

HOME SECURITY SYSTEM WITH AUTOCALL FACILITY USING ARDUINO

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Abstract: The requirement for security alarm systems in home is a serious demand now a days. As the number of crimes are increasing every day, there has to be something that will keep us safe. We are all aware of the high end security systems present in the market but they are not easily available to everyone. We therefore intend to provide a solution by constructing a cost efficient electronic system that has the capability of sensing the motion of the intruders and setting off the alarm. The basic idea behind this project is that all the bodies generate some heat energy in the form of infrared which is invisible to human eyes. But, it can be detected by electronic motion sensor. The Concept involves the use of Arduino, GSM-900, motion sensor, buzzer, LCD display and a simple program. The sensor detects any motion in its permissible range and triggers the alarm. It will also send the signal to Arduino which processes the signal and set off the alarm along with message and call to the house owner through GSM-900. With this system we can easily set up a security alarm in our home for unwanted intruders.

Index Terms – Motion Sensor, Arduino, GSM-900, Heat energy, Infrared, unwanted Intruders

I. INTRODUCTION

We have designed an interesting and cheap home security alarm with automatic call to house owner.. This Gadget helps you to protect your house from thieves. In this project we are going to use an Arduino Uno R3 Board, P.I.R Sensor module, LCD,GSM-900 and some other components. This Project can either powered with 9V Battery or with U.S.B of your computer.This is a basic motion-sensing alarm that detects when someone enters the area. When an intruder is detected, it activates a siren and send a call to house owner through the GSM-900 module. Our body generates heat energy in the form of infrared which is invisible to human eyes. But it can be detected by electronic sensor. This type of sensor is made up of crystalline material that is Piezoelectric. Here, we are using P.I.R. Motion Sensor Module as an infrared sensor that generates electric charge when exposed in heat and sends a signal to Arduino. According to level of the infrared in front of sensor, Arduino displays the status on L.C.D and start buzzing speaker and glows the L.E.D.A simple program is running on Arduino which checks sensor if anything is moved or new object has been detected and send a call to house owner through the GSM-900 module.

II. METHODOLOGY

This system is a basic motion activated alarm. It is built around an Arduino Microcontroller. It is connected to a PIR motion sensor, a buzzer, a resistor, and a pair of external terminals. The whole system is battery powered so that it is easily portable. Once you have the code, you can connect all the external parts. The easiest way to do this is with a breadboard. This will let you make temporary connections to test everything out.

The Circuit diagram for this concept is checked by using Proteus software and the result is checked.

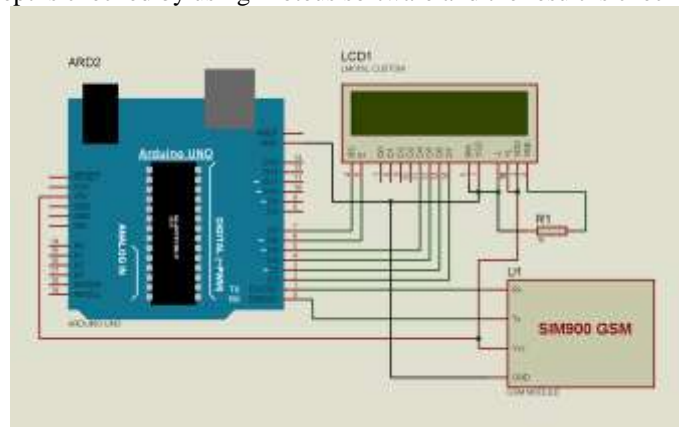


fig.1 Design of the system using Proteus software

Step 1: Connecting the P.I.R sensor to Arduino:

1. Connect Vcc pin of P.I.R sensor to positive terminal of Arduino (5V).
2. Connect Gnd pin of P.I.R sensor to any ground pin of Arduino.
3. Connect out pin of P.I.R sensor to Pin no. -7 of Arduino.

Step 2: Connecting L.E.D and Piezo Buzzer To Arduino**Connecting L.E.D**

Connect Positive terminal (Longer Lead) Of L.E.D To Arduino Pin no. 13.
Connect Negative terminal (Shorter Lead) Of L.E.D To Any Ground Pin.

Connecting Piezo Buzzer

Connect Positive terminal (Red Wire) Of Buzzer to Arduino Pin no. 10.
Connect Negative terminal (Black Wire) Of Buzzer to Any Ground Pin.

Step 3: Connecting L.C.D to Arduino:

To wire your LCD screen to your Arduino, connect the following pins:

- LCD RS pin to digital pin 12
- LCD Enable pin to digital pin 11
- LCD D4 pin to digital pin 5
- LCD D5 pin to digital pin 4
- LCD D6 pin to digital pin 3
- LCD D7 pin to digital pin 2

Additionally, wire a 10K pot to +5V and GND, with its wiper (output) to LCD screens VO pin (pin3).

