Automatic Nightlight: Human Presence Detection

Name : Pramod Basavaraj Menasi Date : 30/05/2024

Project Overview:

o Automatic Nightlight (Human Presence):

- Turns on LED light when someone enters at night (PIR sensor).
- Saves energy by staying off during the day and after inactivity.
- Ideal for hallways, children's rooms, or low-traffic areas

INTRODUCTION:

Generally, we can see street lights are ON even after sunrise and no presence of human thus by having an automatic street light control system, which turns ON and OFF street lights when ambient light falls below a specific intensity, for this, we can use LDR sensor. In this system, we are also using a PIR motion sensor which detects the motion of the object such as human and animal passing through it, using this motion of object LED's are turned ON.

Most of the time we see street lights are ON even after sunrise and no presence of any person who needs light thus by having an automatic street light control system which turns ON and OFF street lights when it detects a person and also when ambient light falls below a specific intensity. The manpower required for controlling the light cuts a huge cost, so using this system we can also reduce the cost of manpower and reduce unnecessary power consumption. We also know that during day time there is no essence of street light this problem is solved by LDR sensor. LDR sensor keeps the street light OFF in day time. When the light intensity is low then the LDR is stared working and the light is switched on.

The main aims of this project are to implement an auto-intensity control of LED-based on LDR and PIR motion sensor. PIR motion sensor detects the human presence and turns ON/OFF LED light. LDR and PIR motion sensor interface with a microcontroller, as the surrounding light decreases LDR sensor turn on the LED light and also when PIR sensor detects motion it turns ON lights.

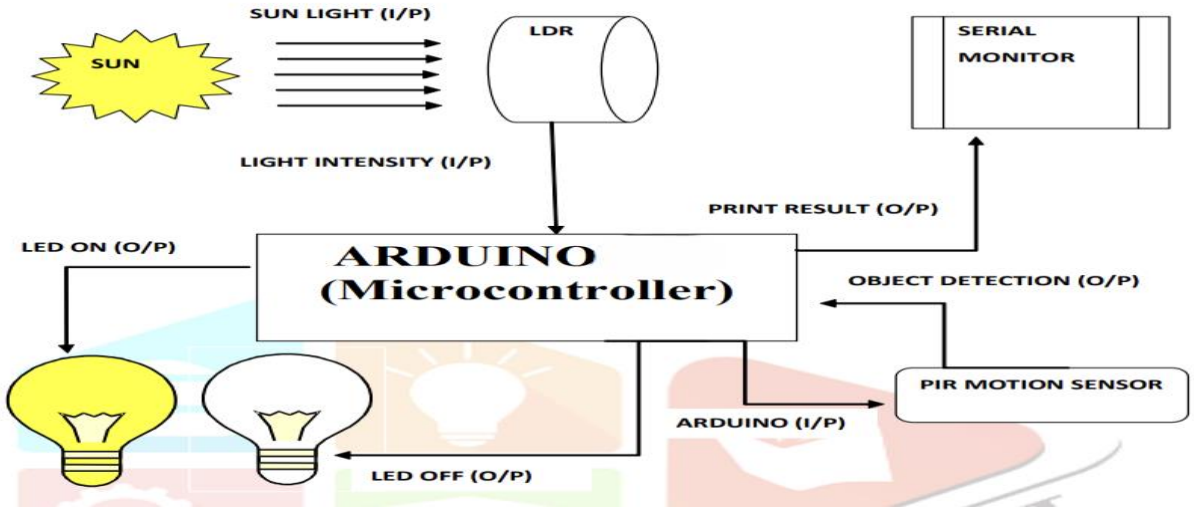

fig: : The architecture design of the automatic street light control system

Automatic Nightlight: Human Presence Detection

Name : Pramod Basavaraj Menasi Date : 30/05/2024

SYSTEM COMPONENTS:

An automatic streets light control system consists of Arduino nano, LDR sensor, PIR motion sensor, LED, resistor, breadboard, jumper wire .

S.No	Components
1	Arduino nano
2	PIR motion sensor
3	LDR sensor
4	LED
5	Resistor

BLOCK DIAGRAM AND DESCRIPTION:

As described in the introduction two parameters are to be considered in this system. One, the street light is controlled when the intensity of light in the surrounding environment is below the given value and another one is detected human presence. These tasks are done by using LDR and PIR motion sensors respectively.

