GSM Based Home Security Using Arduino

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Abstract- *Conventional security systems which are the common form of protection to lives and properties ,have certain limitations such as real time monitoring and control of activities such as intruders in the form of human beings, fire, smoke, etc. These limitations in most cases result in high financial loss to properties and lives. This work involves design and construction of GSM intelligent home security system for real time monitoring of intruders. It consists of intrusion detection sensors,(pressure, Smoke/Fire, Gas and PIR motion), wireless sensors, programmable microcontroller regulated power supply unit, GSM modem, mobile phone, data acquisition node and an interface program development. When the PIR finds intruders (in form of variation in temperature, gas leakage, pressure, etc.) the relevant sensing device respond and the microcontroller sends encoded alarm signal to the wireless sensor network established in home. The moment the alarm signal is received, it will send short message to the users (owners of the building) through GSM network immediately.*

I. LITERATURE REVIEW

"The system designed for Home observance and Security system consists of sensors that are meant to collect the information that may be employed by the owner to create sensible choices. Passive Infrared Sensor (PIR) is employed to find the motion and therefore the temperature sensing element is employed to find the temperature of the space. Numerous modules specifically the PIR module, temperature module and therefore the GSM module communicate with one another to coordinate and increase the safety of the system. In this, the PIR sensing element and therefore the Temperature sensing element are connected to the Arduino board. The digital signal is distributed to the board. The GSM module is employed to send and receive signal from the Arduino board.The received signal is distributed to the house owner through a text message via GSM module's path. If the owner needs to modify off the alarm, he sends an indication to the GSM module. The GSM module can send the signal to the Arduino board. The Arduino board converts this signal into the sensing element comprehendible format and sends it to the sensors. The sensors are transitioned in real time. the most element is that

the Arduino board. The motion detection, temperature sensing element and GSM's code is burned within the Arduino chip. On activating the system, the SMS is straight away sent to the house owner. the required signaling is embedded within the GSM module.

CONSTRUCTION

The logic of this system is very simple. In this system, the PIR Motion Detection Sensor Detect the motion and Send the action to the Arduino and Arduino send the instruction to the GSM SIM800L Module to send the message to the phone no. which entered in program and it send message to the home owner's phone which is entered in program.
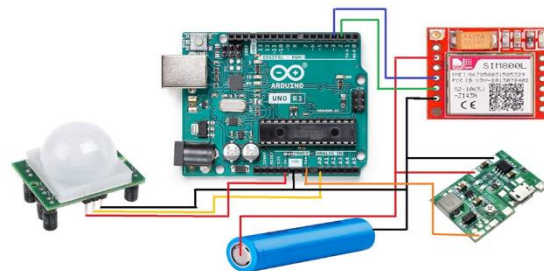
1.1 ARDUINO UNO

The Arduino UNO is a standard board of Arduino. Here UNO means 'one' in Italian. It was named as UNO to label the first release of Arduino Software. It was also the first USB board released by Arduino. It is considered as the powerful board used in various projects. Arduino.cc developed the Arduino UNO board.

Arduino UNO is based on an ATmega328P microcontroller. It is easy to use compared to other boards, such as the Arduino Mega board, etc. The board consists of digital and analog Input/Output pins (I/O), shields, and other circuits.

The Arduino UNO includes 6 analog pin inputs, 14 digital pins, a USB connector, a power jack, and an ICSP (In-Circuit Serial Programming) header. It is programmed based

on IDE, which stands for Integrated Development Environment. It can run on both online and offline platforms

Figure 1.1: Arduino Uno

1.2 PIR MOTION SENSOR:

PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are small, inexpensive, low-power, easy to use and don't wear out. For thatreasonthey are commonly found in appliances and gadgets used in homes or businesses. They are often referred to as PIR, "Passive Infrared", "Pyroelectric",or "IR motion" sensors.

PIRs are basically made of a pyroelectric sensor (which you can see below as the round metal can with a rectangular crystal in the center), which can detect levels of infrared radiation. Everything emits some lowlevel radiation, and the hotter something is, the more radiation is emitted. The sensor in a motion detector is actually split in two halves. The reason for that is that we are looking to detect motion (change) not average IR levels. The two halves are wired up so that they cancel each other out. If one half sees more or less IR radiation than the other, the output will swing high or low

