International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 03 | Mar 2021 www.irjet.net p-ISSN: 2395-0072

INTELLIGENT STREET LIGHT CONTROL SYSTEM

Harshad Nawale[1], Mangesh Shinde[2], Nagraj Alange[3], Parikshit Gokhale[4]

Department of Engineering, Sciences and Humanities (DESH).
*[5]Guide: **Sanika Patankar**, Dept. Instrumentation of Engineering, VIT Pune, Maharashtra, India.*

Abstract - *Currently in the whole world enormous electric energy is consumed street lights are usually very costly to operate bad controlling of street lights lead to vehicle accidents. Today street lights system is not flexible most of the controlling is manual where as some are automated based on environment parameters. Biggest problem is to handle remote area locations manual mistakes result into power wastage. So there is a need of efficient street light system to provide wireless access for controlling it. Server which can be used to control whole city's street light and low cost internet technology can be used for remote access. Proposed system controls all the street lights using an android application all the street lights connected to a junction these junctions are controlled by an android application as per the need street lights can be switched ON/OFF. The main motive behind implementing this project is to save energy.*

***Key Words*: - Street Light; Android Application; Lighting System; Wemos D1 R2 & mini.**

1. INTRODUCTION

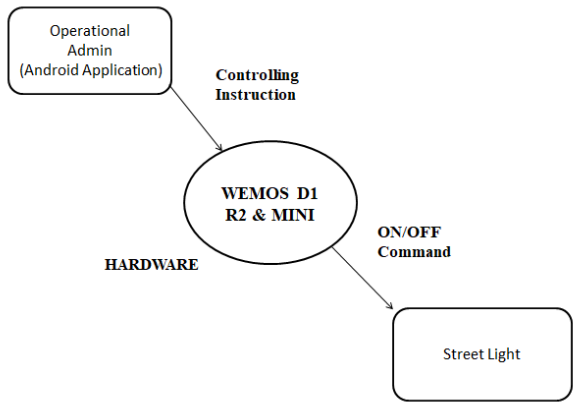
Street lights are the key factor of any city to make it smart city. But we have seen such situation where our street lights are ON in presence of daylight. So we want to develop such a system which will operate street lights of the city at anytime. The motivation of this project is to design a smart lighting system which targets the energy saving and autonomous operation which is economical and affordable for the streets. Design a smart lighting system with modular approach design, which makes the system scalable and reliable. Design a smart lighting system which is compatible and scalable with other commercial product and automation systems, which might include more than one lighting systems. This paper presents a new economical solution for street light control systems. The control system consists of a control circuitry and the electrical devices. This also includes client server mechanism where user can directly interact with web based application to control the Street lights from any place with the help of android application. A street light control system has been developed to control and reduce energy consumption of a town's public lighting system. This ranges from controlling a circuit of street lights or individual light with android application and network operating protocols. This includes sending and receiving instructions via separate data networks, at high frequency over the top of the low voltage supply or wireless. Street lights are connected to the junction. There are multiple junctions each junction covering some particular part of the city. The main aim is to provide Server IP to every junction which can be controlled by establishing.. The main motivation behind implementing project is to save energy. It is an automated system designed to increase the efficiency and accuracy on automated time control, governed.

2. LITERATURE REVIEW

Their aim is to monitor the health of street lamps and forward monitored result to the control station. The lamp module communicates with the control center through connectivity. In the transmission module, there is hardware server that transmit the data through connectivity to control center. In the control center, it will monitor each of the street lamp status, as well as controls the operation of the street lamps. Intelligent Street Light Control System is using android application. Nowadays, human has become too busy, and is unable to find time even to switch the lights wherever not necessary. This paper gives the best solution for electrical power wastage. Also the manual operation of the lighting system is completely eliminated. Intelligent Street Lighting System is using hardware server. If intelligent street light is designed and installed in the cities, then, lot of power can be saved and this will also minimize the cost of maintenance over traditional wired systems. The system is versatile, and can be extended as per user needs.

