CERTIFICATE

This is to certify that this project report "**Home security alarm using arduino**" submitted by Suriya Dhar (2030562), Gitanjali Kumari (2030565), Shivam Ananad (2030581), and Deepak Belwal (2030587) in the partial fulfillment of the requirement for the award of Undergraduate Program.

Signature of Supervisor

Name of Supervisor

Mrs. Alka Singla

Assistant Professor, ECE

Place: SLIET, Sangrur

Date:

Acknowledgement

It is our privilege to express our sincerest regards to our project coordinator, prof. Alka Singla for her valuable inputs, guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of our project. Their useful suggestions for this whole work and co-operative behavior are sincerely acknowledged.

I Would like to express my sincere gratitude to our Head of Department Dr. Surinder Singh for providing us with the facilities required to complete the project.

We deeply express our sincere thanks to our Project Coordinator Dr. Dilip Kumar for encouraging us to present the project on the topic “Home security alarm system using Arduino” at our department premises for the partial fulfillment of the requirements.

We take this opportunity to thank all our lecturers who have directly or indirectly helped our project. We pay our respects and love to our parents and all other family members and friends for their love and encouragement throughout our career. Last but not the least we express our thanks to our friends for their cooperation and support.

ABSTRACT

The need for home security alarm systems nowadays is a serious demand. As the number of crimes is increasing every day, there has to be something that will keep us safe. There is awareness of the high end security systems present in the market but they are not easily available to everyone. Therefore 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 is given in this project. The basic idea behind this project is that all the elements generate some heat energy in the form of infrared which is invisible to human eyes. But, it can be detected by electronic motion sensor. Using a gate control system we enabled the need of door lock system under a very nominal price, taking into consideration of a secured door lock system's need.

The project involves the use of Arduino, motion sensor, buzzer, LCD display, keypad, motor and a simple program. The sensor detects any motion in its permissible range and triggers the alarm, and the LED starts to glow. For any entrance when there is a need to open the door, by pressing * the LCD displays to enter the password, through which one can get access to enter inside.

Table of contents

1. Introduction
2. Circuit Diagram
3. Component list and cost incurred
4. Construction
5. Working of the circuit
6. Relative Merits
7. Future Scope
8. Arduino code for keyboard setup

    8.1 Arduino code for home security alarm system

9. Conclusion
10. References

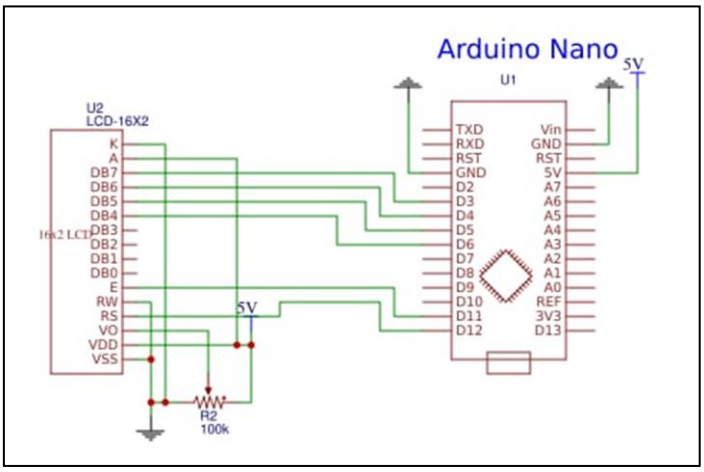
1. INTRODUCTION

We have designed an interesting and cheap home security alarm. This Gadget helps you to protect your house from thieves. In this project we are going to use an Arduino Nano, P.I.R Sensor module, LCD, keyboard, piezo buzzer, Motor, resistor, LEDs some other components. This project can either powered with 9V Battery or with U.S.B of your computer.

