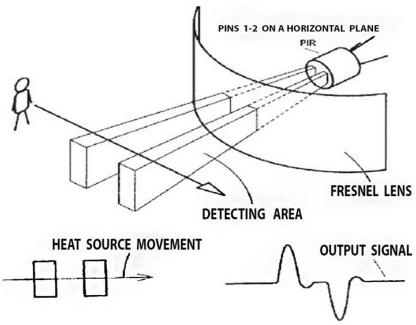
PIR Sensor
(Technical Note)

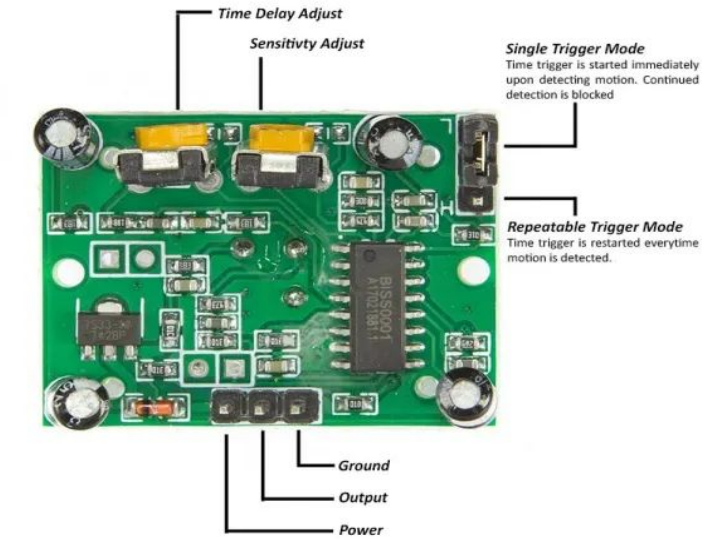
What is PIR Sensor?



A PIR (passive infrared) sensor is an electronic device that detects infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors.

Scientific Fact and Applications

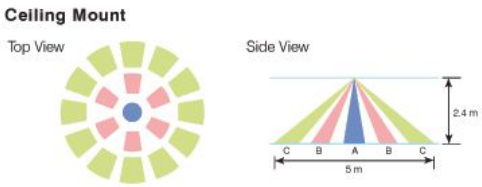
A PIR sensor is made of two slots where each slot is made of a special material sensitive to IR. When the sensor is idle, both slots detect the same amount of IR. When a warm body like a human passes by, it first intercepts one half of the PIR sensor, which causes a positive differential change between the two halves. When the warm body leaves the sensing area, the reverse happens,and the sensor generates a negative differential change. The sensor ultimately detects the change in pulses.

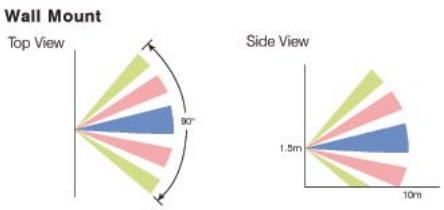


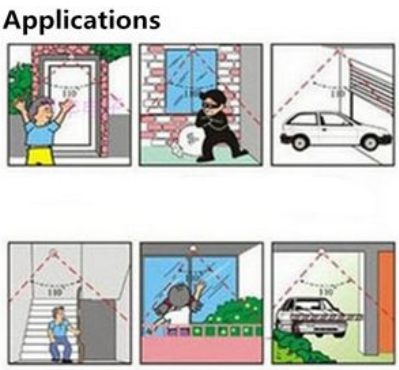
Applications:

Automatic Lighting Applications
PIR can sense the motion of human around it, in-turn signalling the circuit for change of operation. Thus, lights can be switched on or off.

Security Alarm System
System triggered for used in absence, can be utilised for security alarm. As under human intrusion, the sensor can detect it and pass the signal to system to alarm the owners.







References

1. https://learn.adafruit.com/pir-passive-infrared-proximity-motion-sensor/how-pirs-work
2. https://www.researchgate.net/figure/Working-principle-of-PIR_fig4_303314563
3. https://www.amazon.co.uk/Floodlight-Daylight-Waterproof-Security-Driveway/dp/B078NN33F7

Z2M Part Number:
EMS-00006-A

PIR Sensor
(Application Note)

Project

To glow external LED when human comes around the PIR motion sensor

Procedure

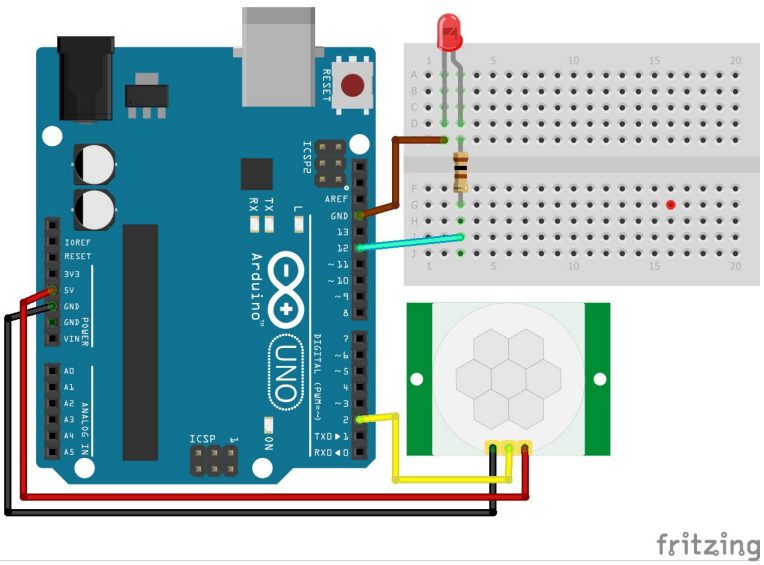
PIR Sensor Module:

- Connect **Vcc** pin of sensor to **5V** of Arduino
- Wire **GND** pin of the sensor to **GND** of the Arduino
- Connect **OUT** pin to **pin 2** of Arduino

LED:

- Connect **shorter leg(cathode)** to **GND** of Arduino
- Connect **longer leg(anode)** to one end of **100 Ω** resistor
- Connect another end of **100 Ω** resistor to **pin 12** of Arduino

Schematic



Challenge Yourself

1. Make the security alert system
2. Make automatic toy home automation using LEDs and toy fans

Components Required

Component	Part No.	Qty
Arduino UNO	EMX-00001-A	1
PIR Sensor	EMS-00006-A	1
LED - Red	EDD-00002-A	1
Resistor - 100Ω	EDR-001-100Z	1

Code

```
int sensorinput = 2;
/* the digital pin connected to the
sensor*/
int ledoutput = 12;
/* pin connected to LED*/
void setup()
{
  pinMode(ledoutput, OUTPUT);
/* this function is used to declare
led connected pin as output*/
  pinMode(sensorinput, INPUT);
/* this function is used to declare
sensor connected pin as input*/
}
void loop()
{
  int value =
digitalRead(sensorinput);
/* function to read analog voltage
from sensor*/
  if (value==HIGH)
/* function to check voltage level
from sensor*/
  {
    digitalWrite(ledoutput, HIGH);
/* make LED - ON*/
    delay(100);
/* to make the LED visible*/
  }
  else
    digitalWrite(ledoutput, LOW); /*
make LED - OFF*/
}
```