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CHITKARA UNIVERSITY INSTITUTE OF ENGINEERING &TECHNOLOGY

COMPUTER SCIENCE ENGINEERING

Project Report

On

Smart Street lighting

Course Name – Internet of Things

Course Code – CS201

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SMART STREET LIGHTING

1. INTRODUCTION TO THE PROJECT-To develop a solution for energy – efficient street lighting based on environmental parameters

a) Control the Street light automatically.

b) Save the data of IR sensor onto the cloud.

2. CIRCUIT DIAGRAM –

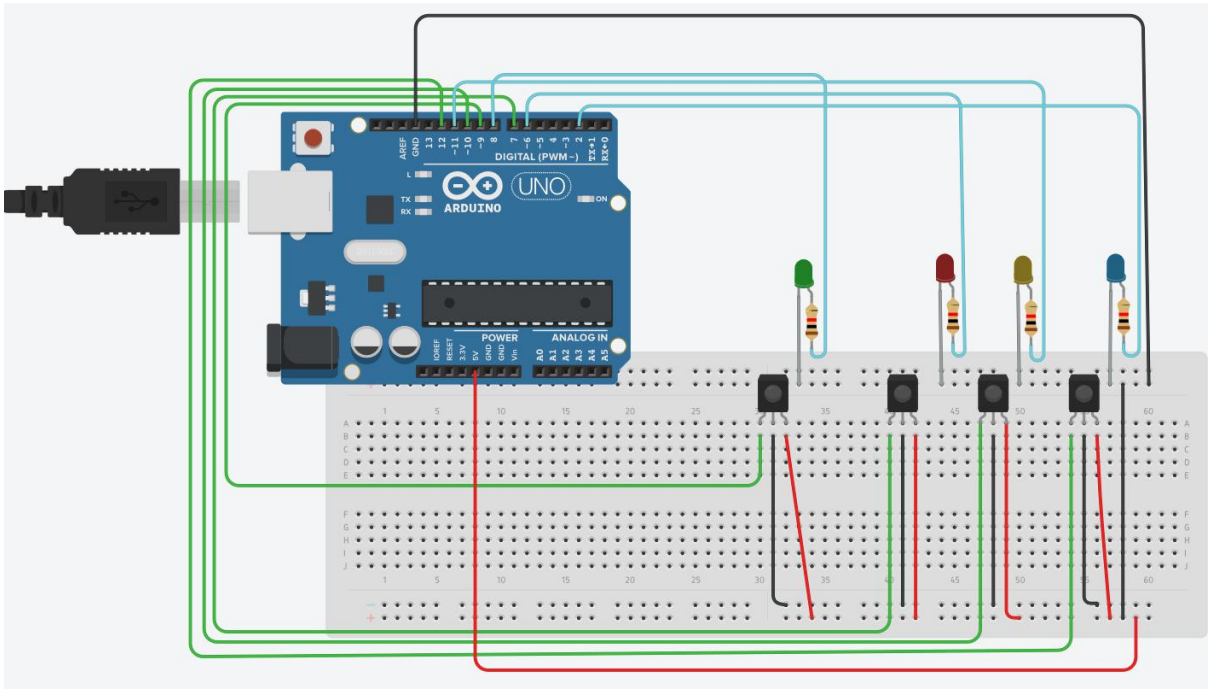

Fig1. Circuit diagram of connections of IR sensors with LED s on Arduino

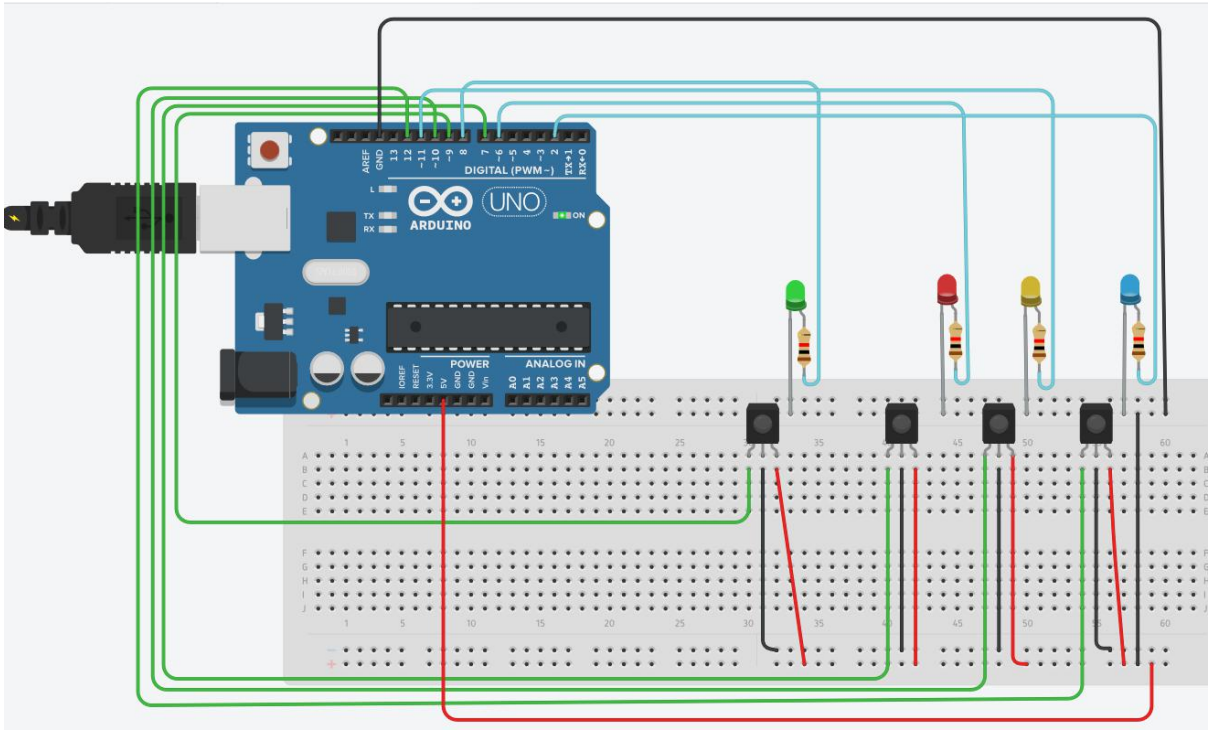

Fig2. Circuit diagram of working of IR sensors with LEDs using Arduino

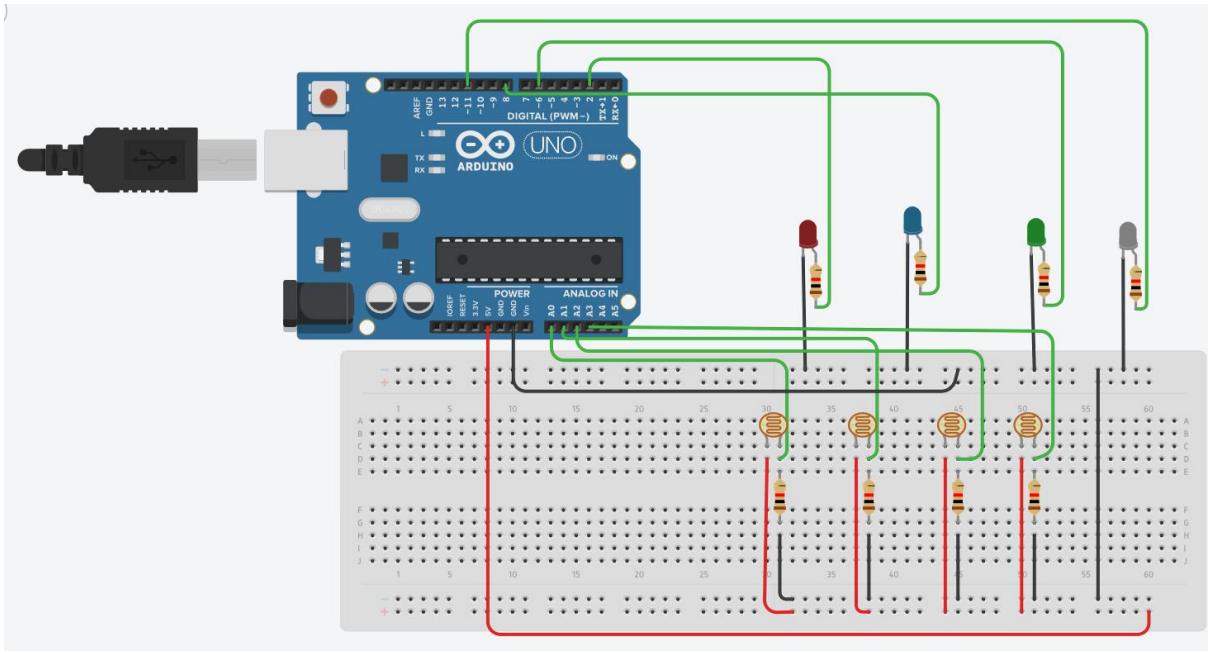

Fig3. Circuit diagram of connections of LDR with LED s using Arduino

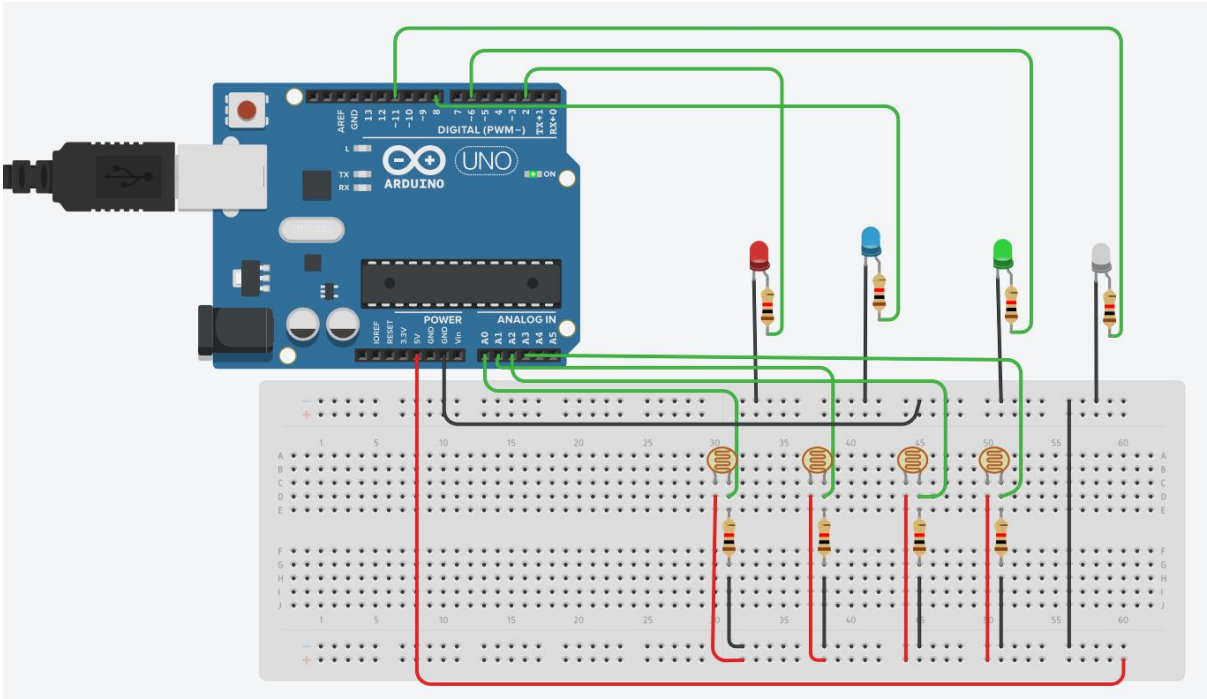

Fig4. Circuit Diagram of working of LDR with LED s using Arduino

3. WORKING OF THE PROJECT –IR Sensor or Infrared Sensor has two main parts. IR Transmitter and IR Receiver. The work of IR transmitter is to transmit the infrared waves whereas the work of IR receiver is to receive the infrared waves. IR receiver constantly sends digital data in the form of 0 or 1 to Vout pin of the sensor.This output of the sensor is used to determine the ON and OFF state of LED.If the output of IRsensor is 1 then led will remain in ON state and if the output of the iRsensor is 0 then LED will remain in OFF state.