Step 4: Connecting GSM-900 with Arduino

1. Connect GSM-900 module with Arduino
2. Write the program for calling through GSM module
3. Install the program in Arduino

Step 5: Programming Arduino:

1. Download Arduino IDE 1.0.6 from <https://www.arduino.cc/en/main/software>.
2. Connect Your Arduino to your computer using USB Cable.
3. Open Arduino IDE, choose your correct board from Tools--Boards
4. Choose Your Correct Port from Tools--Serial Port
6. Copy the following sketch which appears in your Web Browser to your Arduino Sketch Page.
7. Click on Upload Icon or go to File—Upload

Step 6: Drill Holes in the Housing:

Next we need to drill a few holes in the housing so that we can mount all the parts. Start by using a ¼" hole in one end of the housing. This will be where we mount the buzzer. Then use a ¾" hole saw to drill a hole in the other side of the housing. This will be where we mount the motion sensor

Step 7: Glue the Motion Sensor and the Buzzer in Place

Apply a small amount of hot glue around the motion sensor where it lines up with the hole in the housing. Then press the motion sensor into the hole. Apply more hot glue around the outside and hold it in place until the glue cools. Then apply a small amount of hot glue to the face of the buzzer. Align the hole in the buzzer with the hole in the housing and press it in place. Hold the buzzer in this position until the glue dries.

Step 8: Close Up the Housing:

The last thing that you need to do is connect the battery and close up the housing.

This concept can be designed as a equipment to be used in home from safety point of view and can be manufactured in low cost which will be suitable for all people.

III. ALGORITHMS

1. Start
2. Connect the Piezo buzzer to digital pin 10
3. Connect the PIR motion sensor to digital pin 7 as an input
4. LED is connected to digital pin 13
5. We start, assuming no motion detected
6. Create a variable for reading the pin status
7. Initialize the library with the numbers of the interface pins
8. Declare LED as output and sensor as input
9. read input value
10. check if the input is HIGH, then turn LED ON
11. Put the buzzer ON

12. Set LCD cursor position
13. Print text to LCD as ' MOTION DETECTED'
14. Send Call to House owner's number
15. Stop

IV. PROGRAMS FOR OPERATION

//This Type of Sensor Detects Motion and lows L.E.D and Start Buzzing, It Also Displays that the "Motion is Detected" On An Lcd Screen and start calling the owner

```
#include <LiquidCrystal.h>
int ledPin = 13; // choose the pin for the LED
int inputPin = 7; // choose the input pin (for PIR sensor)
int pirState = LOW; // we start, assuming no motion detected
int val = 0; // variable for reading the pin status
int pinSpeaker = 10; //Set up a speaker on a PWM pin (digital 9, 10, or 11)
LiquidCrystal lcd(12, 11, 5, 4, 3, 2); // initialize the library with the numbers of the interface pins
void setup() { pinMode(ledPin, OUTPUT); // declare LED as output pinMode(inputPin, INPUT); //
declare sensor as input
pinMode(pinSpeaker, OUTPUT);
Serial.begin(9600);
lcd.begin(16, 2);
lcd.setCursor(2, 0); // Set LCD cursor position (column, row)
lcd.print("P.I.R Motion"); // Print text to LCD
lcd.setCursor(5, 1); // Set LCD cursor position (column,row)
lcd.print("Sensor"); // Print text to LCD
delay(4000); // wait 4s // Delay to read text
lcd.clear(); // clear LCD display // Clear the display
lcd.setCursor(2, 0); // Set LCD cursor position (column, row)
lcd.print("Developed By"); // Print text to LCD
lcd.setCursor(2, 1); // Set LCD cursor position (column, row)
lcd.print("Suman Ssk Vinit"); // Print text to LCD
delay(5000); // Delay to read text
lcd.clear(); // Clear LCD
lcd.setCursor(0, 0);
lcd.print("Processing Data.");
10
delay(3000);
lcd.clear();
lcd.setCursor(3, 0);
lcd.print("Waiting For");
lcd.setCursor(3, 1);
lcd.print("Motion...");
}
void loop(){
val = digitalRead(inputPin); // read input value
if (val == HIGH) { // check if the input is HIGH
digitalWrite(ledPin, HIGH); // turn LED ON
playTone(300, 300);
delay(150);
if (pirState == LOW) {
// we have just turned on
Serial.println("Motion detected!");
lcd.clear() ;
lcd.setCursor(0, 0); // Set LCD cursor position (column 0, row 0)
lcd.print("Motion Detected!");
// We only want to print on the output change, not state
pirState = HIGH;
}
} else {
digitalWrite(ledPin, LOW); // turn LED OFF
```

```
playTone(0, 0);
delay(300);
if (pirState == HIGH){
// we have just turned of
Serial.println("Motion ended!");
11
lcd.clear() ;
lcd.setCursor(3, 0);
lcd.print("Waiting For");
lcd.setCursor(3, 1);
lcd.print("Motion..."); // We only want to print on the output change, not state
pirState = LOW; } } // duration in mSecs, frequency in hertz
void playTone(long duration, int freq) {
duration *= 1000;
int period = (1.0 / freq) * 100000;
long elapsed_time = 0;
while (elapsed_time < duration) {
digitalWrite(pinSpeaker,HIGH);
delayMicroseconds(period / 2);
digitalWrite(pinSpeaker, LOW);
delayMicroseconds(period / 2);
elapsed_time += (period);
}
}
```

V. FUTURE WORKS

We can adjoin a keypad to arm or disarm the alarm. We can determine the position of the intruder using GPS module and then send a SMS to the concerned authorities nearest to the house to catch the thieves.

VI. ACKNOWLEDGMENT

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