

PROFESSIONAL TRAINING REPORT
at
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
(Deemed to be University)

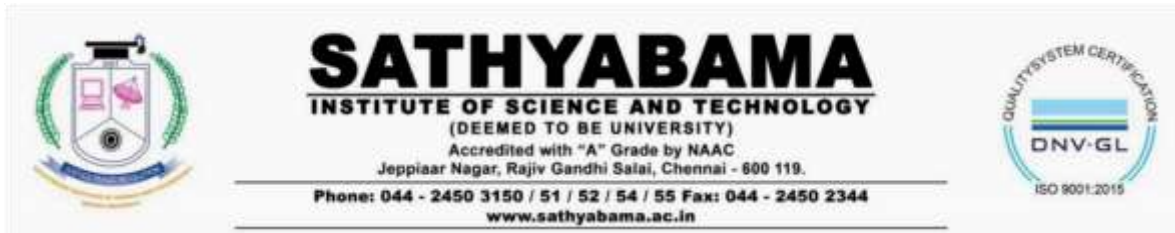
Submitted in partial fulfillment of the requirements for the award of
Bachelor of Technology Degree in
Information technology

By
DINESHMANJU R
(Reg no 37120023)



DEPARTMENT OF INFORMATION TECHNOLOGY
SCHOOL OF COMPUTING
SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
Accredited with Grade "A" by NAAC
JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI – 600119.

AUGUST 2020



DEPARTMENT OF INFORMATION TECHNOLOGY

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **DINESHMANJU R(Reg. No 37120023)** who carried out the project entitled “**Arduino based Alarm**” under our supervision from MAY 2020 to JUNE 2020.

Internal Guide

Dr..R.M.GOMATHI., M.Tech., Ph.D.,

Head of the Department

Dr. R.SUBHASHINI.,M.E., Ph.D.,

Submitted for Viva voce Examination held on_____

Internal Examiner

External Examiner

DECLARATION

I **DINESHMANJU R (Reg. No. 37120023)** hereby declare that the Project Report entitled "**ARDUINO BASED ALARAM**" done by me under the guidance of **Dr.R.M.GOMATHI,M.Tech.,Ph.D.**, is submitted in partial fulfillment of the requirements for the award of Bachelor of Technology degree in Information Technology.

DATE :

PLACE :

SIGNATURE OF THE CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of SATHYABAMA for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr.T.SASIKALA.,Ph.D.**,Dean, school of computing and **Dr.R.SUBHASHINI.,M.E., Ph.D.**,Head of the Department of Computing for providing me necessary support and details at the right time during the progressive views.

I would like to express my sincere and deep sense of gratitude to my Project Guide **Dr.R.M.GOMATHI.,M.Tech.,Ph.D.**,for her valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-Teaching staff members of the Department of **Information Technology** who were helpful in many ways for the completion of my project.

TRAINING CERTIFICATE:



ABSTRACT

The need for home security alarm systems nowadays is a serious demand. 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 project involves the use of Arduino, motion sensor, buzzer, LCD display and a simple program. The sensor detect 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 detection message on display. With this system we can easily set up a security alarm in our home for unwanted intruders.

INTRODUCTION

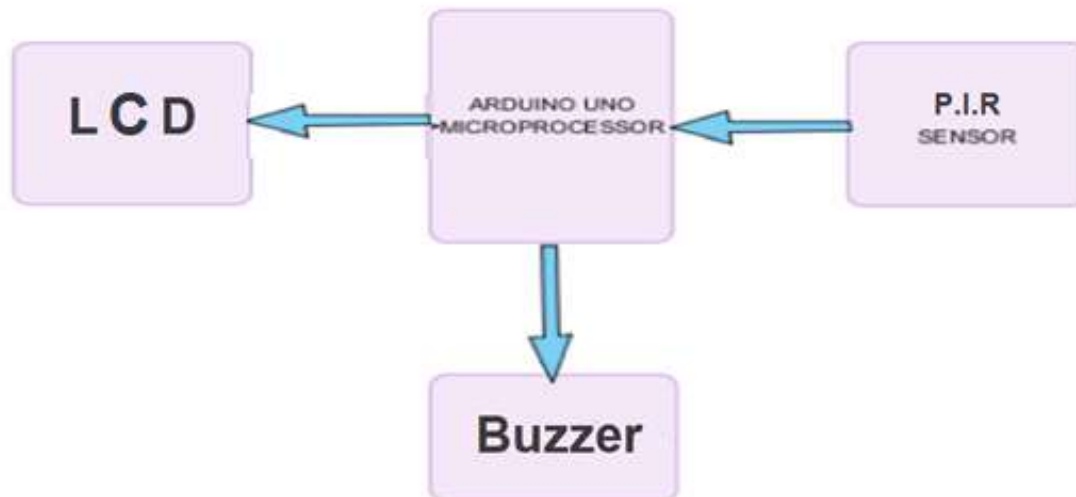
We have designed an interesting and cheap home security alarm. This Gadget helps you to protect your house from thieves. In this project we are going to use an Arduino Uno R3 Board, P.I.R Sensor module, LCD and some other components. This Project can either powered with 9V Battery or with U.S.B of your computer. This is a basic motion-sensing alarm that detects when someone enters the area. When an intruder is detected, it activates a siren. 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, 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.

