

Implementation of Surveillance Monitoring System

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Abstract: This paper is a review on Implementation of Surveillance Monitoring System based on embedded system and PIR sensor modules. The aim of this work is implement a low cost surveillance system using the serial camera using a desktop programming. Matlab is used to for detection of number of person and GSM module is used to provide necessary information to the owner via SMS. When intruders are detected by ultrasonic sensors, the camera will start & captures the images and save it into memory storage. After saving images, these images will send on the processing unit which provides the information about the number of person. PIR module has made the system more reliable.

Keywords: Embedded System, Matlab, GSM module, PIR sensor module.

I. INTRODUCTION

Monitoring facilities are necessary and useful for our day to day life. From elementary schools to several companies, some kinds of surveillance systems have introduced in order to keep their security. People have the inclination to need higher-performance surveillance system with lower cost. Security cameras and sensors are widely employed in the several areas and public environments. So almost all users want to utilize them and obtain useful information including video for efficient determination as well as our risk aversion. A remote surveillance system is already developed to perform remote monitoring and remote controlling services for not only system reliability and maintenance but also security improvement [1].

Robotic systems are becoming smaller, lower power, cheaper, enabling their application in areas previously impossible and this is also true of the vision system. There are many relatively simple computer algorithms which have been proved to be extremely useful in a variety of applications. However, the hardware to implement them is usually complex and expensive. [2]

In the past, computational barriers have limited the complexity of real-time video processing applications. As a consequence, most systems were either too slow to be practical, or succeeded by restricting themselves to very controlled situations.

Recently, faster computers have enabled researchers to consider more complex, robust models for real-time analysis of streaming data. These new methods allow researchers to begin modeling real world processes under varying conditions. [3]

Lately the use of a surveillance system for image detection is becoming more important. An embedded surveillance system is frequently used in the home, office or factory for image processing of the surveillance system, and also for traffic monitoring, but this configuration requires a high performance core, which works against some advantages of embedded systems, such as low power consumption and low cost. [4]

II. PROPOSED WORK

A. Scope of Work:

A surveillance system based on microcontroller and sensors provides more security than existing system, but the system available in will required continuous monitoring and tracking which will be not affordable and not required in some cases, so the system presented in this synopsis will help to reduce the cost of surveillance also it will not require the continuous tracing. The sensor system will help to indicate the presence and it will conveyed the message to the owner, also helps to keep the record by saving it to PC.

B. Methodology:

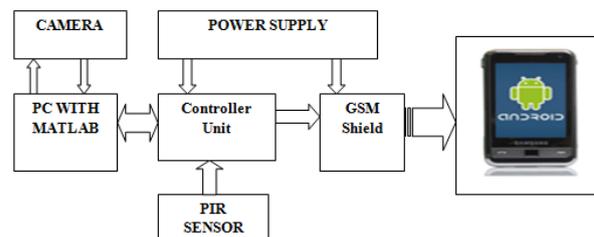


Figure 1: Block Diagram of Proposed System

The system will works in following steps

- PIR sensor scenes the human presence in the restricted area and send a control signal to microcontroller, controller will automatically turn on the camera.
- Camera will capture the motion and saved it to PC for further Processing.
- PC with the help of MATLAB Program counts the number of persons and sends an SMS to owner.

III. DESCRIPTION OF BLOCKS

A. Power Supply:

Power Supply design for the system to provide 5v fixed DC power to it. 230v AC input is applied to that voltage is step down to 15v by the step down transformer. The output of that is fed to the rectifier circuit then it is passed through

the constant supply voltage regulator. The regulator is design in such a way if there is change in input but also the output will get constant 5v and another source is 12V DC.

B. PIR sensor:

Detection range of PIR sensor is up to 20 feet away, it will having Single bit output Jumper selects single or continuous trigger output mode, Its a 3-pin SIP header ready for breadboard or through hole project, Small size of sensor makes it easy to conceal Compatible with BASIC Stamp, Propeller, and many other microcontrollers. Power requirements of sensor are 3.3 to 5 VDC. The PIR (Passive Infra-Red) Sensor is a pyroelectric device that detects motion by measuring changes in the infrared (heat) levels emitted by surrounding objects. This motion can be detected by checking for a sudden change in the surrounding IR patterns. When motion is detected the PIR sensor outputs a high signal on its output pin. This logic signal can be read by a microcontroller or used to drive a transistor to switch a higher current load.

C. GSM Module:

This is a plug and play GSM Modem with a simple to interface serial interface. Use it to send SMS and do other GSM operations by controlling it through simple AT commands from micro controllers and computers. It uses the highly popular SIM900 module for all its operations. It comes with a standard RS232 interface which can be used to easily interface the modem to micro controllers and computers. The modem consists of all the required external circuitry required to start experimenting with the SIM900 module like the power regulation, external antenna, SIM Holder, etc.

D. Atmega328:

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform.

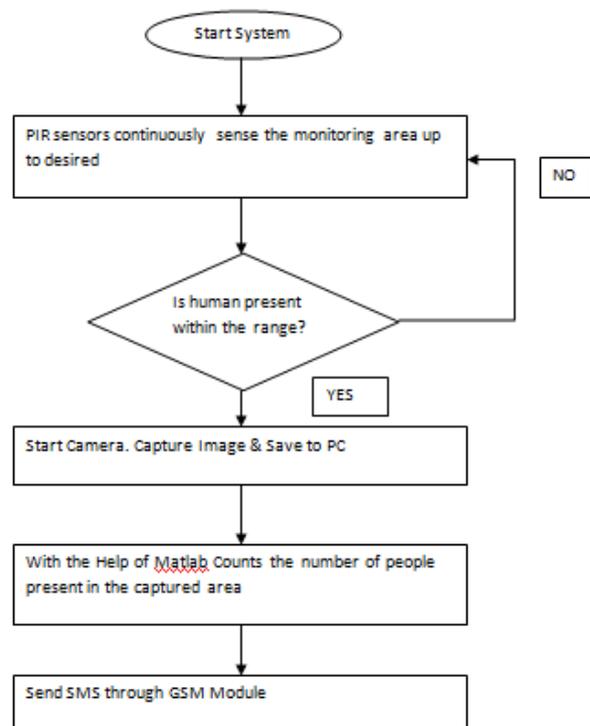
E. WEB Camera & PC:

A camera module with Lens is used to capture the motion in that area, this will be saved in SD card and also given to the computer in which by using the processing it will detect the number of person present in that particular area.

IV. FLOW CHART

A. Transmitter:

Transmitter part consists of PIR sensor module, Arudunio Board, Serial Camera, and PC for Matlab Programming.



As soon as the PIR sensor senses the human presence it gives the signal to controller and controller stars the camera to capture the video after processing through matlab it will detect the number of persons. And an SMS is send on owners mobile.

B. Receiver:



Receiver part consists of Mobile which is used to receive the SMS from the transmitter section; this is at the owner side.

V. CONCLUSION

The surveillence personnel must watch the monitors at a fixed spot at all time and are unable to perform remote, multi-point surveillence. Conventional surveillence system records the images directly and is unable to categorize and manage the graphic information, which makes subsequent retrieval and tracking difficult. Due to the considerable manpower, the conventional surveillence systems incur higher costs and are subject to human errors. To all these disadvantages proposed system provides Video evidence i.e. High-resolution footage and sound recordings let you capture everything that happens on your property. Recorded footage of a theft or vandalism should be enough to validate your insurance claim. Also there is no need to monitor area personally.

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