Problem Statement: Understanding the connectivity of Arduino with IR sensor. Write an application to detect obstacle and notify user using LED.

Objectives:

1. To study about Arduino kit and its component.
2. To Learn the interfacing of IR sensor with Arduino UNO

Software & Hardware Requirements:

1. Operating System: Windows (XP/Vista/7/10)
2. Software: Arduino IDE 1.8.3
3. Hardware: Arduino UNO, IR sensor, Patch Cords, USB cable type A/B.

Theory:

IR Sensor : An infrared sensor (IR sensor) is a radiation-sensitive optoelectronic component with a spectral sensitivity in the infrared wavelength range 780 nm … 50 µm. IR sensors are now widely used in motion detectors, which are used in building services to switch on lamps or in alarm systems to detect unwelcome guests.

How Does an IR Motion Sensor Module Work?

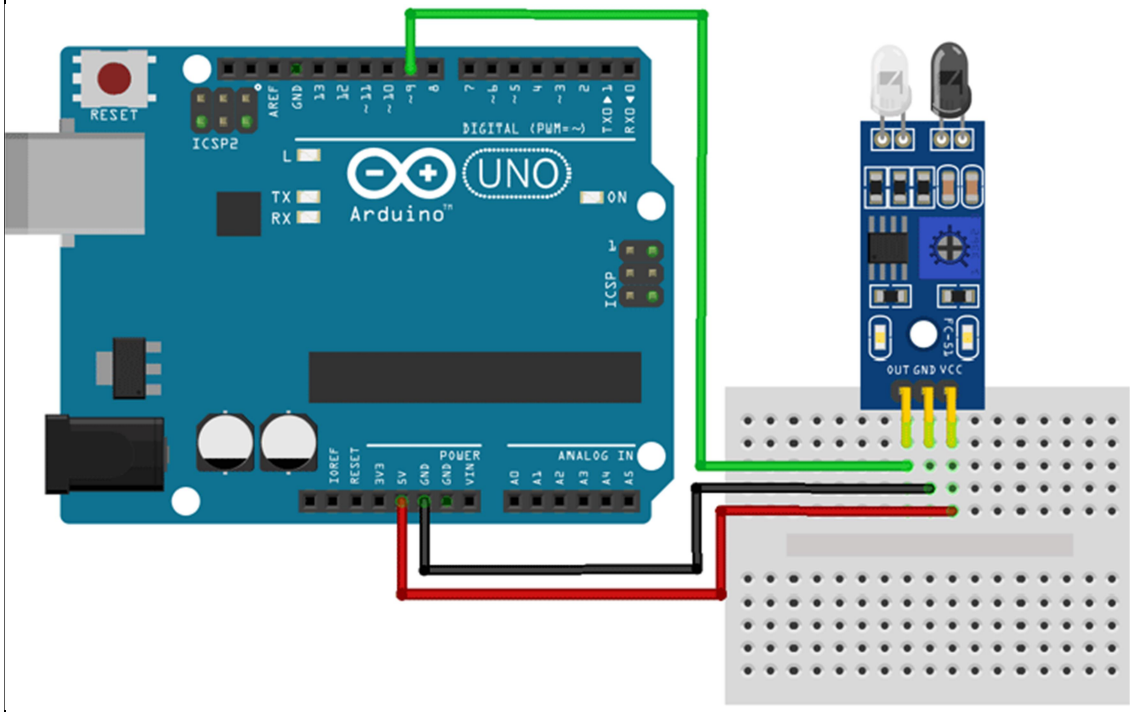
The working of the IR sensor module is very simple, it consists of two main components: the first is the IR transmitter section and the second is the IR receiver section. In the transmitter section, IR led is used and in the receiver section, a photodiode is used to receive infrared signal and after some signal processing and conditioning, you will get the output.

