

**A MINI PROJECT REPORT ON**

**Burglar or Intruder alarm using PIR sensor**

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## **ABSTRACT:**

The world is evolving so fast that it is not surprising to see rapid advancement in technology. As technology is advancing houses are becoming smarter with high-end security. We are all aware of the high-end security systems present in the market but they are not easily affordable by everyone. So there is a need for a safety system can be both affordable and easy to design one such prototype is Burglar alarm using PIR -Passive Infrared Radiation sensor detects the change in infrared radiation of warm-blooded moving objects in its range of detection, then it triggers the alarm and led bulb turns on. Once there is no longer any movement detected in its range the buzzer and the led are programmed to turn off automatically after a certain short period of time.

The project involves the use of the Arduino Uno, PIR sensor, led, resistor, buzzer (piezo) and system program.

**Keywords: Arduino Uno, PIR sensor, the lighting system (led)**

## **INTRODUCTION:**

IT'S already 2020, where we can see the devastating invention of new technology. Even now we are living in the large development of the technical world where we can see thefts and crime rates are increasing day by day, to sustain in these kinds of situations the user should have a high and advanced technology usage tools so that the user can be safe from any kind of sudden incompatible incidents.

One such thing would be burglary or encountering an intruder entering your house for which we may not pay attention until it is done.

The solution for this is to install a security system which can be an Arduino controlled PIR sensor and lightning system which senses the moving objects using infrared radiations and gives an alert buzzer signal with led lighting technique. This is a basic motion-sensing alarm that detects when someone enters its range of detection area. When an intruder is detected, it activates a buzzer sound, by detecting the heat energy generated in the form of infrared radiation which can be detected by the sensor. In this project, we are using P.I.R. Motion Sensor which is an infrared sensor that generates an electric charge when exposed to heat and sends a signal to Arduino. According to the level of the infrared radiation in front of the sensor, Arduino displays the status as "burglar in the house" and starts buzzing the speaker and glows the L.E.D

bulb. A simple program is running on Arduino which checks the sensor if anything is in movement or a new object has been detected.

Most security systems are highly sophisticated designs and they need a large amount of money and time for both design and installation. So here we are presenting a software prototype that can be a do it yourself project (DIY) which can be easily designed, programmed .

## **. OBJECTIVES:**

1. The objective of this project is all about building an anti-theft warning or an intruder alarm using the Arduino and PIR sensor which is a substantial part of home security systems.
2. The idea for this is to be a DIY where it can be cost-efficient and easily designable.

## **PROPOSED METHODOLOGY:**

Our research is beneficial for those who are looking for home security devices for an affordable and reasonable way. We may have a doubt that cc cameras existed for security purposes, then what keeps this in more distinctive?

CCTV camera footage can only show the recordings and so siren alerts will be given in case of any danger, but this burglar alarm with PIR sensor senses the moving warm-blooded infrared radiating objects and triggers the alarm to alert the person instantly. But direct hardware testing may lead to failure and damage of it so we can use some software tools for pre-testing purpose.

**Tinkercad** is one such software that allows anyone to design their own circuits and program Arduino projects without the need for physical hardware.

In this project, the activities are divided into 4 phases.

Phase-1: Starting the execution of design by selecting the components from Tinkercad software.

Phase-2: Connections are given to all the selected components as per the design.

Phase-3: The input and output are declared and code is being generated.

Phase-4: And testing the device and checking the output.

Tools used are Arduino Uno, PIR sensor, Buzzer, Led and resistors which are used in order to control direct power supply using Tinkercad.

Arduino is a microcontroller-based open-source electronic prototyping board, which can be programmed with easy-to-use Arduino IDE.

Why only the Arduino Uno board used in this project?

Uno is one of the boards in the Arduino family because documentation is more detailed in UNO.

