Home Safety & Anti-Theft System

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Objective

Oftentimes we need to leave our house. Frankly, Our home is special to us, but not to a potential criminal. Thieves can infiltrate our homes, and then again accidents can happen as well.

We want to design a system that would work as an anti theft system and also can protect us from unwanted disasters. Its sole objective will be to scare off burglars and it will also send notification to your local authorities if someone did try to break into your property or some disasters happens.

Social Values

- Allows remote access to your home - Modern security systems now allow you to remotely monitor what's happening in your home from your phone when you're not there.
- Protects valuables - A home security system has an alarm that can scare off many would-be burglars and can notify the local authorities if someone does attempt a break-in.
- Prevents accidents - Set up an advanced smoke alarm to respond to a multitude of fire conditions.
- Budget friendly – Just the prototype itself doesn't cost much when you consider your safety and valuables. After a mass production the cost will be much less.
- Deters crime - As the number of home security systems increases in an area, the number of residential robberies decreases, even for people who don't have their own security system.

Required Components

Arduino Mega	Potentiometer
16x2 Lcd Display	PIR Motion Sensor
GPS	Gas Sensor(MQ2)
Speaker	Relay
GSM	Temperature Sensor(LM35)

Working Procedure

The basic components that react to the input are

- Arduino Mega

It controls and connect all the components together.

- PIR Motion Sensor

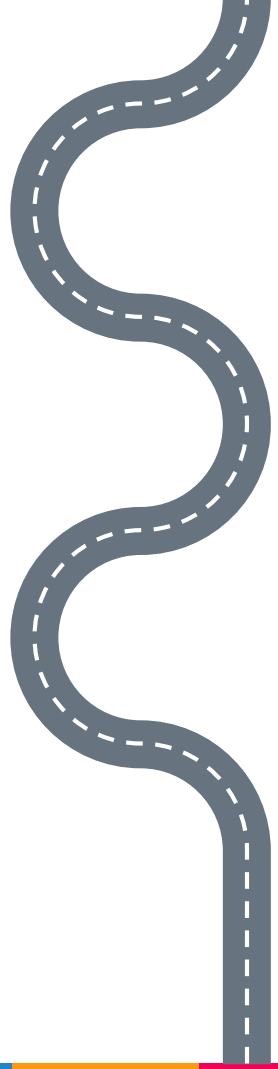
It is used for detecting any movement from home-invader/thief.

- MQ2 Gas Sensor

It is used for detecting any gas leakage.

- LM35 Temperature Sensor

It is used for detecting any fire breakout.



Working Procedure (Contd.)

- NEO-6M GPS Module

It is used to get GPS location.

- Relay

It is used to turn on/off anti-theft system.

The components that receive commands-

- GSM-SIM900D

It will send messages to the police/fire brigade when theft/fire-breakout occurs.

- Speaker

It is used for alarm.

Working Procedure (Contd.)

- 16*2 LCD

It displays message.

- LED

It lights up when a security situation occurs.

Our system will perform following action:

If there is a gas leakage in the house, the Gas Sensor will pick it up, an alarm will be set; GSM module will send a message to the nearby fire-station along with GPS location.

If there is a fire-breakout in the house, the temperature sensor will detect it, an alarm will be set; GSM module will send a message to the nearby fire-station along with GPS location.

If a home invader or a thief enters a house, PIR sensor will detect his movement, an alarm will be set; GSM module will send a message to the nearby police-station along with GPS location.

