, many people ignore and overlook towards home security measures, but it should be the first step towards security. Any wrong entry inside our house may lead to a great loss. Here, we propose a home security system entitled "SMART EYE" to avoid former issue efficiently.

For home security systems sensors are considered as the most vital component. Moreover, sensors are also considered as the major part of Internet of Things (IoT). Sensors are widely finding applications in various fields of technologies growing today. Normally, sensor is a device that receives the input and hence simulate it further in the form of signals or as input to the next device. Growth in the technology with sensors have enhanced the society to work efficiently and intelligently. These are used in various areas like IoT, Pollution Control, and Medical Science etc. Here, in this paper, we have integrated the concept of PIR sensors in the proposed home security system.

This paper briefly explains about the sensor which we are utilising and connecting to the CCTV Camera. Moreover, it verifies the same through pre-saved photos and then inform about the extruder. This paper is organised in five sections. Starting from Introduction of the work presented in this paper in section I and briefing about the subparts of the system in section II respectively. Section III, deals with the technology used in this system.Further, section IV presents the concept of working of proposed system as a single unit. Section IV describe the conclusion.

II. Subsystems Utilized In Proposed Home Security System

In the proposed home security system following subsystems are utilized:

i. PIR Sensor

PIR (Passive Infrared) sensor senses the movement of any object in the specific range. These sensors are very small in size and inexpensive in cost. It utilizes low-power consumption. They are also referred as "Pyroelectric" or "IR motion" Sensor, as these sensors are made up of Pyroelectric detectors which detects levels of Infrared Radiation. It is divided into two parts. Each part is made up of a special material that is sensitive to infrared. These sensors emit infrared continuously from both ends. Whenever a warm body passes by the first half a positive differential change is measured and as it moves, the same radiation is reflected back. Hence, showing the negative differential change in observed radiation. The change in pulses is reflected in the form of change in signals which in turn is detected by the system. Therefore, the motion of objects are detected through PIR sensors.

ii. CCTV

Surveillance camera plays a major role in this system. It captures the picture as soon as motion is detected through PIR sensor. CCTV provide higher level of security to home. There are different types of camera available in the market like – Dome Camera, Bullet Camera, Day/Night Camera etc. The type of camera which we need for this security system is the day/night camera as we can get the clear image in day as well night. These lenses have special type of lenses that allows infrared emission which when focuses on the body

reflects back and through CMOS chip we can see the clear picture. HDR technology is used for better quality. We should have a camera which has min shutter movement approx. 1/100s, so that it can efficiently freeze the motion for picture capturing. At night as the signals become weak therefore to enhance the quality we should adjust AGC (automatic Gain Control) too which can reduce the noise and hence enhance the picture quality. This can affect the clarity. The hyper focal Distance should also be less so that camera can focus on features such as iris, jawline etc.

iii. Internet Connection

Through 24hrs internet connection we can match and verify the extruder image with the known image record. Therefore a high speed connection is needed for fast verification process.

iv. Bulb

We require a bulb of any watt so that we can use it as the indicator for extruder visit. This bulb will be connected through Surveillance camera which lighten ups as soon as any entry comes to our door and the image is been verified from the records. If the record matches up it gives green light else red.

III. Technology Used

We will use MATLAB software for face detection and its recognition. The software will detect the face and hence track the facial feature. Thus helping in face recognition and its verification. For detection of face in the video we will use vision.CascadeObjectDetector function. Now to track the face we further use KLT algorithm i.e.Kanade-Lucas-Tomasi algorithm. This algorithm tracks a set of feature points from the video following with vision.PointTracker function so s to track the points even if in moving position. Then using those facial points we can compare it with the records that how much is the distance between eyes, mouth, jaw edges, width of the nose etc. The prepared template is then matched with the new sample. Then the system decides for the exact same features. The system usually come to the decision in mere 4-5 seconds.

IV. Working Of Proposed Security System

The whole system works in this manner such that suppose a person comes to our door, so as the PIR sensors radiates a constant infrared radiation in a certain range, then due to change in radiation because of warm body a sensation is ben captured hence any motion is detected. The surveillance camera is permanently capturing video but due to motion the facial recognition system activates and the face is now been recognized the further verified. A bulb will be connected to whole system for the alerting concept. If the face is been matched by the new face outside then a bulb that is connected to the camera turns green, showing that the person outside is known. Else the bulb blows red.

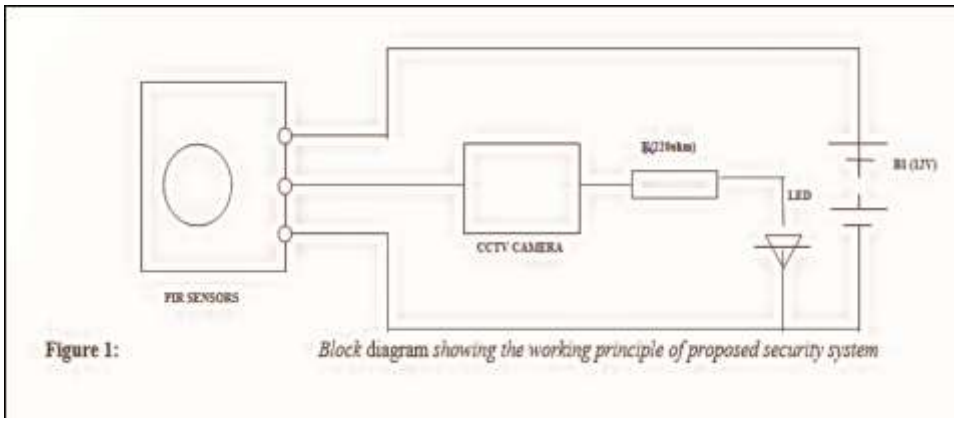

Figure 1: *Block diagram showing the working principle of proposed security system*

V. Conclusion

Security is a key feature to our life existence. These days without security nothing is possible. The situation is so worst that we have to be secure about our lives. Thus, the proposed home security system add a little bit contribution to this world, which ensures the security to our family through PIR sensor. PIR sensors are cheaper sensors as compared to the microwave sensors thus making the whole proposed system as relatable cheap and works great with day as well as dark environment.

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