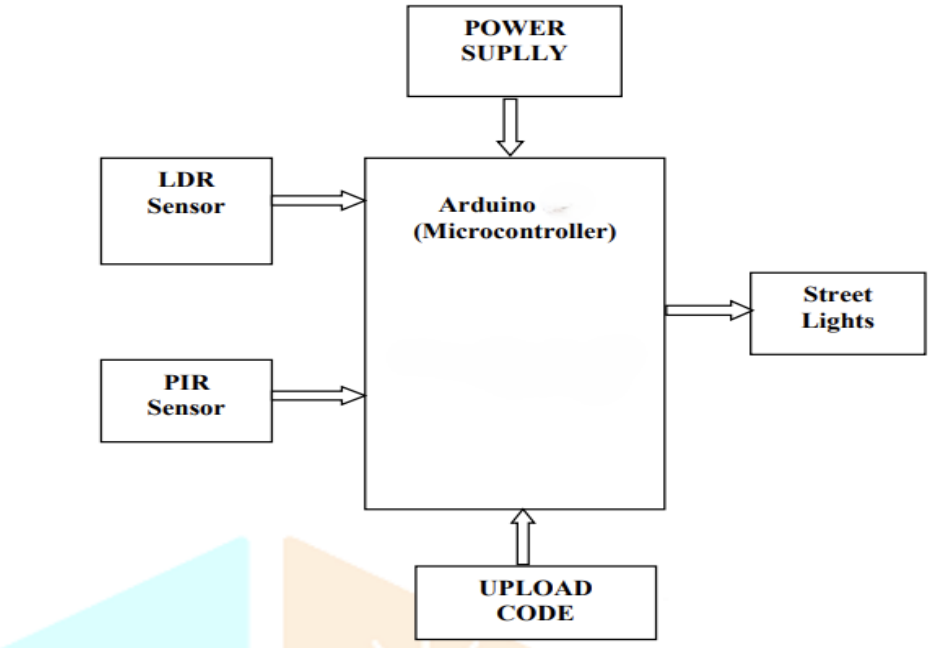

Fig: Block diagram for Automatic Street Light System

Automatic Nightlight: Human Presence Detection

Name : Pramod Basavaraj Menasi Date : 30/05/2024

In this block diagram of the project, we can use LDR and PIR motion sensor as input and street light or lead as output for the project. The sensor can take data from the outer environment and give it to the microcontroller here we can use Arduino Nano as a microcontroller. The microcontroller process the data come from the sensor and take action according to the input data. Arduino is the central unit or brain of the project it can control sensor and light

FLOW CHART:

In this project we can use two sensors for controlling the street light one is LDR and another is a PIR sensor so that now we can see the flow or working of both sensors separately for a better understanding of the system.

Object Detection:

The first flow chart shows the PIR sensor working processor where initially the process is started. Then if any person passes in front of the PIR sensor, it detects the person and sends the PIR value to the microcontroller and the microcontroller turns ON the light and if the person does not present the light OFF, Finally the process is stopped.