Proteus simulation

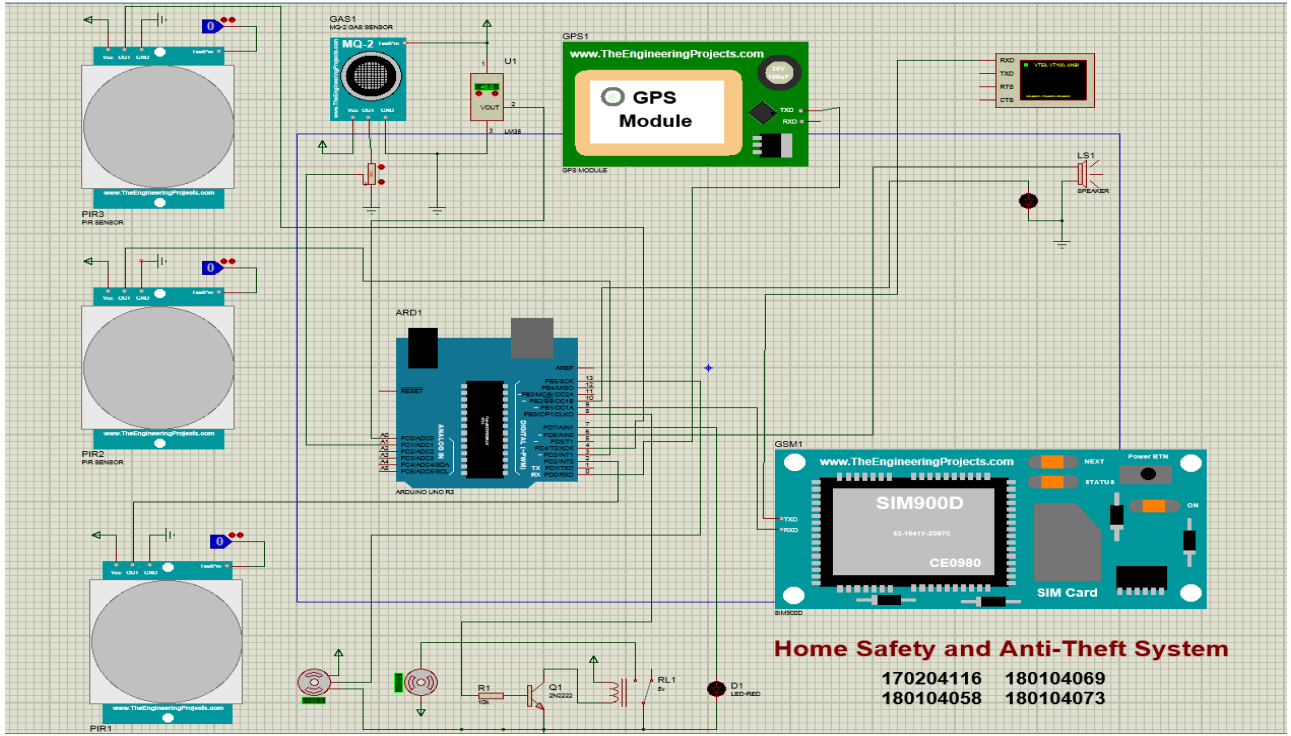


Figure:Home-Safety and Anti-Theft System

Budget

Components	Quantity	Budget(TK)
Arduino Mega	1	900/-
16x2 Lcd Display	1	160/-
GPS	1	890/-
GSM	1	1600/-
Speaker	1	130/-

Budget

Components	Quantity	Budget(TK)
Potentiometer	1	50/-
PIR Motion Sensor	3	3*110/-
Gas Sensor (MQ2)	1	150/-
Temperature Sensor (LM35)	1	125/-
Relay	1	210/-
Total		**4,545/-**

