INTRUSION DETECTION SYSTEM (IDS) BY USING PIR SENSOR AND GSM

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Abstract

Network security involves authorization entry to data in the network which is controlled by the network administrator. Intrusion detection system (IDS) is a network security technology for computers and networks. An IDS gathers and analyzes information from various areas within a computer or a network to identify possible security attacks, which include both intrusions (attacks from outside the organization) and misuse (from within the organization). The main goal of intrusion detection system is to identify normal and abnormal behavior of an intruder.

Keywords: Arduino, Global system for mobile communication (GSM), PIR sensor, OV7670 camera, Intrusion detection system.

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1. INTRODUCTION

In this era, especially on the Internet during searching, chatting, banking, travel, steaming etc. The risk of attacks is increased. These attacks usually damage our data. So there is a need to secure our data for that purpose security mechanism is developed to avoid unauthorized access in our secured area. Intrusion Detection System (IDS) is used to detect the attacks with the help of an intruder behavior. The intruder is a person who tries to enter in our legal area. The Intrusion detection system is a tool which is used to detect illegal access to our system. The intrusion detection system is a process of finding an intrusion into a system by observing the behavior of intruder and monitoring the activities of an intruder.

2. HARDWARE DESIGN AND INTERFACING

2.1 Arduino

Arduino is known to be flexible environment which is open source play computing platform depends on I/O board as well based on development environment for writing code. It has a variety of inputs that is digital and analog pins, serial interface, SPI and PWM outputs. The USB cable is used to make communication between Arduino and computer. The Arduino have transmit and receive data pins via a serial communication takes place.
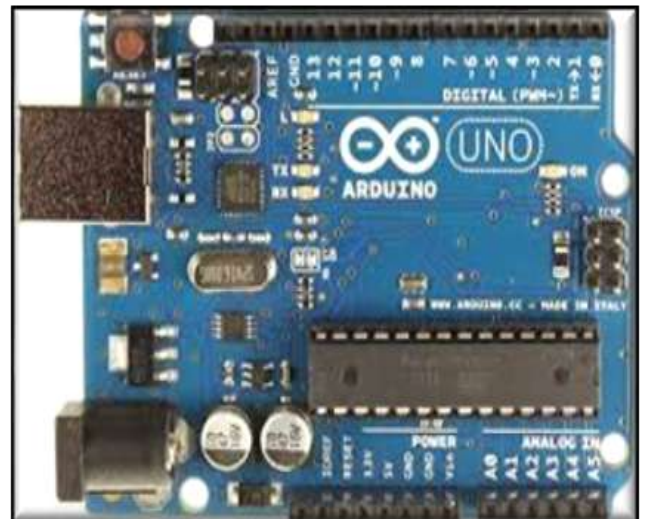

Fig 1: Arduino uno board

2.2 PIR Sensor

PIR is a Passive Infrared Sensor is used to detect the motion of objects like an animal, human being etc. PIR is also known as a pyroelectric sensor which also measures an Infrared light radiating from object. PIR detects the motion on the basis of change in temperature and surface characteristics of objects in front of a sensor.
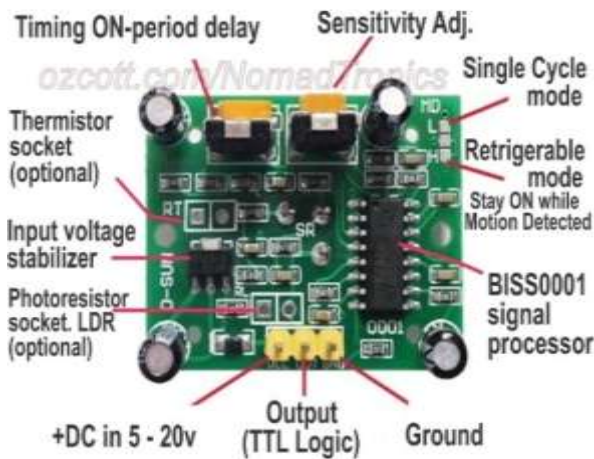
Fig 2(a): PIR sensor