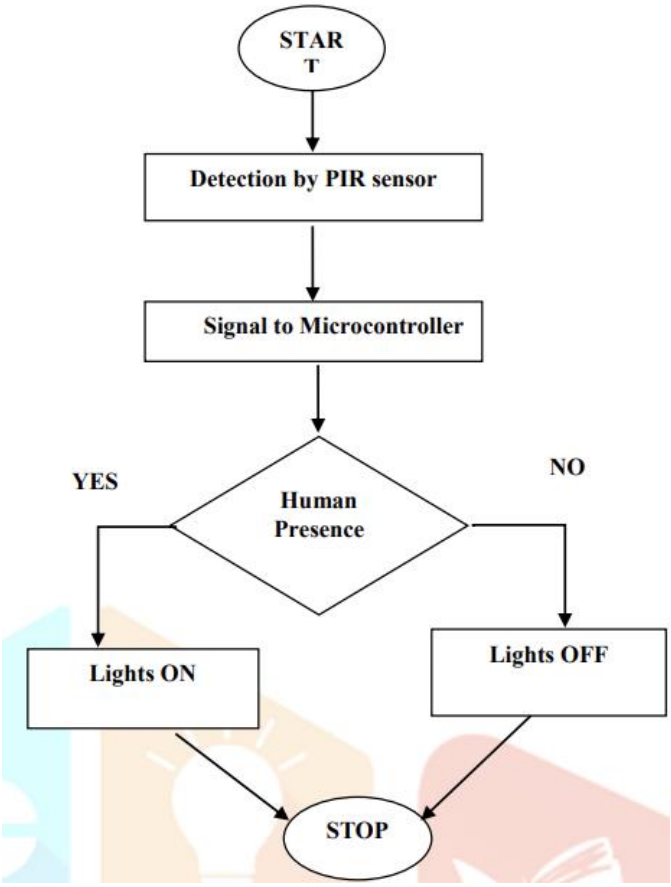

Fig: Flow chart for object detection

Automatic Nightlight: Human Presence Detection

Name : Pramod Basavaraj Menasi Date : 30/05/2024

Light Detection:

In the LDR flow chart initially, the process is started if the LDR sensor detects the light it sends the signal to the microcontroller and if the environment light intensity match to give value microcontroller turn ON the light and if the sensor read value is not matched to set value the light remains low. At the last step, the process is stopped.

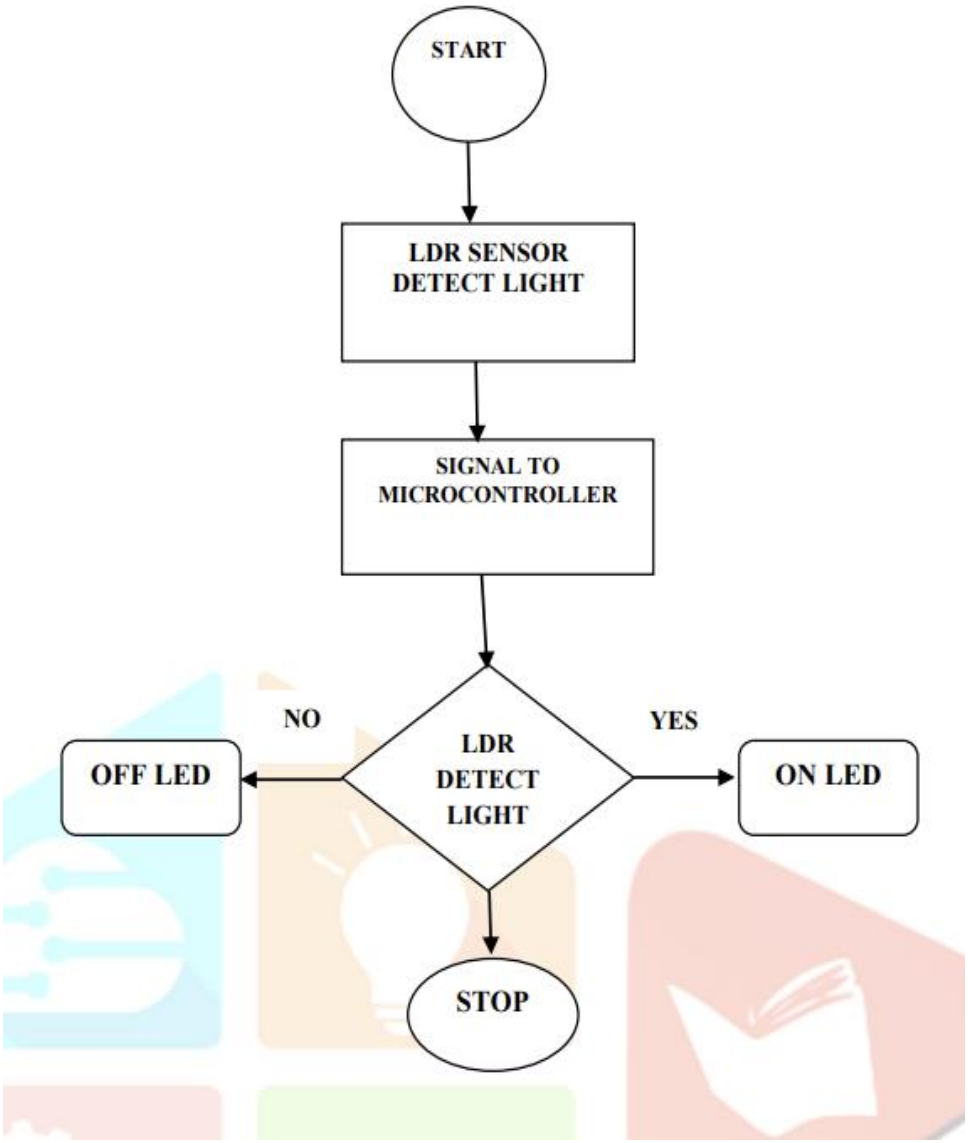

Fig: Light intensity detection flow chart

Automatic Nightlight: Human Presence Detection

Name : Pramod Basavaraj Menasi Date : 30/05/2024

SCHEMATIC DIAGRAMS:

1. Insert your LDR sensor into the breadboard. Connect one leg to the +5v of Arduino using a jumper wire. Connect the other leg of the LDR to A0 (analog pin of the Arduino) and one pin of the 10k ohm resistor. Connect the other pin of the 10k-ohm resistor to the GND of the Arduino pin

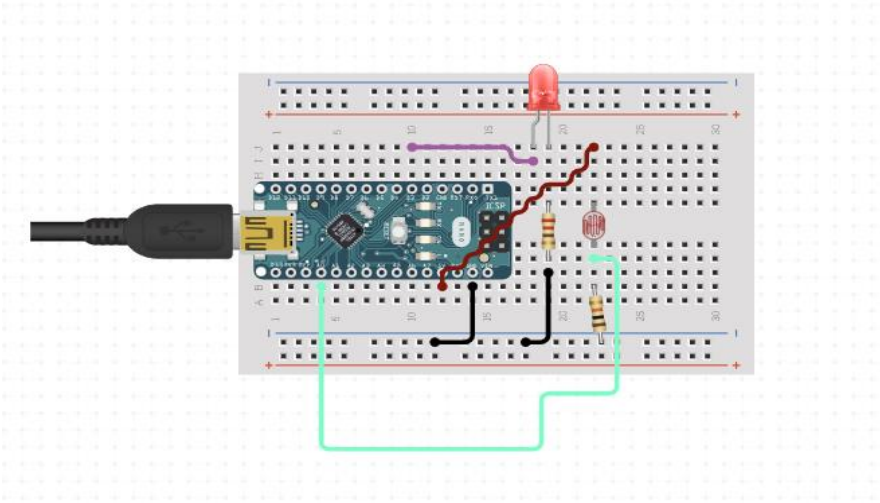

Fig: Semantic diagram of LDR and Arduino

2. Connect the PIR sensor +5V and GND wires to the +5V and GND rails on the breadboard, and connect these rails to the Arduino. Connect the PIR sensor's output wire to Arduino pin 2.

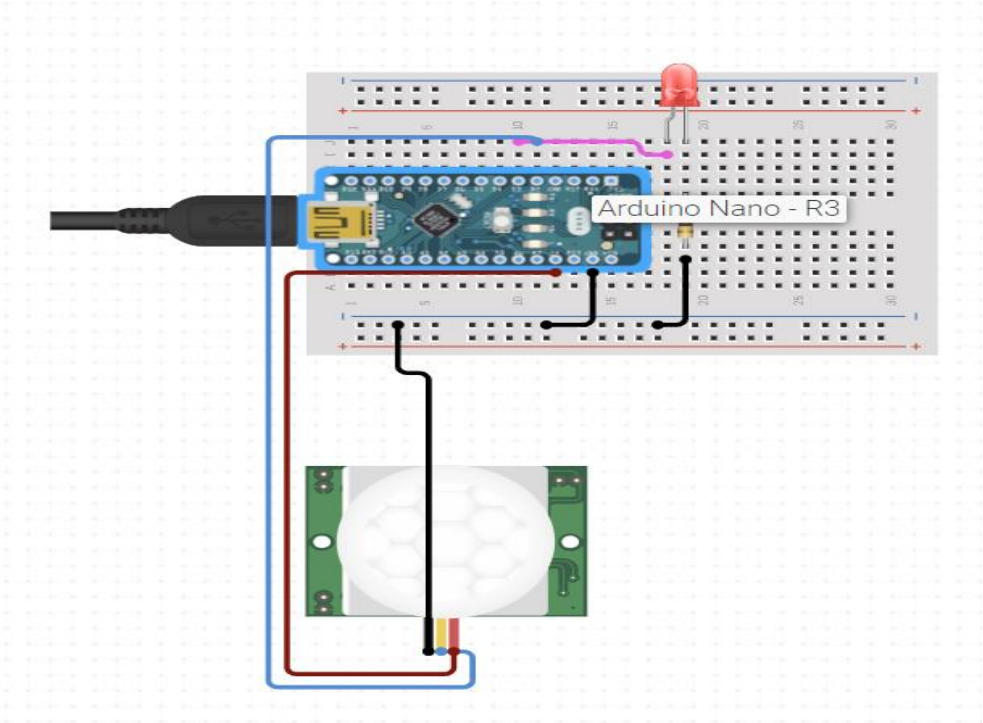

Fig: Semantic diagram of PIR sensor and Arduino

3. Insert an LED into the breadboard and connect the long, positive leg to Arduino pin 3 via 220-ohm resistor, and the short, negative leg to GND.