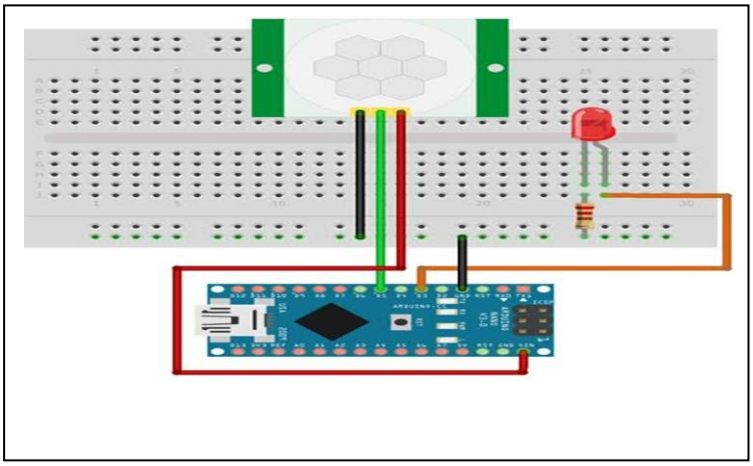
This is a basic motion-sensing alarm that detects when someone enters the area. When an intruder is detected, it activates a siren and LED starts to glow. Our body generates heat energy in the form of infrared which is invisible to human eyes. But it can be detected by electronic sensor. This type of sensor is made up of crystalline material that is Pyroelectric. In this project, it is comprised of 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, a simple program is running in Arduino checks sensor if anything is moved or new object has been detected. Also it have the door open and close function, in this when the user enters the desired password the door gets open and it simply gets closed after some few seconds of Delay.

2. Circuit diagrams

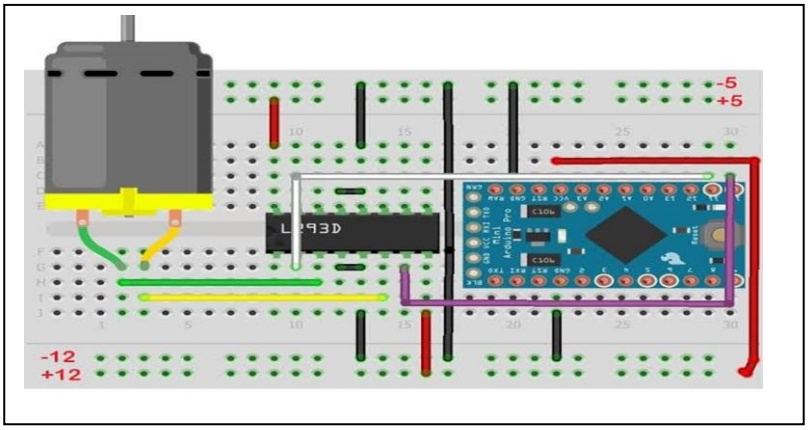
a. Arduino Nano connection with LCD display.



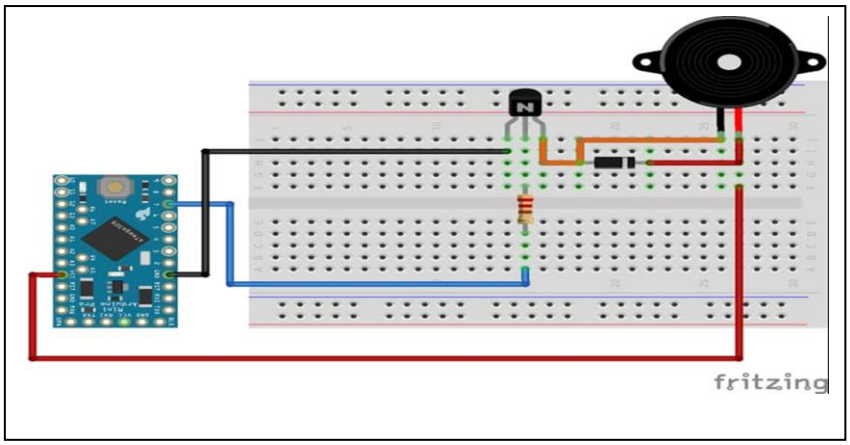
b. Arduino nano connection with PIR sensor.