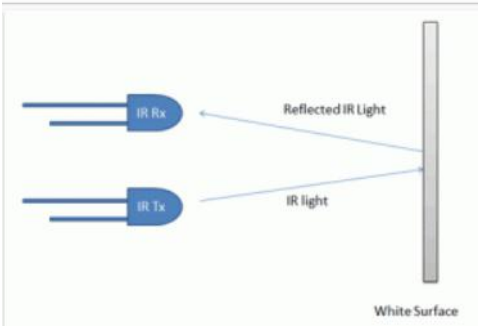

Fig5. Working of IR sensor

We can also control the light based of darkness outside, the light turns ON automatically when it is dark outside and turns OFF when it gets bright. For this purpose we use Light Depending Resistor(LDR).The principle here is of Photo Conductivity that is, whenever light falls on the surface of the LDR the conductance of the element(here it is LED)increases or in other words,the resistance of LDR falls when the light falls on the surface of the LDR.

As per the circuit diagram shown in fig4 ,we have made a voltage divider circuit using LDR and 10k resistor. The voltage divider output is feed to the analog pin of the Arduino. The analog Pin senses the voltage and gives some analog value to Arduino. The analog value changes according to the resistance of LDR. So,as the light falls on the LDR the resistance of it get decreased and hence the voltage value increase.

Intensity of light↓ - Resistance↑ -Voltage at analog pin↓ -LED turns ON

As per the Arduino code, if the analog value falls below 400, we consider it as dark and the light turns ON. If the value comes above 400,we consider it as bright and the light turns OFF.

The status of IR sensor is also uploaded on IOT cloud.