Fig 2(b): PIR sensor

2.3 GSM Module

GSM is a Global system for mobile communication which can be known as Digital telephony system. To make communication between GSM and computer the GSM/GPRS module is used. GSM modem can be used with Serial, Bluetooth or USB connection. The frequencies of GSM modem is 900/1800 MHz For interfacing of PC and GSM modem RS 232 cable is used. The baud rate required for GSM is from 9600-115200.

Fig 3: GSM module

2.3 OV7670 Camera

The OV7670 is a image sensing camera module. It is also a small image sensor module. It works on a low operating voltage. It provides all functions of a single chip of a VGA camera and image processing.
Specifications: Photo sensitive array: 640 X 480
I/O voltage: 2.5-3.0V
Optical size: 1/6
Pixel size: 3.6 um X 3.6 um

Fig 4: OV7670 camera module

3. PROPOSED METHODOLOGY

The Arduino based intrusion detection system by using PIR sensor and GSM, in this PIR sensor senses motion of intruder and controller reads the signal from a sensor and if an intruder is detected turns on the sensor and send the

message to a mobile number through a GSM modem and also it makes a call to predefined mobile number. Whenever you are busy you cannot see the message because of that we are making the calling facility. At the same time controller turns on the camera to capture the image of an intruder and the image is stored in SD card.