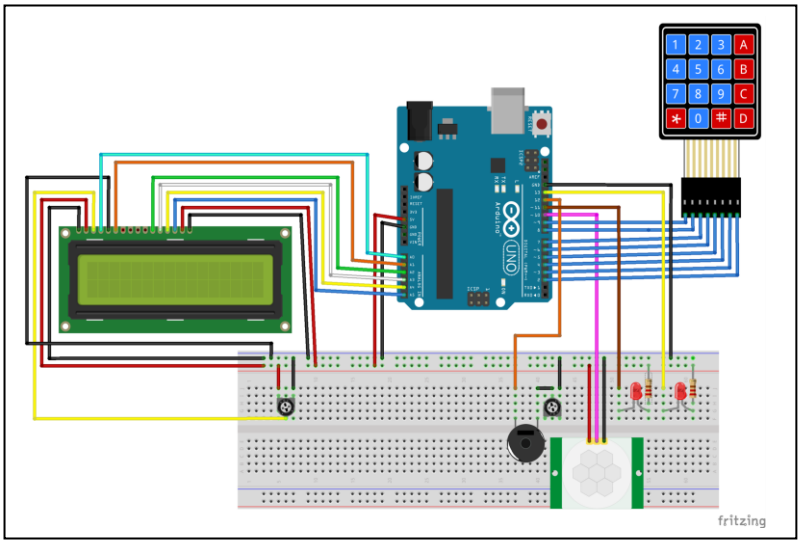
c. Arduino Nano connection with L2923 motor driving .



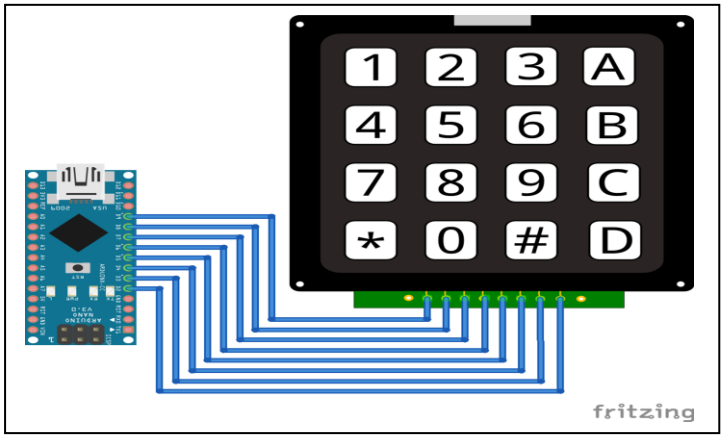
d. Arduino connection with Buzzer.



e. Full circuit Diagram



f. Connection Arduino nano with keybord



3. List of components and cost incured

Name of components	Quantity	Price
Arduino Nano	1	800
PIR sensor	1	230
LED	4	45
Buzzer	1	230
Dc motor	1	145
keyboard	1	202
Resistor	6	119
l2923 ic	1	132
Transistor	1	70
capacitor	2	106

4. Construction

- **CONNECTION OF LCD DISPLAY WITH ARDUINO NANO**

a) First, connect the ground of Arduino to the VSS of the LCD.
   i. Then connect the V0 of the LCD to the ground for full contrast
   ii. Then connect RW to the ground for selecting write mode
   iii. Then connect K, which is the ground of backlight LED also to the ground.
a) Then connect the 5V of Arduino to the VDD of the LCD module.
b) Then connect the digital pin 12 of Arduino to the RS of LCD module.
c) Then connect the digital pin 11 of Arduino to the E of LCD module.
d) Then connect the digital pin 5 of Arduino to the D4 of LCD module.
e) Then connect the digital pin 4 of Arduino to the D5 of LCD module.
f) Then connect the digital pin 3 of Arduino to the D6 of LCD module.
g) Then connect the digital pin 2 of Arduino to the D7 of LCD module.
h) And finally, connect the 3.3V of Arduino to the A of LCD which is the anode of backlight LED.

- **CONNECTION OF PIR SENSOR**

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

- **CONNECTION OF BUZZER AND LED**

Connecting L.E.D

a. Connect Positive terminal (Longer Lead) Of L.E.D To Arduino Pin no. 13.

b. Connect Negative terminal (Shorter Lead) Of L.E.D To Any Ground Pin.

