

CS225/226 MINI PROJECT REPORT

Motion detector using PIR sensor and Arduino

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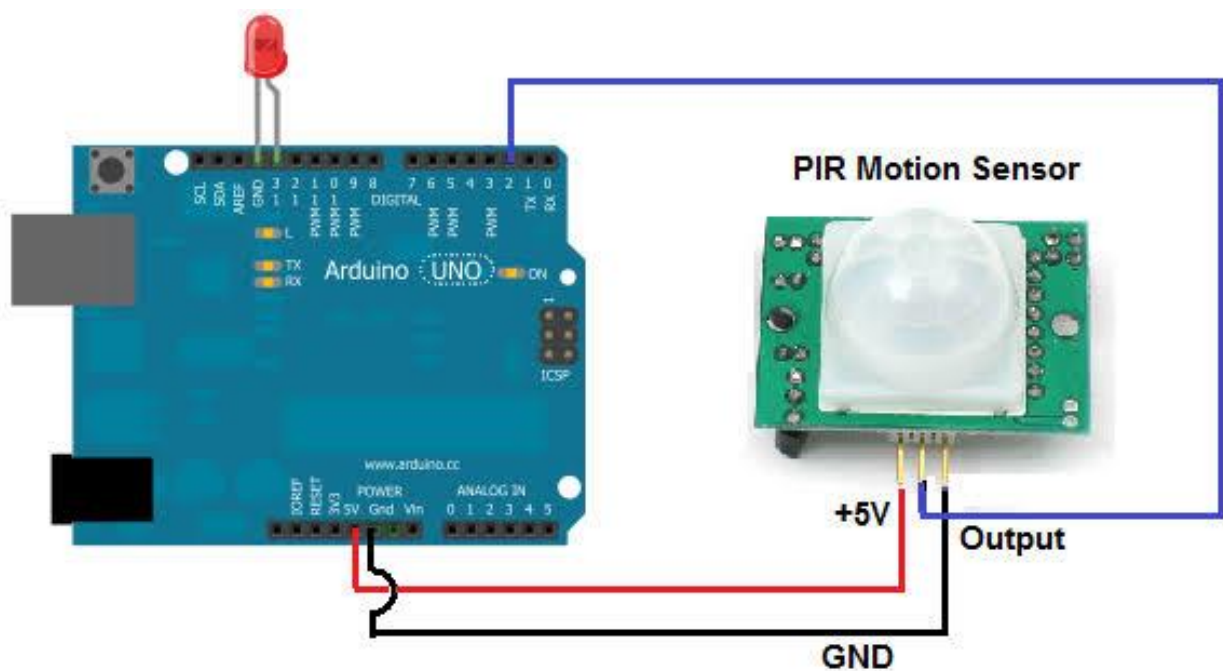
Aim :-

To build a motion detector using PIR sensor and arduino that detects motion and turn ON the LED as output.

Components Required :-

- Arduino UNO
- Passive Infrared Sensor (PIR Motion Sensor)
- Some wires
- LED

Circuit Diagram :-



Connections :-

PIR Motion sensor and Arduino

- The VCC pin of PIR sensor is connected to 5V digital pin with Arduino
- The ground pin of PIR sensor is connected to ground pin of Arduino.
- The output (middle) pin of PIR sensor is connected to digital pin no. 3 of Arduino.

Arduino and LED

- The positive pin of LED is connected to pin no. 13.
- The negative pin of LED is connected to ground pin of Arduino.

Code :-

```
//the time we give the sensor to calibrate (10-60 secs according to the datasheet)
int calibrationTime = 30; //the time when the sensor outputs a low impulse
long unsigned int lowIn; //the amount of milliseconds the sensor has to be low before we
assume all motion has stopped
long unsigned int pause = 5000;
boolean lockLow = true;
boolean takeLowTime;
int pirPin = 3; //the digital pin connected to the PIR sensor's output
int ledPin = 13;
//SETUP
void setup()
{
    Serial.begin(9600);
    pinMode(pirPin, INPUT);
    pinMode(ledPin, OUTPUT);
    digitalWrite(pirPin, LOW); //give the sensor some time to calibrate
    Serial.print("calibrating sensor ");
    for(int i = 0; i < calibrationTime; i++)
    {
        Serial.print(".");
        delay(1000);
    }
    Serial.println(" done");
    Serial.println("SENSOR ACTIVE");
    delay(50);
}
//LOOP
void loop()
{
    if(digitalRead(pirPin) == HIGH)
    {
        digitalWrite(ledPin, HIGH); //the led visualizes the sensors output pin state
        if(lockLow)
            return;
        takeLowTime;
        while(digitalRead(pirPin) == HIGH)
        {
            delay(pause);
            digitalWrite(ledPin, LOW);
            lockLow = true;
        }
    }
}
```

```

    { //makes sure we wait for a transition to LOW before any further output is made:
    lockLow = false;
    Serial.println("---");
    Serial.print("motion detected at ");
    Serial.print(millis()/1000);
    Serial.println(" sec");
    delay(50);
    }
    TakeLowTime = true;
    }
    if(digitalRead(pirPin) == LOW)
    {
    digitalWrite(ledPin, LOW); //the led visualizes the sensors output pin state
    if(takeLowTime)
    {
        lowIn = millis(); //save the time of the transition from high to LOW
        takeLowTime = false; //make sure this is only done at the start of a LOW
    phase
    }
    //if the sensor is low for more than the given pause, //we assume that no more motion is going
    to happen
    if(!lockLow && millis() - lowIn > pause) //makes sure this block of code is only
    executed again after a new motion
    sequence has been detected
    {
        lockLow = true;
        Serial.print("motion ended at "); //output
        Serial.print((millis() - pause)/1000);
        Serial.println(" sec");
        Delay(50);
    }
    }
}
//source :- Circuit Magic

```

Working :-

When any object comes in range of PIR motion sensor. It senses the motion and outputs a **HIGH** signal. The output pin of PIR sensor is connected to Arduino in digital pin no. 3. Arduino reads input from this pin no. 3. If input is **HIGH**. It makes the digital pin no. 13 to **HIGH** which turns **ON** the LED connected to this pin and after the delay time is over (set in code) is over or no motion detected. Arduino makes the pin no. 13 to **LOW** state which turns **OFF** the LED.

Result :-

When we put our hand in front of PIR sensor, the LED turns ON untill we remove our hand from the sensor or time exceed the delay time.

Applications :-

- It is used as washroom automatic light, which turns ON the washroom light when any motion is detected in washroom and turns OFF automatically after there is no motion.
- This can save a considerable amount of electricity as many people forget to turn OFF the washroom lights after using washroom.