I. RELATED WORK

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, 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

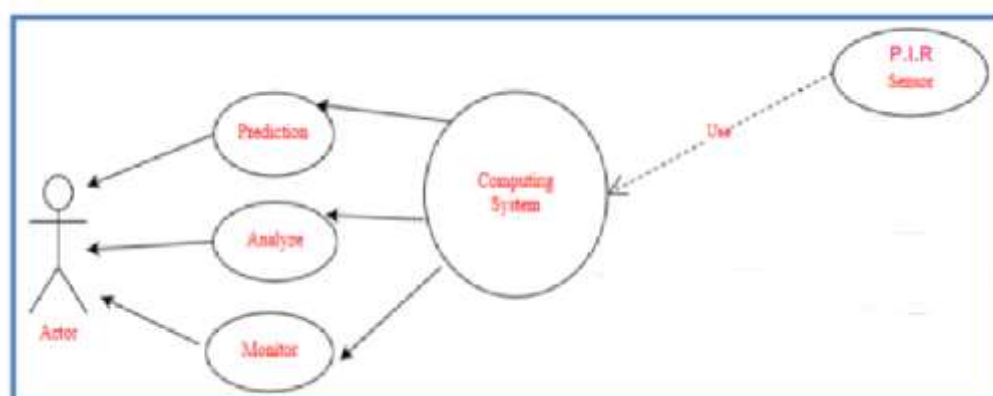
status on L.C.D and start buzzing speaker and glows the L.E.D. A simple program is running on Arduino which checks sensor if anything is moved or new object has been detected. We have designed an interesting and cheap home security alarm. This Gadget helps you to protect your house from thieves. In this project we are going to use an Arduino Uno R3 Board, P.I.R Sensor module, LCD 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. 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 project involves the use of Arduino, motion sensor, buzzer, LCD display and a simple program. The sensor detect 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 detection message on display. The need for home security alarm systems nowadays is a serious demand. 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.

II. BLOCK DIAGRAM /ARCHITECTURE



In this block diagram there is P.I.R Sensor(Passive Infrared Sensor) connected to the Arduino, The passive infrared sensor detects the human heat passing nearby and feeds its value to the **Arduino Uno R3 Microcontroller**. The **L.C.D(Liquid crystal display)** is attached to the arduino so that it displays the heat in the surrounding air. Buzzer is attached to the arduino and it sounds when the heat nearby is high so that the owner can be alert and call police to be safe.

III. SYSTEM DESIGN



IV. IMPLEMENTATION AND RESULTS

MATERIALS REQUIRED

1) Arduino Uno :

Arduino Uno is a microcontroller board based on the ATmega328P ([datasheet](#)). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header and a reset button.

2)P.I.R Sensor Module:

The Passive Infrared Sensor (PIR) sensor module is used for motion detection. ... The module has an on-board pyroelectric sensor, conditioning circuitry and a dome shaped Fresnel lens. It is used to sense movement of people, animals, or other objects.

3)L.C.D(16 X 2);

LCD modules are very commonly used in most embedded projects, the reason being its cheap price, availability and programmer friendly. Most of us would have come across these displays in our day to day life, either at PCO's or calculators. The appearance and the pinouts have already been visualized above now let us get a bit technical.

4)9V Battery:

The nine-volt battery, or 9-volt battery, is a common size of battery that was introduced for the early transistor radios. It has a rectangular prism shape with rounded edges and a polarized snap connector at the top. This type is commonly used in walkie-talkies, clocks and smoke detectors.

5)L.E.D:

A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor.^[5] White light is obtained by using multiple

semiconductors or a layer of light-emitting phosphor on the semiconductor device.

6)Piezo Buzzer:

Piezo buzzers are simple devices that can generate basic beeps and tones. They work by using a piezo crystal, a special material that changes shape when voltage is applied to it. If the crystal pushes against a diaphragm, like a tiny speaker cone, it can generate a pressure wave which the human ear picks up as sound.