Connecting Piezo Buzzer

a. Connect Positive terminal (Red Wire) Of Buzzer to Arduino Pin no. 10.

b. Connect Negative terminal (Black Wire) Of Buzzer to Any Ground Pin

- **Arduino connection with keyboard**

a. Row 0 ==> D5

b. Row 1 ==> D4

c. Row 2 ==> D3

d. Row 3 ==> D2

e. Col 0 ==> D11

f. Col 1 ==> D10

g. Col 2 ==> D9

h. Col3==>D8

5. Working of the circuit

- First test the LCD screen display with the short code. Test the components functionality with code as you build along to solve error problems and avoid a system that dosn't work. a complete system with error can be hard to solve if it was handled step-by-step. most of the problem that will arise are due to either wrong connection, code error or defective component used. be sure to watch out for those alone the way

  remember to attach 1KOhm resistor to the positive leads of the PIR sensor to act as pull-up resistor.

- Turn on the system by connecting the power supply.

- It will show WELCOME TO DIGITAL LOCK SYSTEM.

- To open the door press * it will ask for the desired code.

- Enter the correct code to open the door and for incorrect code it will show wrong password entered.

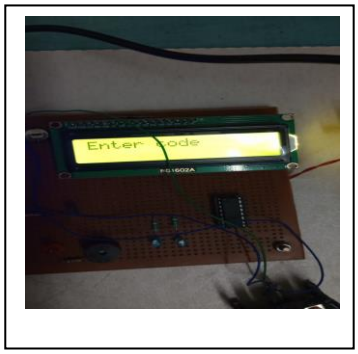


Fig: 5.1 Enter code after pressing*

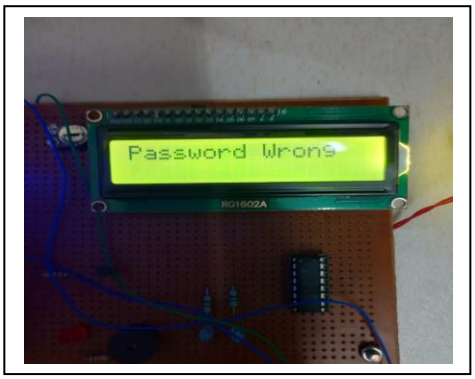


Fig:5.2 for entering wrong password

- After entering the correct password doors will be open and after few secs doors will automatically gets closed.
- There is some delay associated in the system after the gates are closed the system will activate the PIR sensor after few seconds of delay.

5.1.1 Working of PIR Sensor

- The alarm system is triggered when a “Logic High (H)” level signal is detected at its sensor input port.
- The PIR Sensor detects the motion of a human body by the change in surrounding ambient temperature when a human body passes across, and effectively controls the switching when it detects a moving target.