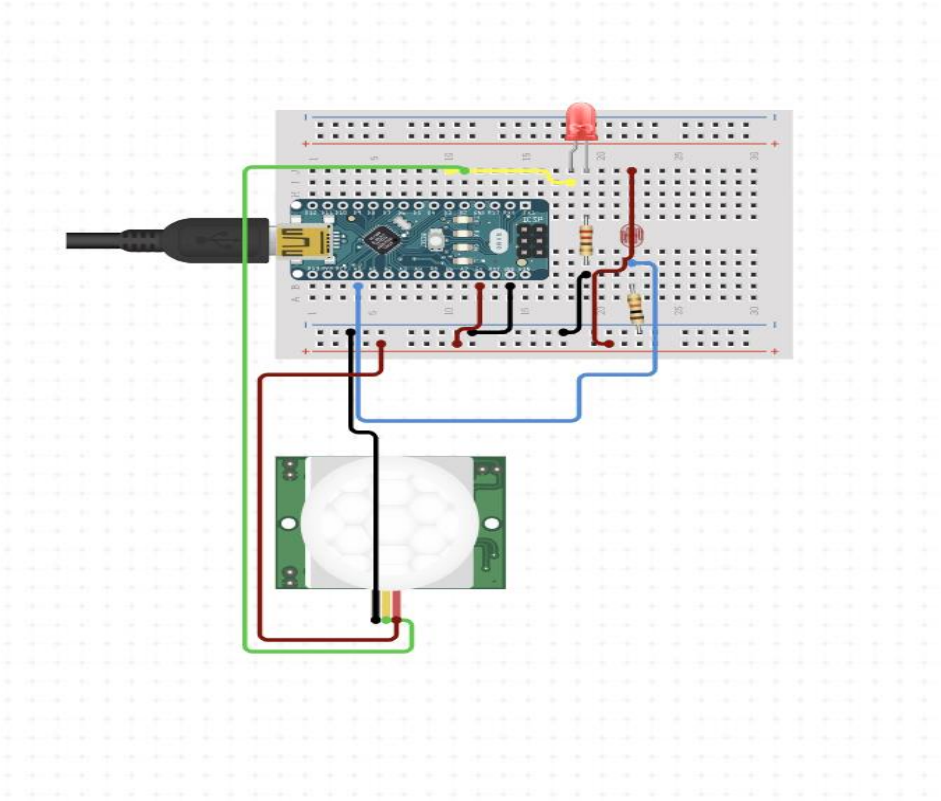

Fig: Pin configuration for final project components

4. Connect the USB port of Arduino with a computer for uploading code and power

```
int led=3;
int pir=2;
int ldr_value;
bool pir_value;


void setup() {
 pinMode(led,OUTPUT);
 pinMode(pir,INPUT);
 Serial.begin(9600);


}

void loop() {
ldr_value =analogRead(A0);
```

Name : Pramod Basavaraj Menasi Date : 30/05/2024

```
pir_value = digitalRead(pir);

if(ldr_value <520){
  if(pir_value == HIGH){
    digitalWrite(led,HIGH);
  Serial.println("Motion detected");
  delay(3000);

  }else{
     digitalWrite(led,LOW);
  Serial.println("Motion stopped!");
  }

}else{
   digitalWrite(led,LOW);

}


Serial.print("LDR value is :");
Serial.println(ldr_value);
delay(100);
```

Fig: Code for the project

RESULTS AND DISCUSSIONS:

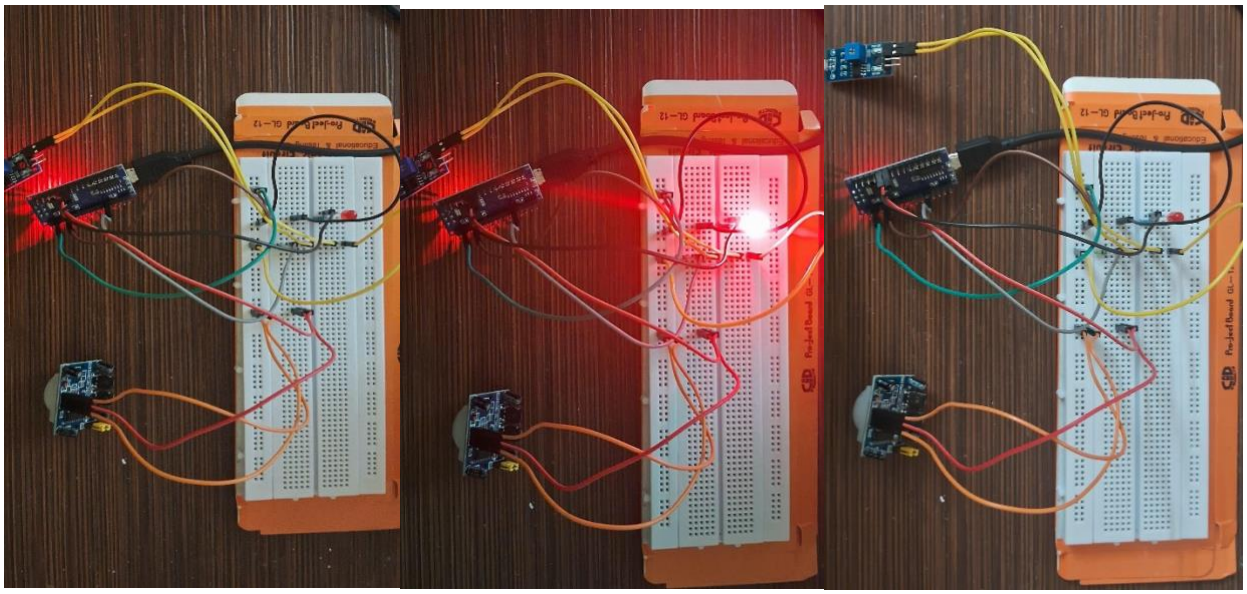

Fig:(a) Fig:(b) Fig:(c)

Automatic Nightlight: Human Presence Detection

Name : Pramod Basavaraj Menasi Date : 30/05/2024

Fig: (a). Initially LED value LOW due to no motion and the LDR value is high (b). LED value HIGH because LDR value is less than set value AND LED value HIGH because motion is detected by the PIR sensor. (c). Now motion is not detected by the PIR sensor and the LED value LOW again.

Fig:(a)

Fig:(b)

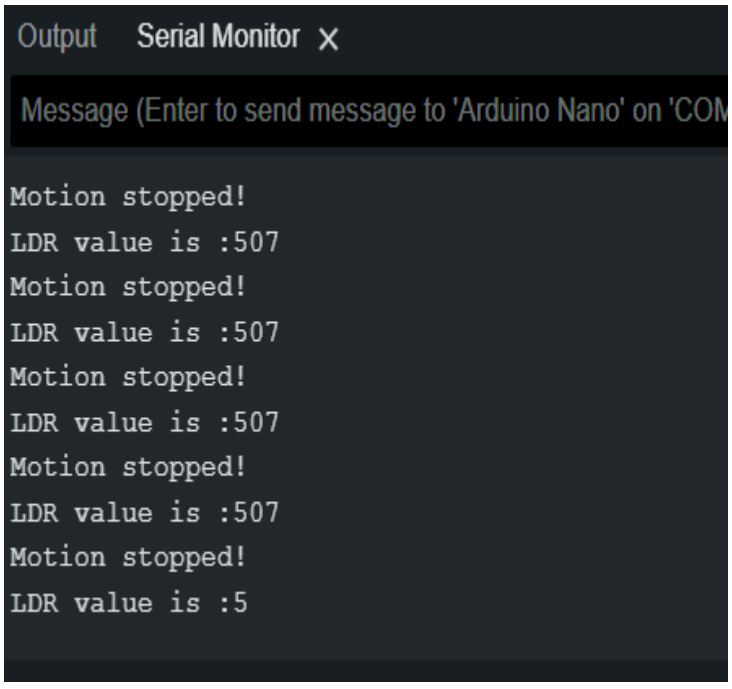

Fig:(c)

Automatic Nightlight: Human Presence Detection

Name : Pramod Basavaraj Menasi

Date : 30/05/2024