

Home Security System Using Arduino Nano and GSM Modem With Pir Sensor

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Abstract

This project is initiated by the inception of an idea which not only aims at using the product but also study in depth about existing and proposed systems in the same category. A proposal is taken, which is far better from the existing system.

Devices required

GSM modem sim900A; Arduino nano; breadboard; PIR sensor; connecting wires; transmitter; receiver; normal sim card 4G.

Existing system

IR security alarm circuit can detect any movement and trigger the alarm. This circuit is very useful in homes, banks, shops, restricted areas where an alert alarm is needed on any movement. This circuit is based on PIR sensor where an IR beam is continuously falling on a photodiode, and whenever this infrared beam breaks, by any kind of movement, alarm is triggered. PIR sensor consist an IR LED and photodiode, in which IR LED emits IR radiation and photodiode detects the radiation.

Disadvantages of existing system

The existing system contains IR light that is invisible while laser is visible. The thief may get alert on seeing the laser. Whenever someone moves through this beam, IR rays stops falling on photodiode and buzzer starts beeping. Beeping sound can alert the thief and create a mess around the surroundings. Beeping is the disadvantage of the existing system.

Proposed system

The system is composed of the microcontroller based wireless sensor network center node with GSM module, data collecting node, device control node and mobile phone. The wireless sensor network data collecting node module is connected with infrared detector. When the IR finds that some people intrudes into the house, the data collecting node will send encoded alarm signal to the wireless sensor network center node through the wireless sensor network established in home. Once the wireless sensor network center node receives alarm signal, it will send alarm short message to the users through the GSM module and GSM network immediately.

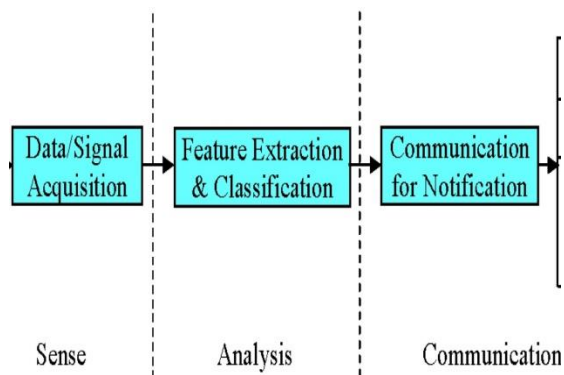
Advantages of proposed system

The benefit of using PIR (PASSIVE INFRARED) sensor is that PIR light is invisible while laser is also INVISIBLE AND SLOWLY RECEIVE THE SIGNAL. When the thief crosses the IR sensor, without the knowledge of the thief, silently the message will be passed to the owner's mobile with the help of GSM sim. GSM sim is not like other sim cards. It works on the basis of GPRS hence the owner will receive the message wherever he/she is.

Modules

- Detecting
- Sensing
- Analyzing
- Communication

Schematic diagram



Module 1

Detecting

PIR sensors would detect if the person is entering from outside to inside. Also, when the person is going out from inside to outside with the help of arduino nano.

Sensing

When a person intrudes the sensor, the emitter PIR sensors falls on the person. And the receiver gets the signal and slowly.

Analyzing

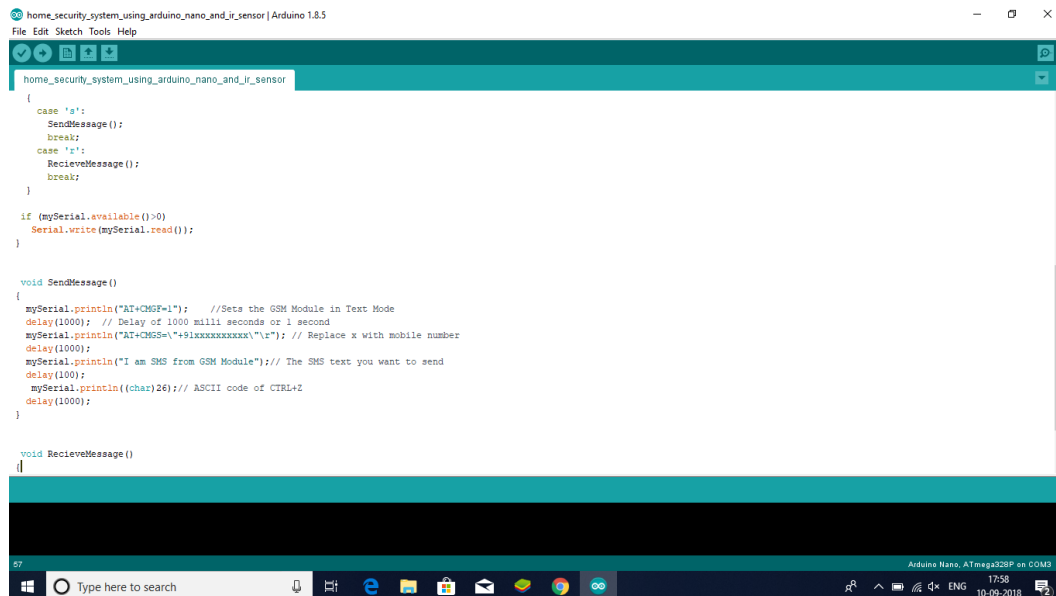
According to the pulse received by microcontroller, a message is sent to mobile through a GSM modem and thus warns the presence of human in the home to owner-occupier. On the other hand this security system remains in idle position and performs nothing if no one is in the home.

