

Automatic Smart Street Light by Intensity Controller Using Node-MCU

Sandhya Pasala, Veeramanickam M.R.M, Mamatha Vayelapalli

Abstract; India facing one of the major problem is maintenance of street lights. In India street lights are maintained manually, it is found that there is wastage of power by operating the street lights due to manual operations like switch on the lights at day time. Due to that wastage of electricity will be occurred. The methods that are working on the maintenance of street lights are not effective. In this paper a new technique is proposed to control the intensity of LED lights using LDR sensors and PWM drivers resulting in power saving and reducing the manual errors by controlling automatically. Implementation is done using NodeMCU. For effective communication, sending the status of the street lights by using Blynk App for monitoring the street lights effectively.

Keywords; NodeMCU, Street Lights, LDR, PWM driver, Battery, Regulator, Blynk App.

I. INTRODUCTION

In present days we can see there is a lot of wastage of electricity. especially in street lights. Street lights are controlled manually in olden days. These days automation of street lights has emerged. As we do not required high intensity light of lights in the peak hours i.e. when there is no traffic and even in early mornings. This reduction of lights brightness intensity helps to save more energy of power consumption to the small extent. So in this project we are implanting based on the intensity of light. The intensity of the light will be calculated and based on that intensity the LED lights will glow. The brightness of the LED lights will be gradually increased with respective to the intensity and the brightness will decrease when the intensity of the light is low. So that we can reduce the electricity and no man labour is required.[1][2]

The objective of the project is to provide automatic control on street lamps and street lamp glowing at day or Street lamp not glowing at night then attend the problem immediately. The main purpose of this project is to reduce the wastage of electricity in the field of Street lights, reducing the manual errors and providing safety at late hours.

II. EXISTING SYSTEM

Most of the existing application is studied about the automatic light intensity automation in various platform like this system used LDR sensing techniques in sensing required light intensity with PIR based motion sensing used to detects its speed of objects motions. This entire concept deployed in

the mobile application which is controlled using a database which collects data in real time. [3][4]

In this model, Arduino used to do the comparison for switch ON and OFF timing with the help of the rtc module deployed to match required outputs. The LED which is attached will be turned OFF based on inputs matches with on and off modules with Aurdino.[5] In this application users used manual controlling for the street lights based on lot time allotted for taking in the evening timing which helps to switch ON.[6][7] Most of the application making automation in controlling lights with the help of the internet of things feature's with Aurdino.[8] The light controlling the intensity with the help of dimmer basic circuits. This Light dependent resistor which is used for sensing darkness and then Passive Infrared are used for detecting any objects. Raspberry Pi acting as master and then Arduino is used as slave for communicating among one another.[9][10]

In the existing system street light automatic intensity controlling done by using Aurdino UNO. Arduino is an open-source hardware kit with 8-bit Atmet AVR pre-programmed on-board micro-controller kit, with boot loader that uploads programs into micro-controller memory. In this work, two kinds of sensors namely, PIR, which is a motion sensor, used to identify passage of vehicles or pedestrians and LDR is a light sensor which will detect intensity of sun light. Wi-Fi module is a wireless communication medium, used to send/receive information from/to street lights and control unit.[11][12]

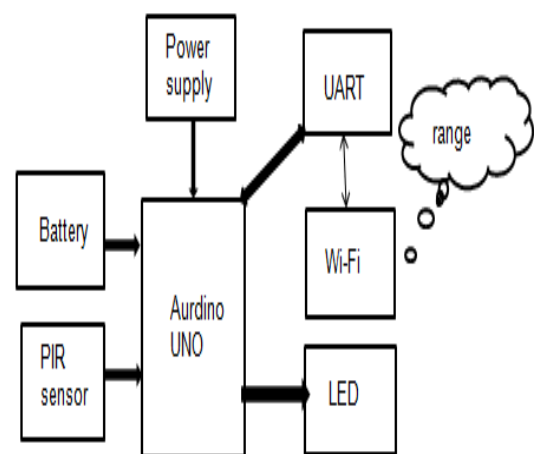


Fig:1 Block Diagram

Revised Manuscript Received on June 8, 2019

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III. PROPOSED SYSTEM

It is proposed to reduce the wastage of electricity and manual errors while maintaining the street lights and providing security at late hours, it is proposed to glowing of street lights with the help of Internet of Things . In which we simply design that without any help of human or man power we can automatically turn on and turn off the lights.

