Surveillance System using PIR Sensor

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Abstract— Here we design and implement a surveillance system using PIR sensors. PIR sensor has receiver of human presence. This PIR sensor is fitted on a motor with camera. The aim of this project is to develop & implement an affordable low cost digital camera based surveillance system for remote security monitoring. User can access to their monitoring system remotely via RF receiver module. This surveillance system consists of PIR sensors and digital camera that attached a rotating platform which can rotate in desired angle. When intruder detected by PIR sensor, the camera will start the record the image & GSM module inform to monitoring person about security alert via SMS & short missed call and then monitoring person can easily view movement of intruder on its TV screen or laptop.

Key words: Surveillance, GSM Module, Microcontroller 89552, PIR, LCD

I. INTRODUCTION

A. What is Surveillance?

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. This can include observation from a distance by means of electronic equipment (such as CCTV cameras), or interception of electronically transmitted information (such as Internet traffic or phone calls) and it can include simple, relatively no- or low-technology methods such as human intelligence agents and postal interception. The word surveillance comes from a French phrase for “watching over” (“sur” means “from above” and “veiller” means “to watch”), and is in contrast to more recent developments such as sousveillance.

Surveillance is used by governments for intelligence gathering, the prevention of crime, the protection of a process, person, group or object, or for the investigation of crime. It is also used by criminal organizations to plan and commit crimes such as robbery and kidnapping, by businesses to gather intelligence, and by private investigators.

B. Need of surveillance

− Public Safety:—Surveillance cameras can be used to keep an eye out for any crimes that are in progress or that can be stopped before they even start. If a suspicious person or item is in the area, the proper authorities can be informed before any crime can be committed or damage can be done. In addition, the area can be cleared of any people as a precautionary measure.

− Can Help Catch a Criminal:—If a crime is committed and there is a surveillance camera, there is a good chance that the authorities will be able to get a viable image of the criminal. The camera footage can be used to put the image on posters and aired on television where someone might be able to recognize who the person is. Without the surveillance camera, it may be more difficult to get a detailed description of the perpetrator. Sense of Security For some people, knowing that surveillance cameras are in certain areas can help create a sense of security. No one wants to fear having to go into an area or feel as though she is not safe. Some may believe that there may be less of a chance that a crime will be committed if there are cameras in the area watching over them.

− Crime Prevention:—Some businesses and authorities may place cameras in areas in hope that it will prevent crimes from being committed in the first place. If a person knows that there is a surveillance camera in a specific area, he may be less willing to commit a crime at that location for fear of being caught. Some cities are even putting, or have already put, surveillance cameras on stoplights in hopes that it will prevent people from speeding or committing other traffic offenses.

− Evidence:—In court, the footage from the surveillance camera that captured a crime can be used as evidence against the accused. Without the footage, there may be little to no evidence to go on and the criminal could go free. In some cases, the footage may also help prove the innocence of someone who was accused of a crime, but did not commit it.

II. SYSTEM ARCHITECTURE

Block diagram of proposed system is shown in Fig.1.
A. Block Diagram Description

Following figure 1 is a block diagram of our project. In this project we designed microcontroller based surveillance system using sensor. First Micro Controller kit is used to switch ON/OFF second kit. This kit is designed to switch off the main system whenever any authorised person enters in the prohibited area. In this project, we used a wireless camera to capture the video of intruder also PIR sensor which is main component of our system which is used to detect the intruder. This PIR sensor is placed on rotating platform (motor) with camera in the direction towards where intruder has chances to enter in the restricted area.

Other important component is motor which DC motor is used to varying camera and PIR sensors which is placed on a motor. By using programming in 89S52 we rotate motor in 180. GSM module is extra important block of system which is used to inform monitoring person about a intruder is detected. When intruder is detected system gets activated and sends SMS of alert in addition call to a monitoring person. Due to this facility no need to monitor continuously on a TV screen and at the moment security also can take proper action. Here we use two Micro Controller Kit. One for drive camera, motor and GSM module & second for to ON/OFF first kit.

III. HARDWARE IMPLEMENTATION

A. PIR Sensor

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in detectors. All objects with a temperature above absolute zero emit heat energy in the form of radiation. Usually this radiation is invisible to the human eye because it radiates at infrared wavelengths, but it can be detected by electronic devices designed for such a purpose. The term passive in this instance refers to the fact that PIR devices do not generate or radiate any energy for detection purposes. They work entirely by detecting the energy given off by other objects. PIR sensors don’t detect or measure “heat”; instead they detect the infrared radiation emitted or reflected from an object. Here we used PIR sensor for detecting human being.

B. GSM Module

GSM (Global System for Mobile) / GPRS (General Packet Radio Service) TTL –Modems SIM900 Quad-band GSM / GPRS device, works on frequencies 850 MHZ, 900 MHZ, 1800MHZ and 1900 MHZ. It is very compact in size and easy to use as plug in GSM Modem. The Modem is designed with 3V3 and 5V DC TTL interfacing circuitry, which allows User to directly interface with 5V Microcontrollers (PIC, AVR, Arduino, 8051, etc.) as well as 3V3Microcontrollers (ARM, ARM Cortex XX, etc.). The baud rate can be configurable from 9600-115200 bps through AT (Attention) commands. This GSM/GPRS TTL Modem has internal TCP/IP stack to enable User to connect with internet through GPRS feature. It is suitable for SMS as well as DATA transfer application in mobile phone to mobile phone interface. The modem can be interfaced with a Microcontroller using USART (Universal Synchronous Asynchronous Receiver and Transmitter) feature (serial communication).

IV. SOFTWARE DESIGN

Our surveillance system is running on a micro controller based system. In this system two micro controllers are used, in which one used for controlling second kit of micro controller & this kit can be activated using only by password. First we entered a password to activate a system. When a system gets activated it rotates a motor & camera in desired angle. PIR sensor also attached with motor.

When an intruder enters in prohibited area PIR sensors sense it presence & stops motor & activated a camera at a same time by using GSM module security alerts are sends on a authorised person mobile in the type of SMS & short missed call.
A. Security Alerts on Mobile Phone
If any intruder entered in surveillance prohibited area then GSM module sends a SMS and short missed call on cell phone off a monitoring person for security Alerts.

V. RESULT & DISCUSSIONS

B. Output Image/Video on a T.V./Computer

VI. CONCLUSION
Our system shows the improvements in CCTV monitoring system by using PIR sensors & GSM module. By using GSM module extra high tech security is provided. It also reduced the human efforts to watching or monitoring continuously to TV screen.

REFERENCES