- **Size:** Rectangular
- **Price:** $10.00 at the Adafruit shop
- **Output:** Digital pulse high (3V) when triggered (motion detected) digital low when idle (no motion detected). Pulse lengths are determined by resistors and capacitors on the PCB and differ from sensor to sensor.
- **Sensitivity range:** up to 20 feet (6 meters) 110° x 70° detection range
- **Power supply:** 5V-12V input voltage for most modules (they have a 3.3V regulator), but 5V is ideal in case the regulator has different specs
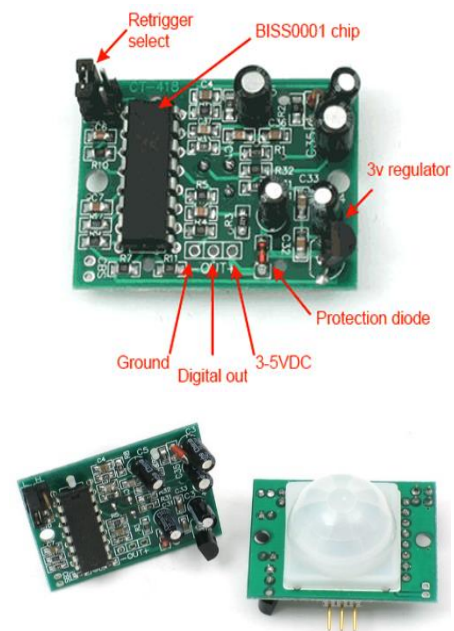

Figure 1.2: PIR Motion Sensor

1.3 SIM 800L Module :

The SIM800L GSM/GPRS module is a miniature GSM modem that can be used in a variety of IoT projects. You can use this module to do almost anything a normal cell phone can do, such as sending SMS messages, making phone calls, connecting to the Internet via GPRS, and much more.

All the necessary data pins of the SIM800L GSM chip are broken out to a 0.1″ pitch headers, including the pins required for communication with the microcontroller over the UART. The module supports baud rates ranging from 1200 bps to 115200 bps and features automatic baud rate detection.

The module requires an external antenna in order to connect to the network. So the module usually comes with a helical antenna that can be soldered to it. The board also has a U.FL connector If you wish to keep the antenna at a distance from the board.
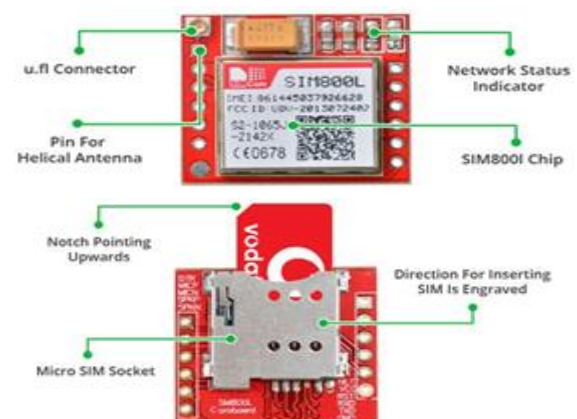

Figure 1.3: GSM SIM800L Module

1.4BATTERY 9V

A 9V battery is a type of primary (non-rechargeable) battery that provides a nominal voltage of 9 volts. It is commonly used in portable devices such as smoke detectors, remote controls, and small electronic toys. 9V batteries are also used in some low-power projects such as small robots and simple electronic circuits.