In this proposed system the human intrusion is detected by using PIR sensor, GSM and Camera module. In this the electronic board Arduino is used. On that Arduino board, we are mounting the Ethernet shield to provide the Internet. Here camera module is interfaced with Ethernet and Ethernet has inbuilt SD card. The captured image is automatically stored in SD card. So the stored image of intruder can be seen by authorized person.
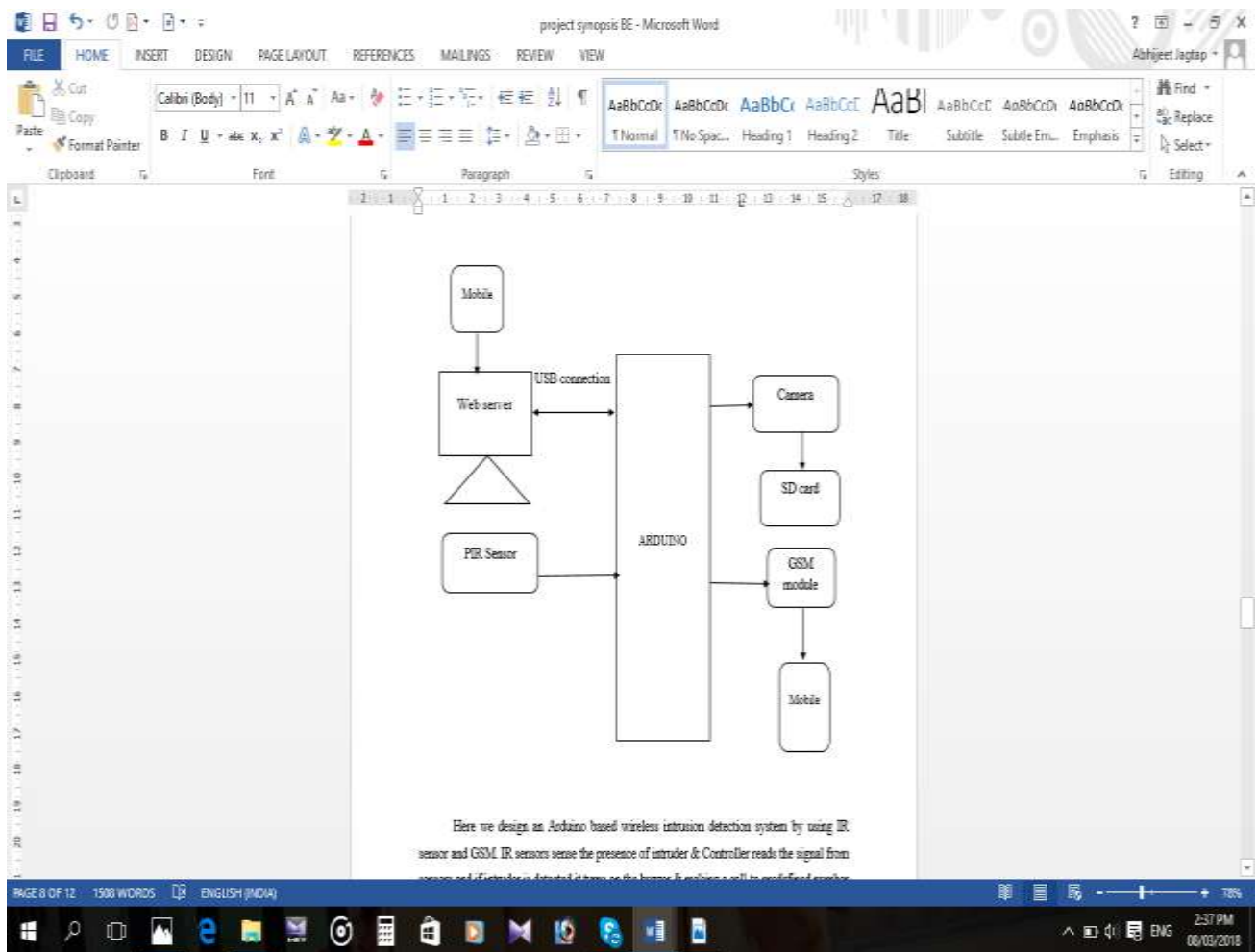
Fig 5: Block diagram proposed intrusion detection system
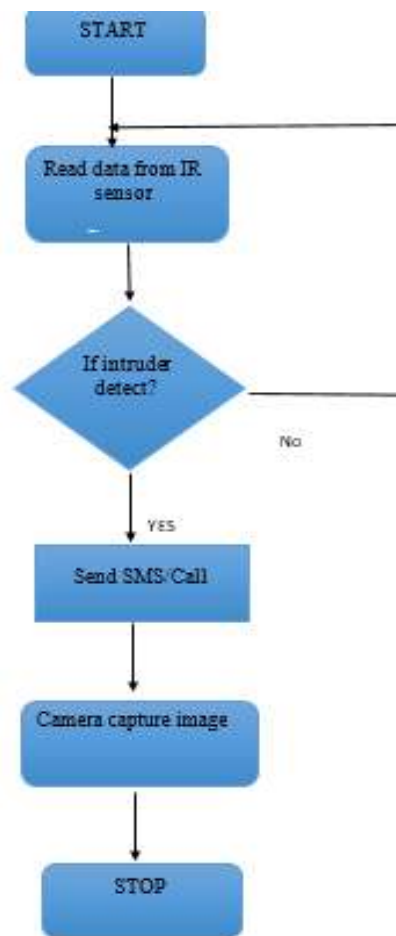
Fig 6: Flowchart of Intrusion detection system

In above figure (6), the PIR sensor senses the physical signal and it convert it into electrical signal. If the intruder is detected then it send SMS/call to on a predefined mobile number and at the same time image is captured by camera and that image is stored in SD card. If the intruder is not detected it will continue the same process.

4. RESULT ANALYSIS

A cost effective system that informs the authorized person of an unauthorized intrusion by making a call no matter where the person is, except the person is in the region where there is no network coverage at the time of intrusion.

5. CONCLUSION

At the time of working hours authorized person can enter into the secured area, but at the time of non-working period unauthorized person may enter in our area, so that to prevent our authorized area form unauthorized human intruder intrusion detection system is useful.

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