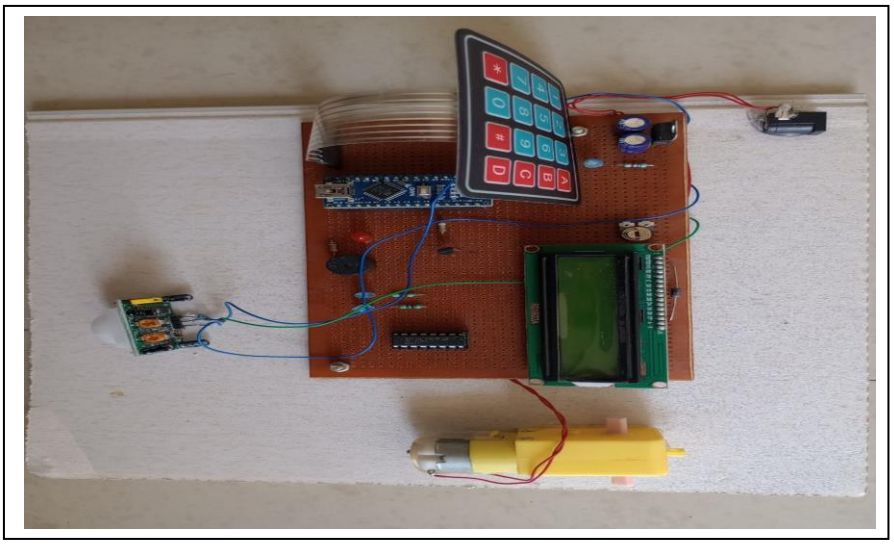


Fig 5.3 Complete circuit of home security Alarm system

6. Relative merits

ADVANTAGES

- The given system is handy and portable, and thus can be easily carried from one place to another.
- The circuitry is not that complicated and thus can be easily troubleshoot.
- The given system sets off a powerful buzzer, and it is effective as any other alarm system
- It is available in the market.
- Home security systems are great for home protection that ensure the safety of your valuables and loved ones.
- Home security systems are very easy to install. They can be monitored within 24 hours of the installation. This service has helped many people to save their lives and valuables.

DISADVANTAGES

- The given alarm system determines the presence of the intruder only, and does not determine how
- many persons are in there actually.
- The alarm activates only when the person cuts through the line of the PIR sensor.
- One time investment cost.
- It has to be planted throughout the area.
- wireless home security alarm is that there is always a small chance that they may be remotely hacked and the intruder will find the security code embedded inside the key fob.

7. Future scope

The sensors placed on the door informs the home owner as soon as the door is opened by sending a Push notification by using the GSM module. The user will get this notification irrespective of whether the phone is locked or unlocked or even if any other app is opened at the moment. The user feels safe and not worry about any intrusion or break-ins when he is away from home. This setup can also be used in commercial offices where some areas are restricted for certain personnel, such a system will immediately inform the administrator of any unauthorized personnel trying to access such an area. Therefore the extensibility and applicability of such a system is no more only limited by the imagination.

The developed system can also be used to in industrial and commercial applications such as offices, warehouses and other areas where some areas are reserved for authorized personnel only or other places where safety and precautions are of primary concerns such as internet server room of a big MNC from where corporate data can be stolen. The system can also be easily upgraded to add extra safety features such as cameras, motion detection sensors, etc. for increased safety. The system can also further be developed by adding an RFID scanner so that the authorized users need only carry a RFID or NFC tag with them on their person. The RFID scanner will work by scanning the tag wirelessly and if the user is authorized to enter, the alarm system will be disabled for sometimes and it will allow the person to enter the room.

8. Arduino code for Keyboard setup

- Code for setup of keyboard

```
#include <Keypad.h>

const byte ROWS = 4; //Four rows
const byte COLS = 4; //Four columns
char keys[ROWS][COLS] = {
  {'1','2','3','A'},
  {'4','5','6','B'},
  {'7','8','9','C'},
  {'S','0','H','D'}
};
byte rowPins[ROWS] = {9, 8, 7, 6}; //connect to the row pinouts of the keypad
byte colPins[COLS] = {5, 4, 3, 2}; //connect to the column pinouts of the keypad

Keypad keypad = Keypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS );

String v_passcode="";

void setup(){
  Serial.begin(9600);
}

void loop(){
  char key = keypad.getKey();

  if (key != NO_KEY){
    //Serial.println(key);

    v_passcode = v_passcode + key;

    if(key=='*')
    {
            Serial.println("Enter Password");
       v_passcode="";
    }
     if(key=='A')
    {
            Serial.println("welcome");
            //Serial.println(v_passcode);

            if (v_passcode=="0000A")
       {
         Serial.println("doors are open");
       }

    }
  }
}
```