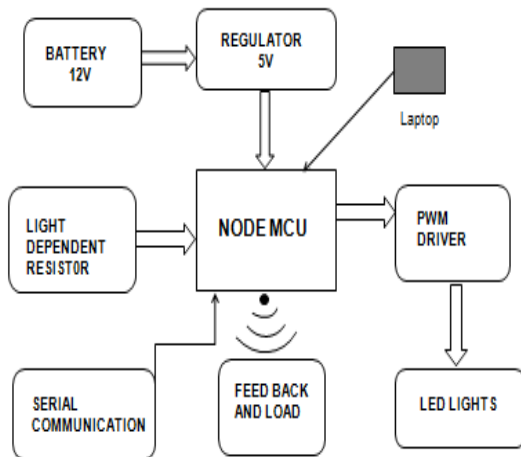


Fig:2 Block Diagram of Working Model

IV. DESIGN

The first level in the development phase is design in methodology and techniques towards the purpose of device, for process or system. For the deceives physical permit and usage for realization. Whensoever requirements are collected and analyzed for the software towards the design for three levels of technical work like designing, code for implementation, finally testing. All these are used to build the software as expected.

V. IMPLEMENTATION

Implementation is the part of the process where software engineers actually program the code for the project. Here, we are using both hardware and software. When light ray is incident on LDR sensor it will captures the light singles and send to NodeMCU . In NodeMCU we had preload the code which written in embedded C by using Arduino IDE platform for connecting hardware and software. The code which is present in NodeMCU will processed and led lights will be activated according to the intensity presented on the LDR sensor i.e light intensity decrease led light glow and if intensity increases then led will be dim this glowing of lights can be done by PWM driver. Blynk app will display the information about Led on or off state. By using this technology we can know the status of the light any where in the world. The source code has been written in embedded c.

A. SAMPLE CODE:

STEP 1:

INITIALIZATION:

```

Int sensor= A0;
Char author[];
  
```

```

// Wi-Fi credentials, password
  
```

```

Char ssid[];
  
```

```

Char pass[];
  
```

```

Int output=D1;
  
```

```

Int output=D2;
  
```

STEP 2:

SETUP:

```

// initialize the digital pin as an output
  
```

```

pinMode(output, OUTPUT);
  
```

```

pinMode(output1, OUTPUT);
  
```

```

//initialize the blynk app
  
```

```

Blynk.begin( aut, ssid, pass);
  
```

```

//initialize serial communication at 9600 bits per second
  
```

```

Serial.begin(9600)
  
```

STEP 3:

LOOP:

```

Run the blynk app
  
```

```

Int reading= analogRead (sensor);
  
```

```

Print reading
  
```

```

Blynk.virtualWrite(v2,reading);
  
```

```

Int bright=reading/4
  
```

```

//Wait for 500ms
  
```

```

Delay(500);
  
```

```

analogWrite(output, bright);
  
```

```

analogWrite(output1,bright);
  
```

```

//wait for 1000ms
  
```

```

Delay(1000);
  
```

```

If reading less than 200
  
```

```

Then
  
```

```

Serial.println(" I turned off the lights");
  
```

```

//seeing the status of the light in blynk app
  
```

```

Blynk.virtualWrite(v2," I turned off the lights");
  
```

```

END IF
  
```

```

Else
  
```

```

Then
  
```

```

Serial.println(" I turned on the lights")
  
```

```

//seeing the status of the lights in blynk app
  
```

```

Blynk.virtualWrite(v2, "I turned on the lights")
  
```

```

END ELSE
  
```

```

END LOOP
  
```

VI. RESULTS AND ANALYSIS

The resultant output is in the form of hardware kit. Here, we upload the code into NodeMCU. The output will be based on light intensity falling on the LDR sensor. The light intensity on the LDR sensor is low then the brightness of the street lights will be high.

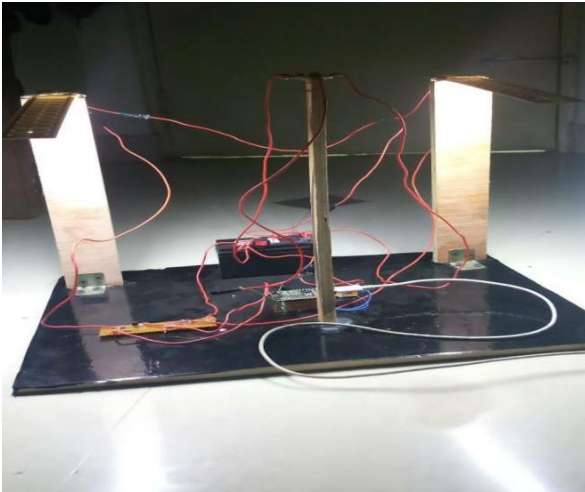


Fig:3 Intensity of light low on LDR sensor

The light intensity on the LDR sensor is medium then the brightness of the street light will be moderate.