4. SCREENSHOT OF THE PROJECT-

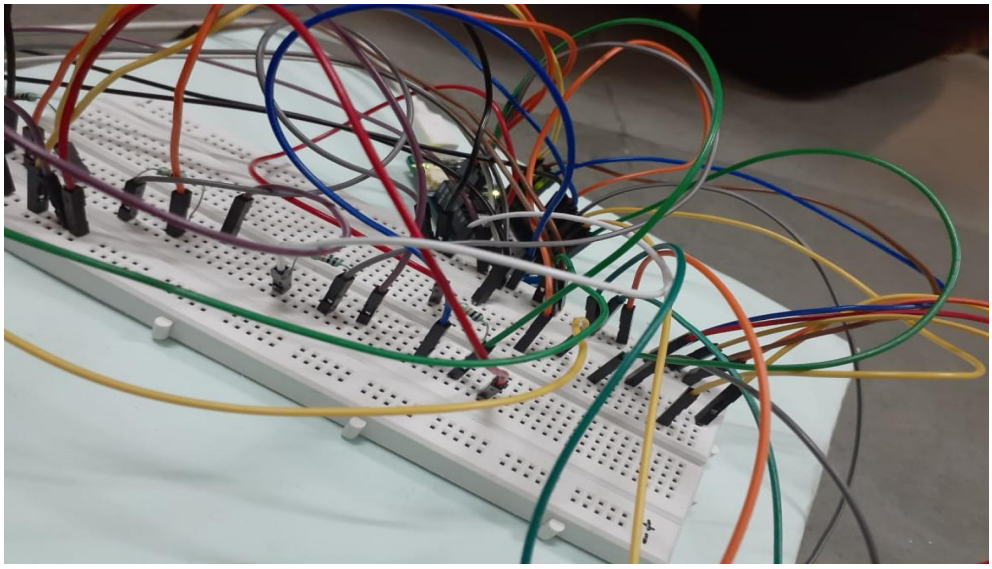

Fig6. Real time connections of IR sensors and LDR s with LED s

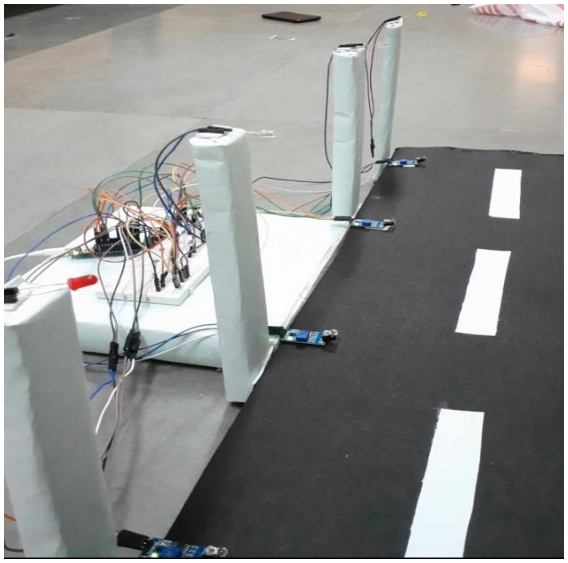

Fig7. LED s are OFF when light is ON

Fig8. LEDs are ON when Light is OFF

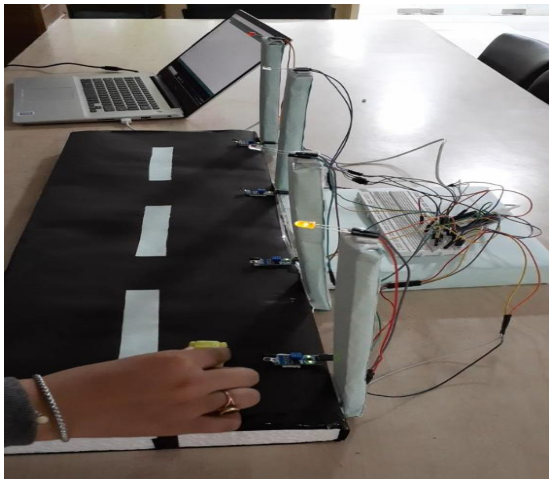

Fig9.Detection of object by IR sensor

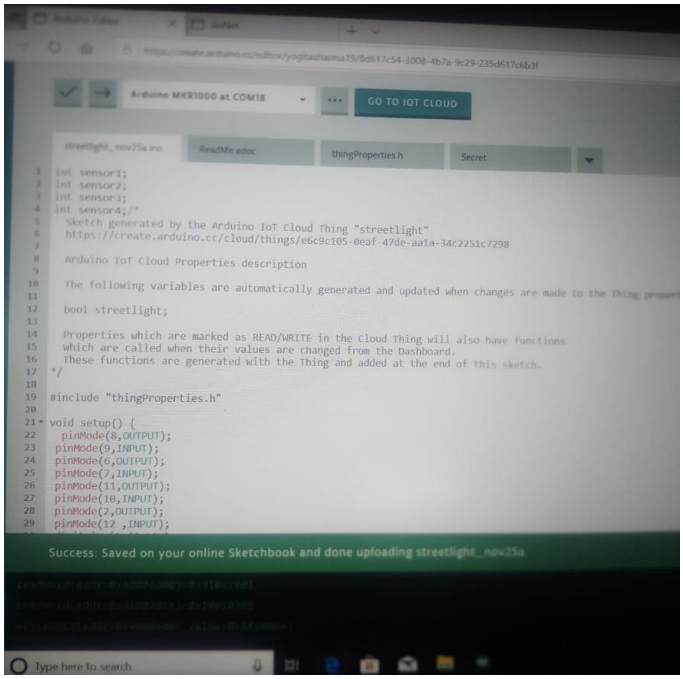

Fig10.Uploading the status of IR sensor on cloud

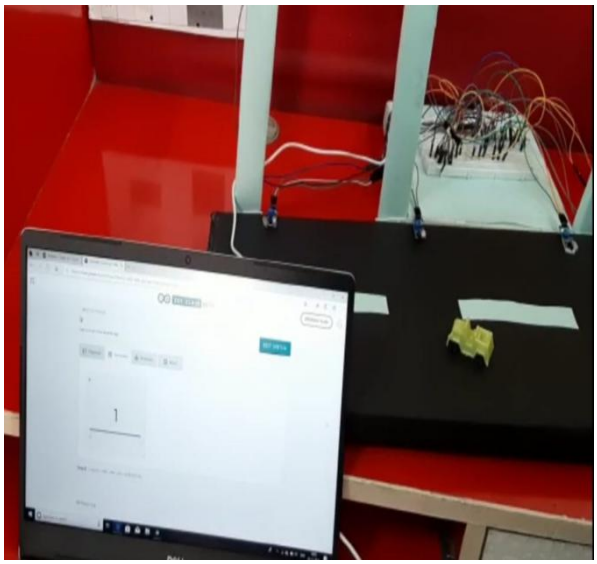

Fig11.Data uploaded on IOT cloud

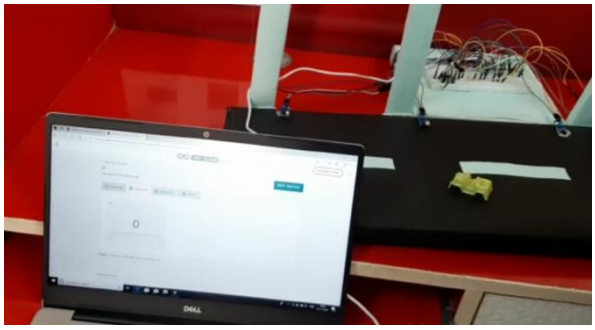

Fig12.Data uploaded on IOT cloud

5. SOFTWARE PROGRAM OF THE PROJECT-

Code for using IR Sensors with LED s on Arduino:

```
 int sensor1;
int sensor2;
int sensor3;
int sensor4;
void setup(){
 pinMode(8,OUTPUT);
 pinMode(9,INPUT);
 pinMode(6,OUTPUT);
 pinMode(7,INPUT);
 pinMode(11,OUTPUT);
 pinMode(10,INPUT);
 pinMode(2,OUTPUT);
 pinMode(12 ,INPUT);
 digitalWrite(8,LOW);
 digitalWrite(6,LOW);
 digitalWrite(11,LOW);
 digitalWrite(2,LOW);
}
void loop(){
 sensor1=digitalRead(9);
```

```
 if(sensor1==1)
 digitalWrite(8,LOW);
 else
 digitalWrite(8,HIGH);
sensor2=digitalRead(7);
if(sensor2==1)
digitalWrite(6,LOW);
else
digitalWrite(6,HIGH);
sensor3=digitalRead(10);
if(sensor3==1)
digitalWrite(11,LOW);
else
digitalWrite(11,HIGH);
sensor4=digitalRead(12);
if(sensor4==1)
digitalWrite(2,LOW);
else
digitalWrite(2,HIGH);
}
```

Code for using LDR s with LEDs on Arduino:

```
int LedPin1=2;
int LedPin2=8 ;
```

```
int LedPin3= 6;
int LedPin4=11 ;
int sensorPin1=A0;
int sensorPin2= A1;
int sensorPin3=A2 ;
