

## Assignment: 6

**Aim:** What is PIR Sensor(HC-SR501)? Explain it's Structure, How it works, Applications. Programming & Interfacing of PIR Sensor with Arduino Uno. Develop anti-theft alarm system using PIR sensor.

### What is PIR Sensor(HC-SR501)?

The PIR sensor stands for Passive Infrared sensor. It is a low cost sensor which can detect the presence of Human beings or animals.

### Structure: -

The module has an on-board pyroelectric sensor, conditioning circuitry and a dome shaped Fresnel lens.

### Work: -

PIR sensor is specially designed to detect such levels of infrared radiation. It basically consists of two main parts: A Pyroelectric Sensor and A special lens called Fresnel lens which focuses the infrared signals onto the pyroelectric sensor. A Pyroelectric Sensor actually has two rectangular slots in it made of a material that allows the infrared radiation to pass. Behind these, are two separate infrared sensor electrodes, one responsible for producing a positive output and the other a negative output. The reason for that is that we are looking for a change in IR levels and not ambient IR levels. The two electrodes are wired up so that they cancel each other out. If one half sees more or less IR radiation than the other, the output will swing high or low.

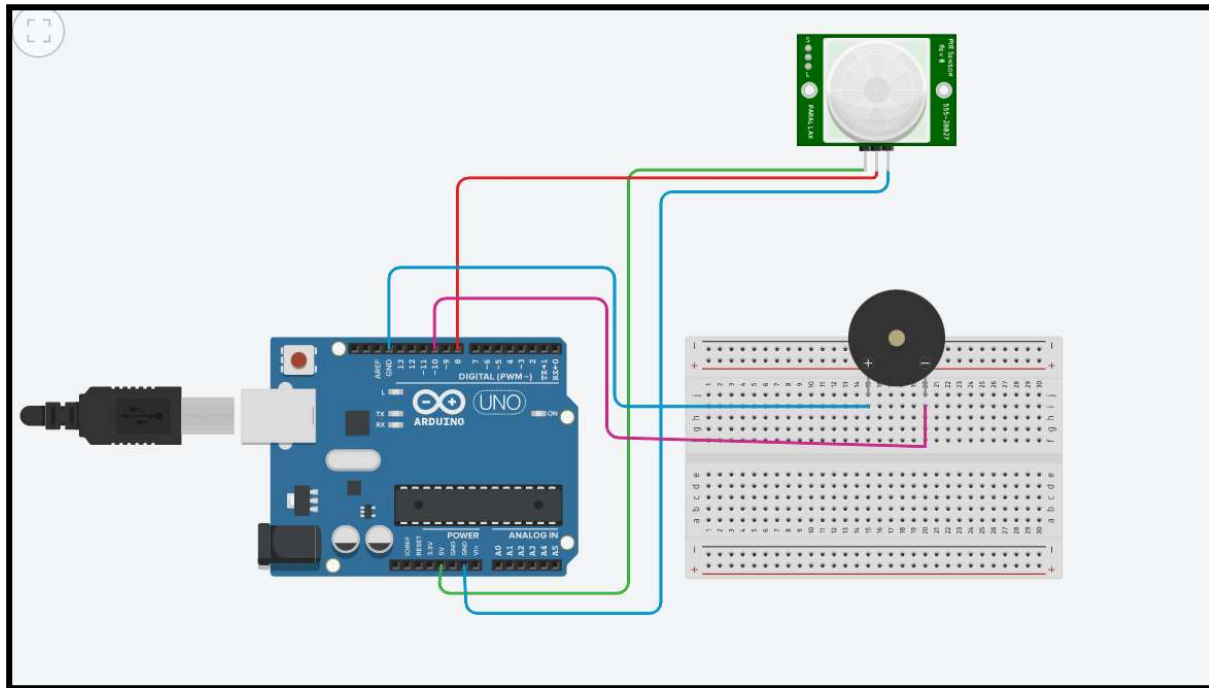
### Applications:-

Here are some of the popular applications of PIR sensors.

1. Lighting Control
2. Smart Home and IoT Applications
3. Motion Detection Using PIR Sensor

4. Automatic Door Opening System
5. Security Alarm System Based on PIR Sensor
6. Human Detection Robot Using PIR Sensor

**Set up:-**



**Code:-**

```
int ledPin = 10;           // choose the pin for the LED
int inputPin = 8;          // 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

void setup() {
  pinMode(ledPin, OUTPUT); // declare LED as output
  pinMode(inputPin, INPUT); // declare sensor as input
```

```
Serial.begin(9600);  
}  
  
void loop(){  
  val = digitalRead(inputPin); // read input value  
  
  if (val == HIGH) // check if the input is HIGH  
  {  
    digitalWrite(ledPin, HIGH); // turn LED ON  
  
    if (pirState == LOW)  
    {  
      Serial.println("Motion detected!"); // print on output change  
      pirState = HIGH;  
      delay(500);  
    }  
  }  
  else  
  {  
    digitalWrite(ledPin, LOW); // turn LED OFF  
  
    if (pirState == HIGH)  
    {  
      Serial.println("Motion ended!"); // print on output change  
      pirState = LOW;
```

```
}  
}  
}
```

**Circuit output:-**