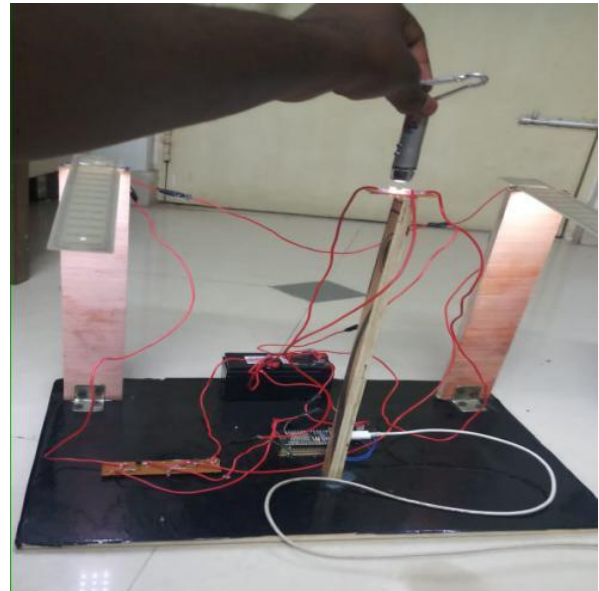


Fig:5 Intensity of light moderate on LDR sensor

The status of the street light will be display on the Blynk app. We can know the on/off state of the light in Blynk application.

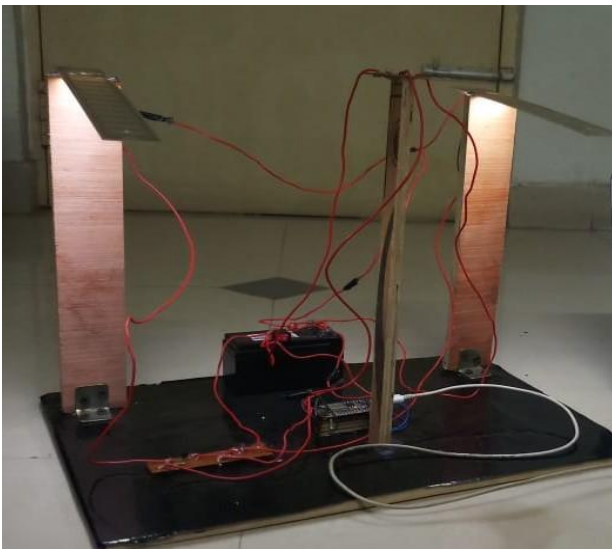


Fig:4 Intensity of light moderate on LDR sensor

The light intensity on the LDR sensor is high then the brightness of the street light



Fig:6 Blynk Application displaying features.

The intensity of the light will be display on the monitor. How much brightness of light will be glow is shown on the laptop screen.

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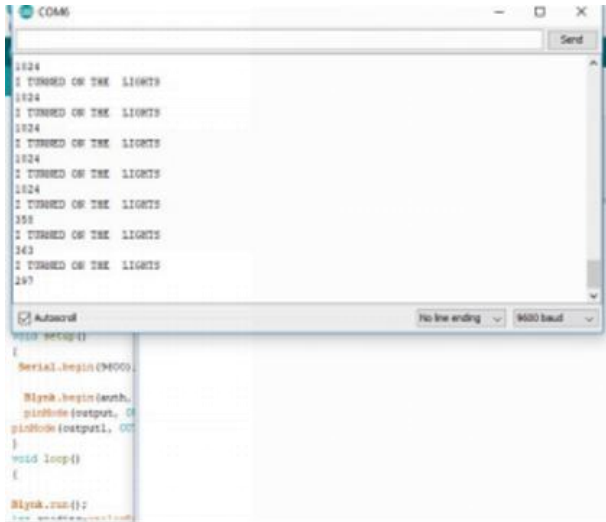


Fig:7 Node MCU displaying features.

VII. CONCLUSION

Power wastage and manual errors occurred in street lights is major problem for many countries. The proposed system is maintain the street lights automatically as well as saving the power. It is low cost because we are using NodeMCU. There is no on/off button process in this project it can be done by automatically. So no man labour required to switch on/off the lights. Up-to 80% of power wastage will be reduced by implementing this proposed system. It provides effective communication to monitoring the street lights by using Blynk app. It reduces the manual switching of street lights. The proposed system can be used in many areas like for example colleges, industries etc., finally this proposed system provides security at late nights. This implemented projects used to reduce the wastage of electricity for better maintenance of street lights using technique by controlling the intensity of LED lights with helps of LDR sensors and PWM drivers. This results in turns of power usage saving and also minimal the manual errors using automatic. This implementation is done using NodeMCU and Blynk App for effectively monitoring the street lights.

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