8.1 Code of Arduino for home security alarm system

```
#include <LiquidCrystal.h>                    // Include LiquidCrystal library
#include   <Keypad.h>                         // Include Keypad library
LiquidCrystal movie(A5,A4,A3,A2,A1,A0);
#define   Password_Length 8                   // Length of password + 1 for null character
char Data[Password_Length];                   // Character to hold password input
char Master[Password_Length] = "0000A";       // Password
char customKey;  // Character to hold key input
int electric_motor   = 10;   // Pin connected to Electric Motor
int buzzer = 11;   // Pin connected   to Buzzer
int indicator_led = 12;   // Pin connected to Green Indicator LED
int   k ;
int i = 0;
int s = 0;
int g = 0;
int a = 0;
int wait = 300; //   Delay time for LED
byte data_count = 0; // Counter for character entries
const   byte ROWS = 4; // Constants for row sizes
const byte COLS = 4; // Constants for   column sizes

char hexaKeys[ROWS][COLS] = {  // Array to represent keys on   keypad
{'1', '2', '3', 'A'},
{'4', '5', '6', 'B'},
{'7', '8', '9', 'C'},
{'*',   '0', '#', 'D'}
};
byte rowPins[ROWS] = {9, 8, 7, 6};  // Connections to   Arduino
byte colPins[COLS] = {5, 4, 3, 2};
Keypad customKeypad = Keypad(makeKeymap(hexaKeys),   rowPins, colPins, ROWS, COLS); // Create keypad object

void setup() {
pinMode(electric_motor, OUTPUT);  // Set Electric Motor pin as an OUTPUT pin
   pinMode(buzzer, OUTPUT); // Set Buzzer pin as an OUTPUT pin
  pinMode(indicator_led,   OUTPUT); // Set Green Indicator LED pin as an OUTPUT pin
  Serial.begin(9600);     // Initialize serial communications at 9600 baud rate
  movie.begin(16,2);   // Initialize LiquidCrystal display
  Serial.print("Enter Password:");
   movie.print("Enter Password:");
  delay(1500);
  movie.clear();
}
void   loop() {
for(k=0;k<7 && g<1;k++)         // "For loop" for taking   Input
{
  movie.setCursor(0,0);
 movie.print("Enter Password:");
   delay(100);
 customKey = customKeypad.getKey();                    // Look for keypress
if   (customKey)
 {                                      // Enter keypress into array and increment counter
   Data[data_count] = customKey;
   Serial.print(Data[data_count]);
```

```
    movie.setCursor(s,1);          // LCD Command for changing the column of second row
   movie.print(Data[data_count]);

   digitalWrite(indicator_led,HIGH);  // Blink the green indicator LED with   every successful input
   delay(wait);
   digitalWrite(indicator_led,LOW);
    delay(wait);

   data_count++;
   s++;
}
}
if (data_count   == Password_Length - 1) {                                    // See if we have reached the password length
 while(i<1)
{
 Serial.println("");                  //   For sending the serial monitor's cursor in next line
 movie.print("");
   i++;
}
if (!strcmp(Data, Master)) {     // Password is correct
  digitalWrite(electric_motor, HIGH);
   digitalWrite(buzzer, LOW);
   Serial.println("correct");
    movie.clear();
   movie.setCursor(0,0);
   movie.print("The password is");
    movie.setCursor(0,1);
   movie.print("correct");
   delay(1000);
    movie.clear();
   g=1;
}
else {
   digitalWrite(electric_motor,   LOW);     // Password is incorrect
   digitalWrite(buzzer,HIGH);
   Serial.println("incorrect");
    movie.clear();
   movie.setCursor(0,0);
   movie.print("The password is");
    movie.setCursor(0,1);
   movie.print("incorrect");
   delay(1000);
    movie.clear();
   g=1;
}
}
   a=1;
}
void clearData() {
while   (data_count != 0) {     // Go through array and clear data
Data[data_count--]   = 0;
}
return;
}
```

9. Conclusion

The sensors placed on the system can be setup in door during night while sleeping or anytime while user thinks there is a need of security. The sensor will detect the motion of human body after system gets activated, and it will start beeping the buzzer for security alarm. Gate control has been added as one of the features of password based door lock security system. In this project as soon as the doors get closed the PIR sensor gets activated. This was the main objective of the project, which is the user feels safe and not worry about any intrusion or break-ins. This setup can also be used in commercial offices where some areas are restricted for certain personnel, such a system will immediately inform the administrator of any unauthorized personnel trying to access such an area. ThereforeThus we have designed a home security alarm system using arduino nano and PIR sensor, which is handy, portable, cost effective as well. Such alarm system are hugely in demand for security purposes, and thus the given system can be proved useful and effective in view of the above features

Reference

I. https://youtu.be/hwE0L8F6v7Y

II. https://youtu.be/lTAo_H5eqsk

III. https://youtu.be/iS3I4HhCaJM

IV. https://youtu.be/odvXvw9lc3o