

Smart Surveillance System Using PIR Sensor Network and GSM

Abstract— Surveillance is most important security systems in home, industrial, office and public places. In this security system is based on the embedded system along with GSM and sensor networks. The human movement is detected using the PIR sensors. In this time, the system triggers an alarm detecting the presence of person in a specific interval of time and simultaneously sends the how many persons are intruder via message to the SMS through GSM Modem. When the security system is activated, the CCTV camera is activated. This highly reactive approach has low computational requirement. Therefore it is well suited for home surveillance system. This surveillance security system implemented using PIC micro controller, camera, gsm and sensors.

Index Terms— PIR Sensor; GSM; PIC microcontroller; Camera.

I. INTRODUCTION

Surveillance is most important field in security system. Surveillance is the monitoring of the behavior, activities, or other changing information, usually of people for the purpose of influencing, managing, directing, or protecting them. surveillance systems are habitually used in home, office, factory or vehicle monitoring and image identification, but this system requires a high performance core, which works against some advantages of embedded systems, such as low power consumption and low cost. Surveillance is very helpful to governments and law execution to maintain social control, recognize and monitor threats, and prevent/investigate criminal activities.

Home/office security systems have grown in popularity in recent years, a home/office owner's look for ways to protect their personal space and enhance their home values. It is necessary for every home owner to considering adding a home security system, as burglaries, thefts and murders have become routine in big cities.

PIR sensor are low cost security system for home applications in which Passive Infrared (PIR) sensor has been implemented to sense the motion of human through the detection of infrared radiation from that human body. PIR device does not emit an infrared radiation but passively accepts incoming infrared radiation. PIR sensor notice the presence of human in the home and generates signal which is read by the microcontroller. According to the signal received by microcontroller, a call is acknowledged to mobile station through a GSM modem and thus alert the presence of human in the home to owner-occupier.

Designed an advanced GSM based electronic security system for home applications using infra red motion detectors and RISC based Micro controller using embedded C language. Infra red motion detectors will sense any intruder with 10 feet and alert the Owner of house or police control room by sending SMS through GSM modem about the intruder.

In section II, existing system are discussed. In section III, proposed system are discussed. In section IV, discuss about hardware specifications. In section V, discuss about conclusion of this project.

II. EXISTING SYSTEM

A. Video Cameras

Security and crime control concerns are the motivating factors for the deployment of video surveillance cameras. Closed-circuit television (CCTV) is the use of video cameras to transmit a signal to a specific place, on a limited set of monitors. This technique just uses the cameras to do surveillance. It needs a command and control center to monitor all the activities using cameras. All the cameras are connected to the command center and send their data directly to the central location. All the activities which are happening in the organization or inside the building can be viewed live from the command center.

III. PROPOSED METHOD

In this proposed system, the home based smart surveillance system which evaluates the development of a very Low-cost security system using PIR (Pyroelectric Infrared) sensors and video cameras built around the PIC(Peripheral Interface Controller) microcontroller. the human movement is detected using the PIR sensors. In this time,the system triggers an alarm detecting the presence of unauthorized person in a specific interval of time and simultaneously sends a message to the SMS through GSM Modem. When the security system is activated, the CCTV camera is activated. This highly reactive approach has low computational requirement. Therefore it is well suited for home surveillance system.

A Pyroelectric Infrared Sensor (PIR sensor) is an electronic sensor,in that type of sensor measures the infrared (IR) light radiating from objects or human in its field of view.the normal sensor emit the radiation but in this sensor detect the radiation .

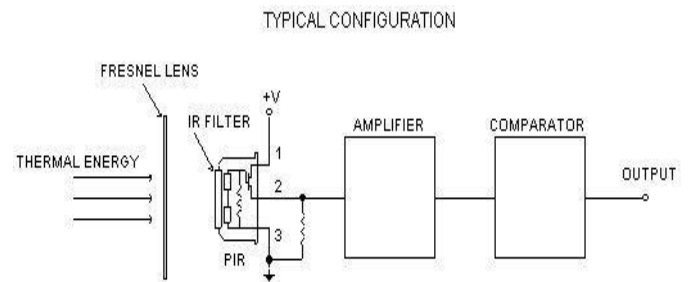


Fig 4.2 Internal structure of PIR

The PIR Sensor has a range of approximately 20 feet (6 meters). The sensor is designed to identify the slowly changing conditions that would happen normally as the daily progresses and the environmental condition changes, but it responds by making its output when sudden changes occur, such as when there is motion. This device is designed mainly for indoor use. Operation outside or in very high temperatures may affect stability negatively. Due to the high sensitivity of PIR sensor device, it is not recommended to use the some condition like rapid environmental changes and strong shock or vibration.and also in not working in direct sun light or direct wind from a heater or air condition.

GSM

The GSM stands for Global System for Mobile Communications. In this technology is used to the communication purpose; it operates at a baud rate of 9600bps in standard UART model through AT Commands. This GSM Modem can accept any of the 2G or 3G network operator SIM card and act like as mobile phone with its unique phone number.

Advantage of using this GSM modem will be that it can use RS232 port to communicate and develop embedded security applications or any other applications.

This modem used to SMS Control, data transfer, remote control and logging can be developed easily. The modem can either be connected to PC serial port directly or microcontroller. It can be mainly used to send and receive SMS or make/receive voice calls. This GSM modem is a highly flexible for plug and play quad band GSM modem for direct and easy integration to applications.

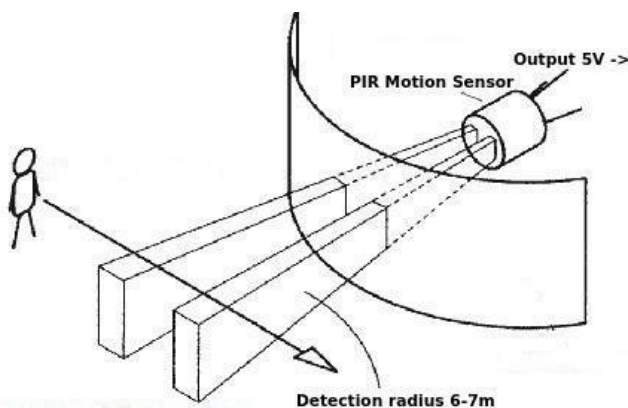


Fig 4.1 PIR Sensor

All the objects with a temperature above absolute zero emit heat energy in the form of radiation. Usually this radiation is not visible by human eye because it radiates at infrared wavelengths, but in this infrared can be detected by electronic devices designed for detecting the human movement.

V. CONCLUSION

In this surveillance security system PIR sensor has been used which is low power, and low cost. It have a wide lens range, and are easy to interface with microcontroller. This security system can be implemented in places like home, office, shop etc. The sensitivity range for detecting motion of this system is 3to 4 feet. It can be raised up to 20 feet through careful using the concentrating optical lenses as future development. In addition to this, this system can be equipped with glass break detectors to enhance the level of protection.

Use of multi-sensor data fusion and complex algorithm can be used to increase the effective FOV for larger spaces. In order to enhance the location accuracy and to enhance the method of processing the PIR sensor signal, use of more advanced techniques such as probabilistic theories.