Communication

GSM SIM 900A as we said before it is not like other sim card ,it works with the help of GPRS, which is enabled in mobile phones, thus there is no need for network connection. With a tiny configuration of 24mm x24mm x 3mm, sim900a can fit almost all the space requirement in your application, such as smart phone, pda phone and other mobile device.

Source code

Embedded C language is used.



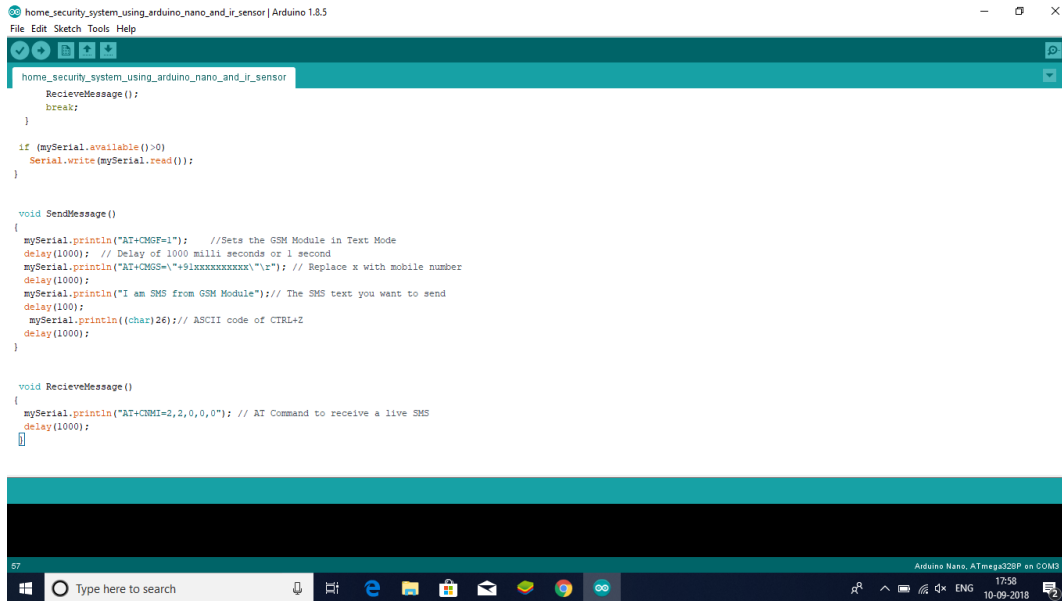
```
home_security_system_using_arduino_nano_and_ir_sensor | Arduino 1.8.5
File Edit Sketch Tools Help

home_security_system_using_arduino_nano_and_ir_sensor
{
  case 'a':
    SendMessage();
    break;
  case 'r':
    RecieveMessage();
    break;
}

if (mySerial.available()>0)
  Serial.write(mySerial.read());
}

void SendMessage()
{
  mySerial.println("AT+CMGF=1"); //Sets the GSM Module in Text Mode
  delay(1000); // Delay of 1000 milll seconds or 1 second
  mySerial.println("AT+CMGS="+91xxxxxxxxx"\r"); // Replace x with mobile number
  delay(1000);
  mySerial.println("I am SMS from GSM Module");// The SMS text you want to send
  delay(100);
  mySerial.println((char)26);// ASCII code of CTRL+Z
  delay(1000);
}

void RecieveMessage()
{
}
```

A screenshot of the Arduino IDE software interface. The title bar reads 'home_security_system_using_arduino_nano_and_ir_sensor | Arduino 1.8.5'. The menu bar includes 'File', 'Edit', 'Sketch', 'Tools', and 'Help'. The main workspace shows a C++ sketch with the following code:

```
home_security_system_using_arduino_nano_and_ir_sensor
  RecieveMessage();
  break;
}

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  delay(1000);
  mySerial.println((char)26);// ASCII code of CTRL+Z
  delay(1000);
}

void RecieveMessage()
{
  mySerial.println("AT+CMHI=2,2,0,0,0"); // AT Command to receive a live SMS
  delay(1000);
}
```

The bottom of the window shows the Windows taskbar with the search bar, taskbar icons, and system tray showing the time as 17:58 on 10-09-2018.

Conclusion

From this project we conclude that an approach is taken to control theft with the help of various devices and the user was informed about the entry of the person through a SMS sent by the modem at the receiver.