### **Internal components of Arduino:**

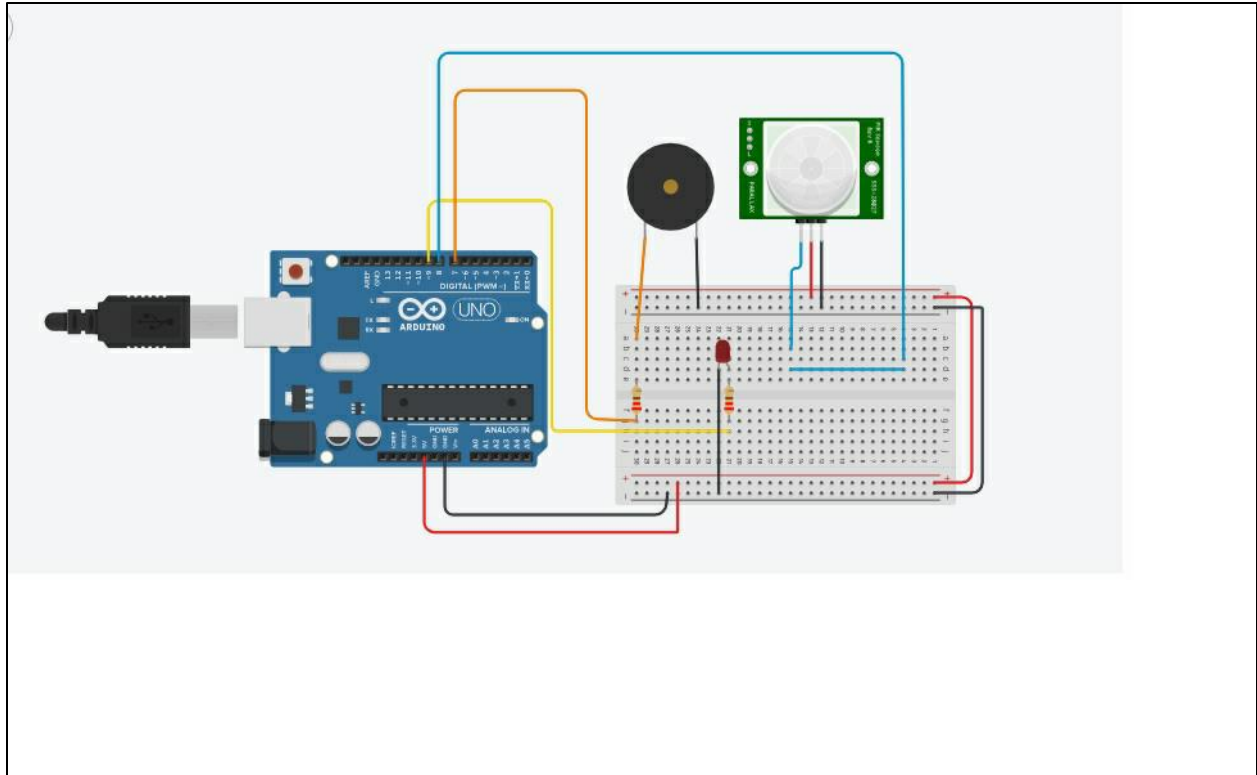
1. **USB connector**-use this port to load a program from Arduino board
2. **Microcontroller**-most prominent black rectangular chip with 28 pins, brain of Arduino.
3. **Digital pins**-You can find these pins labeled "Digital 0 to 13." These pins can be used as either input or output pins. When used as an output, these pins act as a power supply source for the components connected to them. When used as input pins, they read the signals from the component connected to them
4. **Analog input pins**-Arduino UNO board has 6 analogue input pins labeled "Analog 0 to 5". These pins can read signals from an analogue sensor and convert to digital signals. ( pin numbers 3, 5, 6, 9, 10, and 11). These pins act as normal digital pins but can also be used for Pulse-Width Modulation (PWM), which simulates analogue output like fading an LED in and out.
5. **Reset switch**: When this switch is clicked, it sends a logical pulse to the reset pin of the Microcontroller, and now runs the program again from the start. This can be very useful if your code doesn't repeat, but you want to test it multiple times.
6. **Crystal oscillator**: This is a quartz crystal oscillator which ticks 16 million times a second. On each tick, the microcontroller performs one operation, for example, addition, subtraction, etc
7. **USB interface chip**: Think of this as a signal translator. It converts signals in the USB level to a level that an Arduino UNO board understands.
8. **Power port**-Arduino board can be powered through AC to DC adaptor.

### **PIR sensor:**

PIR sensor is a combination of PIR and IR, the whole combination is a white shell passive infrared.

A PIR sensor is used here to detect the human body movement, whenever there is anybody movement, the voltage at the output pin changes. Basically, it detects the change in heat, produces output whenever such detection occurs.

### **SCHEMATICS & SIMULATION RESULTS:**



In the above schematic, an Arduino Uno board is used in which the 8<sup>th</sup> pin of it is given to accept the digital input of the PIR sensor.

The 7<sup>th</sup> pin is connected to the LED as a lighting system and the 9<sup>th</sup> is connected to the buzzer.

5v power pin and ground pins of the Arduino are connected to the 2<sup>nd</sup> pin of PIR, the cathode of LED and buzzer.

The “+” & “-” signs of the breadboard are interconnected. By executing the below code the simulation is done the result can be obtained in the form of sound, light and text.

### **CODE:**

```
int sensor=8; //The output of PIR sensor connected to pin 7
```

```
int buzzer=7; // buzzer connected at pin 8
```

```
int led=9; // led connected to the pin 7
```

```
int sensor_value; //variable to hold read sensor value

void setup()

{

pinMode(sensor,INPUT); // configuring pin 8 as Input

pinMode(led,OUTPUT); //configuring pin 9 as OUTPUT

pinMode(buzzer,OUTPUT); // configuring pin 7 as OUTPUT

Serial.begin(9600);

}

void loop()

{

sensor_value=digitalRead(sensor); // Reading sensor value from pin 7

if(sensor_value==HIGH) // Checking if PIR sensor sends a HIGH signal to Arduino

{

digitalWrite(buzzer,HIGH);// Activating the buzzer

digitalWrite(led,HIGH); // activating the led

Serial.println("burglar in the house"); // to print the detected info in serial monitor

tone(7,4000); //setting the frequency for buzzer

delay(500); // maintaining delay for the time duration

digitalWrite(buzzer,LOW);

noTone(7); // turning off the buzzer
```

```

digitalWrite(led,LOW);

}

}

```

By executing the above program the result can be seen in the serial monitor as “burglar in the house”, whenever there is motion detected by the sensor.

## CONCLUSION:

Security is a rapidly growing and essential field and there are new and improved burglar alarms coming up every day. With the rapid advancement of technology the field is turning out to be an area full of scope and new changes can be made to make it more efficient. By using the above model when an intruder has detected then PIR sensor senses and sets an alert sound and led glows. Thus we have successfully designed the prototype of instant alerting burglar alarm using a PIR sensor and Arduino.

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