Code

```
    SIM900.println ();
  }
else if (ptrval1 == 1 || ptrval2 == 1 || ptrval3 == 1)
{

  digitalWrite(LED_RED, HIGH);
  digitalWrite(LED_YELLOW, HIGH);
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("  THERE IS POSSIBLE HOME INTRUDER ");
  lcd.setCursor(0, 1);
  lcd.print(" BE AWARE ");
  delay(1);
  lcd.clear();
  lcd.print("Sending SMS...");


  tone(SPEAKER, 1047, 500);
  delay(200);
  tone(SPEAKER, 1109, 300);
  delay(200);
  tone(SPEAKER, 1175, 100);

  float flat, flon;
  unsigned long age;
  gps.f_get_position(&flat, &flon, &age);
  SIM900.print("AT+CMGF=1\r");
  delay(100);
  SIM900.print("AT+CMGS=\"+8801716676517\"\r");
  SIM900.print("POSSIBLE THEFT!\r");

  SIM900.print("AT+CMGS=\"+8801716676517\"\r");
  SIM900.print("POSSIBLE THEFT AT!\r");

  SIM900.print("Latitude = ");
  SIM900.print(flat == TinyGPS::GPS_INVALID_F_ANGLE ? 0.0 : flat, 6);
  SIM900.print(" Longitude = ");
  SIM900.print(flon == TinyGPS::GPS_INVALID_F_ANGLE ? 0.0 : flon, 6);

  SIM900.println((char)26); // End AT command with a ^Z, ASCII code 26
  SIM900.println();
}
else
{
  digitalWrite(Relay, LOW);
  delay(50);
  digitalWrite(LED_RED, LOW);
  digitalWrite(LED_YELLOW, LOW);
  for (pos = 180; pos >= 0; pos -= 5)
  {
    myservo.write(pos);
  }


  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("NO FIRE OR INTRUDER");
  lcd.setCursor(0, 1);
  lcd.print("   ALL SAFE    ");
}


}
```

```
ptrval2 = digitalRead(ptr2);
ptrval3 = digitalRead(ptr3);
delay(1);

bool newData = false;
unsigned long chars;
unsigned short sentences, failed;
for (unsigned long start = millis(); millis() - start < 1000;)
{
  while (Serial.available())
  {
    char c = Serial.read();
    if (gps.encode(c))
      newData = true;
  }
}

if (tempC_1 >= 50 || smkC_1 >= 50)
{
  digitalWrite(Relay, HIGH);

  for (pos = 0; pos < 180; pos += 1)
  {
    myservo.write(pos);
  }


  digitalWrite(LED_RED, HIGH);
  digitalWrite(LED_YELLOW, HIGH);
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("  THERE IS FIRE ");
  lcd.setCursor(0, 1);
  lcd.print(" NOT SAFE HERE ");
  delay(100);
  lcd.clear();
  lcd.print("Sending SMS...");


  tone(SPEAKER, 1047, 500);
  delay(200);
  tone(SPEAKER, 1109, 300);
  delay(200);
  tone(SPEAKER, 1175, 100);

  float flat, flon;
  unsigned long age;
  gps.f_get_position(&flat, &flon, &age);
  SIM900.print("AT+CMGF=1\r");
  delay(100);
  SIM900.print("AT+CMGS=\"+8801713376517\"\r");
  SIM900.print("FIRE ALERT!\r");

  SIM900.print("AT+CMGS=\"+8801713376517\"\r");
  SIM900.print("FIRE OCCURED!\r");

  SIM900.print("AT+CMGS=\"+8801713376517\"\r");
  SIM900.print("FIRE OCCURED! \n\r");

  SIM900.print("Latitude = ");
  SIM900.print(flat == TinyGPS::GPS_INVALID_F_ANGLE ? 0.0 : flat, 6);
  SIM900.print(" Longitude = ");
  SIM900.print(flon == TinyGPS::GPS_INVALID_F_ANGLE ? 0.0 : flon, 6);

  SIM900.println((char)26); // End AT command with a ^Z, ASCII code 26

  SIM900.println();
}
```

```

#include<Servo.h>
Servo myservo;
int pos = 0;
int val;
#include <LiquidCrystal.h>
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
#include <TinyGPS.h>
#include <SoftwareSerial.h>
SoftwareSerial SIM900(22, 23);
byte tx = 1;
TinyGPS gps;  //Creates a new instance of the TinyGPS object

const int SPEAKER = 6;
const int LED_RED = 7;
const int LED_YELLOW = 10;
int Relay = 8;
int tempC_1 = 0; //set initial tempC @° for all LM35
int smkC_1 = 0; //set initial tempC @° for all MQ 2
const int SensorPin1 = A0; //fire input sensor pin
const int SensorPin2 = A1;

int ptr1 = 30;
int ptr2 = 33;
int ptr3 = 36;

int ptrval1;
int ptrval2;
int ptrval3;



String textForSMS;
void setup()
{

  pinMode(tx, OUTPUT);
  pinMode(Relay, OUTPUT);
  myservo.attach(13);
  pinMode(SPEAKER, OUTPUT);
  lcd.begin(16, 2);
  delay(100);
  pinMode(SensorPin1, INPUT);
  pinMode(SensorPin2, INPUT);
  pinMode(SPEAKER, OUTPUT);
  pinMode(ptr1, INPUT);
  pinMode(ptr2, INPUT);
  pinMode(ptr3, INPUT);


  pinMode(LED_RED, OUTPUT);
  pinMode(LED_YELLOW, OUTPUT); //Set control pins to be outputs
  digitalWrite(LED_RED, LOW);
  digitalWrite(LED_YELLOW, LOW);//set both motors off for start-up

  myservo.write(pos);
  SIM900.begin(9600);
  Serial.begin(9600); //Start the serial connection with the computer
}
void loop()
{
  int tempC_1 = analogRead(SensorPin1);
  int SmkC_1 = analogRead(SensorPin2);
  tempC_1 = analogRead(SensorPin1); //read the value from the LM35 sensor
  tempC_1 = (5.0 * tempC_1 * 100.0) / 1024.0; //convert the analog data to temperature
  smkC_1 = analogRead(SensorPin2); //read the value from the MQ 2 sensor
  smkC_1 = (5.0 * smkC_1 * 100.0) / 1024.0; //convert the analog data to temperature
  ptrval1 = digitalRead(ptr1);
```

Difficulties

- The Arduino Mega turns out to be working a bit slow with proteus and because of that the response time is much higher while simulating.
- Finding the proper library files.

Future Plan

We have almost implemented everything that we had thought of in proteus simulation. Even checked performance issues for Arduino Uno and Mega. For future work we wish to make this project in real life.

Conclusion

The Security System we have designed will ensure the safety of our homes both from burglars and other potential threats e.g. fire outburst and gas leakage. This system will cost very little when we consider the amount of safety related to the field. After the mass production it’ll be much cheaper and would be easier to set up. This system would somewhat guarantee the safety of our property as well as relieve us of our worries.

THANK YOU