Figure 1.4: Battery 9V

SOURCE CODE:

```
#include <SoftwareSerial.h>
SoftwareSerialsim800l(2, 3);
#define Motion_Sensor A0
boolSensor_State; //Sensor_State
void setup()
{
pinMode(Motion_Sensor, INPUT);
sim800l.begin(9600);
Serial.begin(9600);
delay(1000);
}
void loop(
{
//SendSMS();
Sensor_State = digitalRead(Motion_Sensor);
if (Sensor_State == HIGH) {
Serial.println("Sensor detect motion");
delay(200);
SendSMS();
delay(4000);
 }
else{
Serial.println(".");
 }
if (sim800l.available())
{
Serial.write(sim800l.read());
}
}
voidSendSMS()
{
```
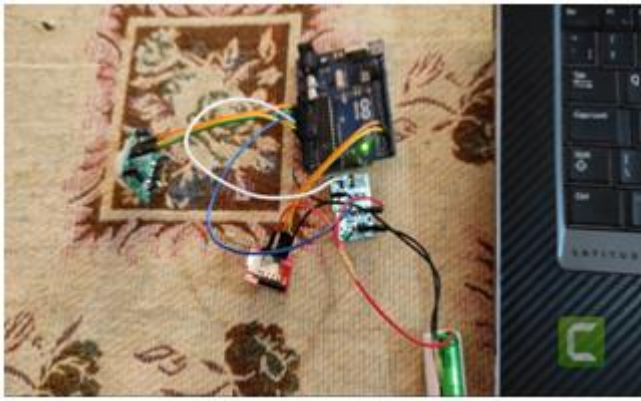
```
Serial.println("Sending SMS...");
sim800l.print("AT+CMGF=1\r");
delay(100);
sim800l.print("AT+CMGS=\"+91**********\"\r");
delay(500);
sim800l.print("security alert..... some on entered in your house!!!!!!! ");
delay(500);
sim800l.print((char)26);
delay(500);
sim800l.println();
Serial.println("Text Sent.");
delay(500);
}
```
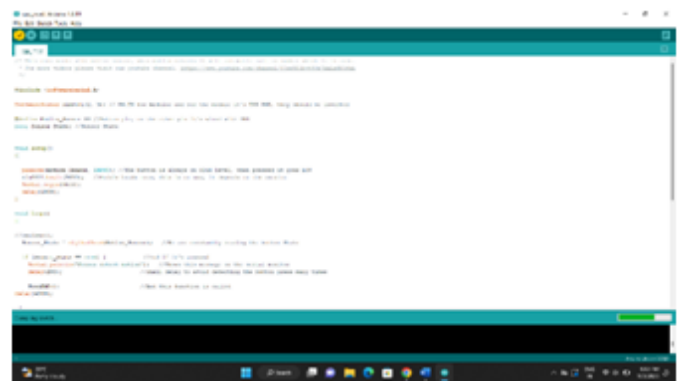

II. RESULT, CONCLUSION AND FUTURE SCOPE

1. RESULT
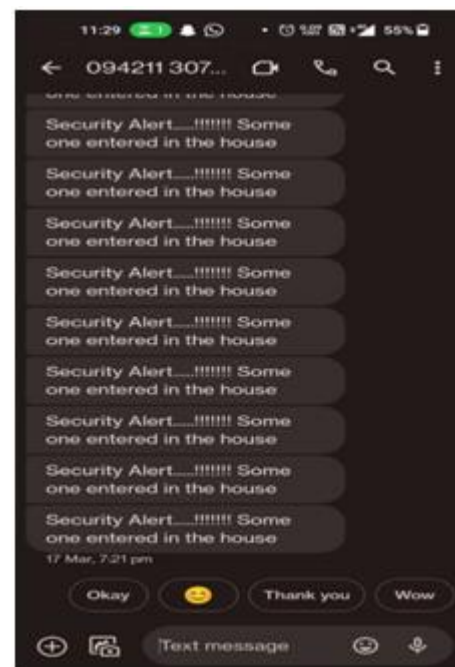
[1]. Improved Security: it is very useful model for our home security As well As offices, lockers, etc

[2]. Security And Privacy :It is less Noisy.

[3]. Skill Required: It has not required skilled person.

[4]. Energy efficiency: The system can be designed to operate at specific times of the day or when the home owner goes outside from the house then active this system

III. CONCLUSION

Home security has been a major issue where crime is increasing and everybody wants to take proper measures to prevent intrusion. In addition, there is need to automate home so that the user can take the advantage of technological advancement. This project presents a model that will provide security to their home, via SMS using GSM technology. Basic Idea of our project is to provide GSM Based security even if the owner is away from the restricted areas. For this we adopted wireless mode of transmission using GSM. Beside this there are many methods of wireless communication but we selected GSM in our project because as compared to other techniques, this is an efficient and cheap solution also, we are much familiar with GSM technology and it is easily available. This project is designed to provide ubiquitous access to the system for the security using extensive GSM technology for communication purposes and microcontroller for device control. The detailed sensors above are used to sense the disturbance and inform to the programmed microcontroller and then information is sent between controlling unit and home owner for security purpose. The end product will have a simplistic design making it easy for users to interact with.

IV. FUTURE SCOPE

• In this project we added the GSM module and when the PIR senser detect the human activity then it send the message only .

• In future we will modify this project as when the PIR senser detect the any human activity then the GSM module will sends the message as well as phone call.

REFERENCES

[1] https://components101.com/ microcontrollers/ arduino-uno

[2] http://www.circuitbasics.com/setting-up-a-5v-relayon-the-arduino/

[3] https:/c/www.academia.edu/32196589/GSM_Based_Home_Security_System?email_work_card=view-paper

[4] https://learn.adafruit.com/pir-passive-infrared-proximity-motion-sensor/overview

[5] https://lastminuteengineers.com/sim800l-gsm-module-arduino-tutorial/