An IR proximity sensor works by applying a voltage to the onboard Infrared Light Emitting Diode which in turn emits infrared light. This light propagates through the air and hits an object, after that the light gets reflected in the photodiode sensor. If the object is close, the reflected light will be stronger, if the object is far away, the reflected light will be weaker. If you look closely toward the module. When the sensor becomes active it sends a corresponding Low signal through the output pin that can be sensed by an Arduino or any kind of microcontroller to execute a particular task. The one cool thing about this module is that it has two onboard LEDs built-in, one of which lights on when

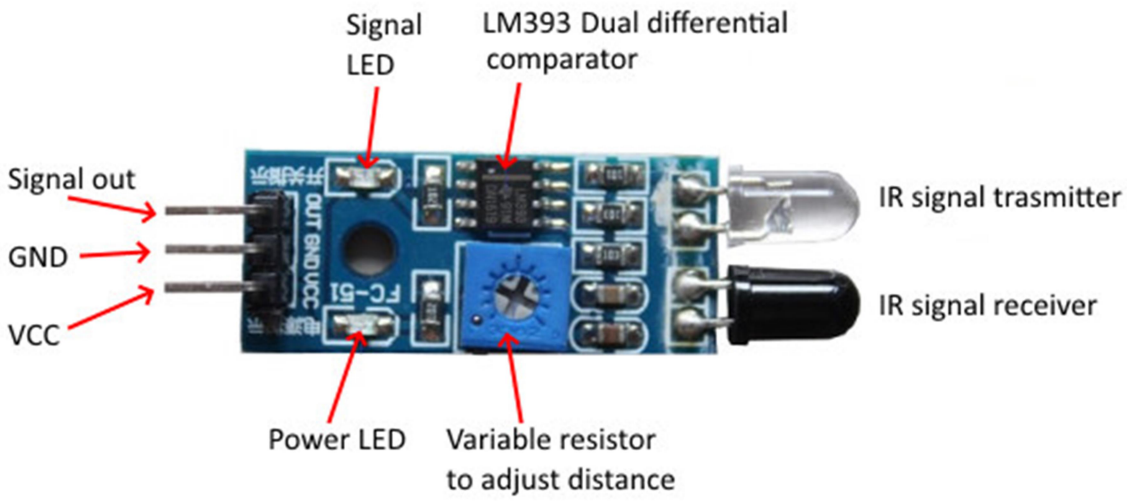
power is available and another one turns on when the circuit gets triggered.

IR Sensor with Arduino UNO – Connection Diagram :-

Now that we have a Connecting the IR sensor to any microcontroller is really simple. As we know this sensor outputs a digital signal and processing this signal is very easy. There exist two methods to do so first, you can always check the port in an infinite loop to see when the port changes its state from high to low, or the other way is to do it with an interrupt if you are making a complicated project the interrupt method is recommended. Power the IR with 5V or 3.3V and connect ground to ground. Then connect the output to a digital pin D9. We have just used a Male to Female Jumper wire to connect the IR sensor module with Arduino board as shown below. Complete understanding of how an IR sensor works, we can connect all the required wires to Arduino as shown below.



Signals and connections of the FC-51 Proximity sensor



VCC – 3.3 to 5 VDC Supply Input pin

GND – Ground Input pin

Signal out – Digital output pin. LOW when obstacle is in range

Power LED – Illuminates when power is applied

Signal LED – Illuminates when obstacle is detected

Variable resistor – Adjust detection distance. CCW decreases distance. CW increases distance.

Source Code

```
int IRSensor = 9; // connect ir sensor module to Arduino pin 9
int LED = 13; // conect LED to Arduino pin 13
void setup()
{
  Serial.begin(115200); // Init Serila at 115200 Baud
  Serial.println("Serial Working"); // Test to check if serial is working or not
  pinMode(IRSensor, INPUT); // IR Sensor pin INPUT
  pinMode(LED, OUTPUT); // LED Pin Output
}

void loop()
{
  int sensorStatus = digitalRead(IRSensor); // Set the GPIO as Input
  if (sensorStatus == 1) // Check if the pin high or not
  {
    // if the pin is high turn off the onboard Led
```

```
  digitalWrite(LED, LOW); // LED LOW
  Serial.println("Motion Ended!"); // print Motion Detected! on the serial monitor window
 }
 else
 {
  //else turn on the onboard LED
  digitalWrite(LED, HIGH); // LED High
  Serial.println("Motion Detected!"); // print Motion Ended! on the serial monitor window
 }
}
```