7)Breadboard:

Because the solderless breadboard does not require soldering, it is reusable. This makes it easy to use for creating temporary prototypes and experimenting with circuit design. For this reason, solderless breadboards are also popular with students and in technological education. Older breadboard types did not have this property.

8)Some Jumper Wire:

A jump wire is an electrical wire, or group of them in a cable, with a connector or pin at each end which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering

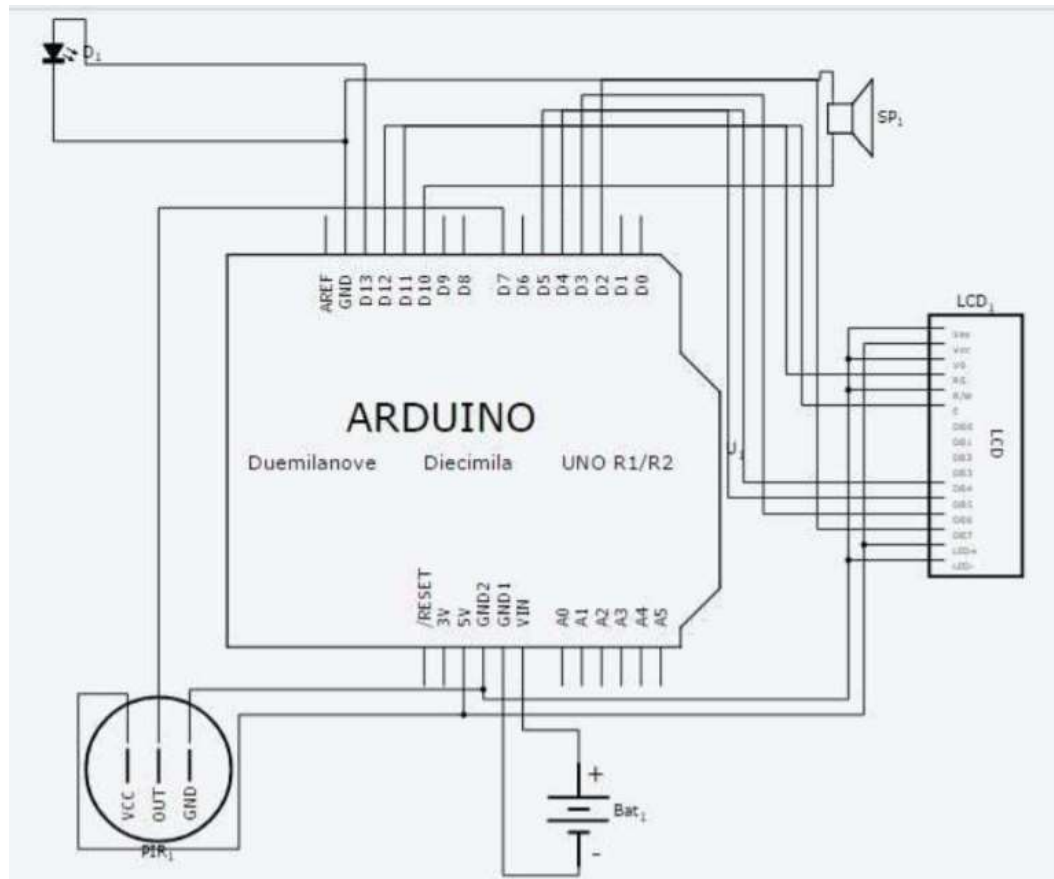
9)An USB Cable:

Universal Serial Bus (USB) is an industry standard that establishes specifications for cables and connectors and protocols for connection, communication and power supply (interfacing) between computers, peripherals and other computers.^[3] A broad variety of USB hardware exists, including eleven different connectors, of which USB-C is the most recent.

10)Computer:

A computer is a machine that can be instructed to carry out sequences of arithmetic or logical operations automatically via computer programming. Modern computers have the ability to follow generalized sets of operations, called programs.

CIRCUIT DIAGRAM



WORKING PRINCIPLE

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.

CODING

```
#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. APPLICATIONS

This type of motion sensing alarm system can be easily employable for security purposes at banks, various offices and even for sensitive establishments such as for military. We can easily set up this system for household purposes.

VI. CONCLUSION

Thus, we have designed a home security alarm system using Arduino and PIR motion sensor, which is handy, portable, cost-effective and highly effective as well. Such alarm systems are hugely in demand for security purposes, and thus the given system can be proved useful and effective in view of the above features.

VII. REFERENCES

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- [2] Arduino IDE 1.0.6 from
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- [3] www.circuitstoday.com
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