int sensorPin4= A3;
int sensorValue1=0;
int sensorValue2=0;
int sensorValue3=0;
int sensorValue4=0;
void setup() {
pinMode(LedPin1,OUTPUT);
pinMode(sensorPin1,INPUT);
pinMode(LedPin2,OUTPUT);
pinMode(sensorPin2,INPUT);
pinMode(LedPin3,OUTPUT);
pinMode(sensorPin3,INPUT);
pinMode(LedPin4,OUTPUT);
pinMode(sensorPin4,INPUT);
digitalWrite(LedPin1,LOW);
digitalWrite(LedPin2,LOW);
digitalWrite(LedPin3,LOW);
digitalWrite(LedPin4,LOW);}
```

```
void loop() {
  int sensorValue1=analogRead(sensorPin1);
  if(sensorValue1>400)
  digitalWrite(LedPin1,LOW);
  else
  digitalWrite(LedPin1,HIGH);
  int sensorValue2=analogRead(sensorPin2);
  if(sensorValue2>400)
  digitalWrite(LedPin2,LOW);
  else
  digitalWrite(LedPin2,HIGH);
  int sensorValue3=analogRead(sensorPin3);
  if(sensorValue3>400)
  digitalWrite(LedPin3,LOW);
   else
   digitalWrite(LedPin3,HIGH);
  int sensorValue4=analogRead(sensorPin4);
  if(sensorValue1>400)
  digitalWrite(LedPin4,LOW);
  else
  digitalWrite(LedPin4,HIGH);}
```

Code uploaded on IOT cloud:

```
Int sensor1;
```

```
Int sensor 2;
Int sensor 3;
int sensor 4;
#include”thingProperties.h”
Void setup(){
pinMode(9,INPUT);
pinMode(7,INPUT);
pinMode(10,INPUT);
pinMode(12,INPUT);
Serial.begin(9600);
delay(1500);
initPropeties();
ArduinoCloud.begin(ArduinoIoTPrefferedConnection);
setDebugMessageLevel(2);
ArduinoCloud.printDebug Info();
}
Void loop() {
ArduinoCloud.update();
Sensor1=digitalRead(9);
Sensor2=digitalRead(7);
Sensor3=digitalRead(10);
Sensor4=digitalRead(12);
}
```

6. BILL OF THE MATERIAL USED -