3. METHODOLOGY/EXPERIMENTAL

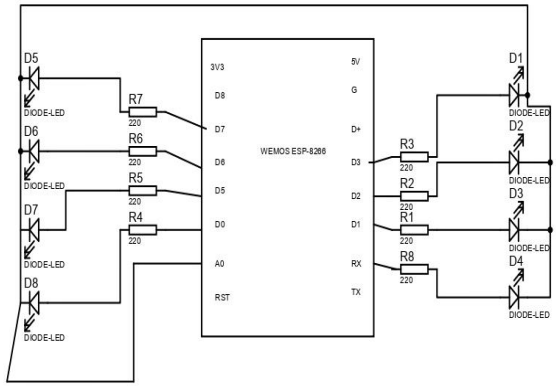
3.1 BLOCK DIAGRAM



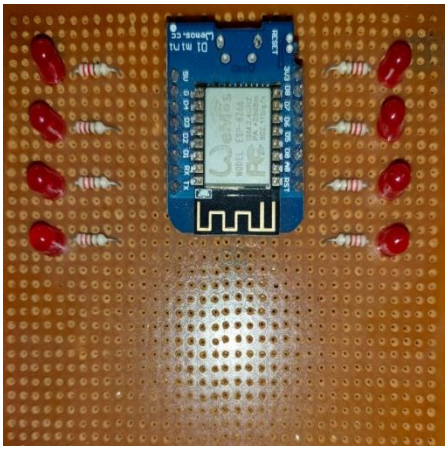
3.2 DESIGN METHOD & ALGORITHM

For designing the working model, firstly we designed how the circuit will look like. This was done using PROTEUS software which helps to design electrical circuits. After designing and testing the circuit on the software itself using simulation we started our work on the model. Algorithm of the proposed system is that using an android application we are controlling the street light by switching them ON/OFF. Firstly when you Switch ON/OFF a light from the application the signal is sent to the server/hardware. Then the hardware proceeds the command to the street light.

Designed circuit Using Proteus software



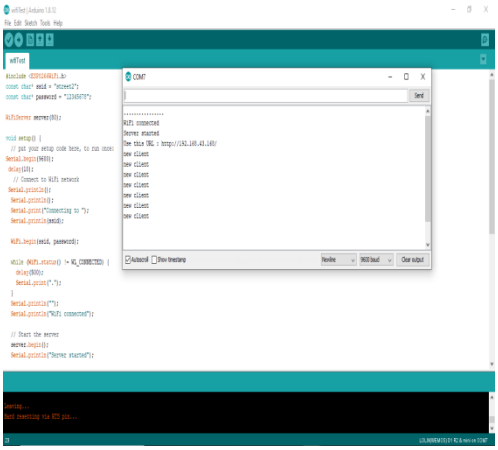
Original Circuit.



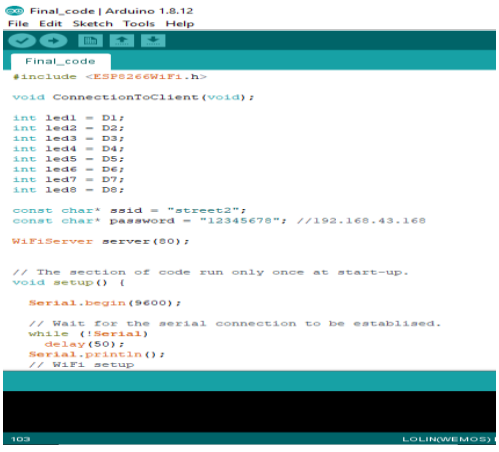
3.3 PSEUDO CODE/TESTING

After all the designing and simulation part, we started with the code for the hardware. As the hardware itself contains Wi-Fi module in it and it can be programmed using Arduino software. To start with coding we needed to test the hardware for blink, LED glow & Wi-Fi test. After checking all this functionality we started with final code. The final code has initialization of 8 LED, SSID & Password, Wi-Fi server etc. in void. The program also has function like digital.write, Serial.println, pinMode, etc.

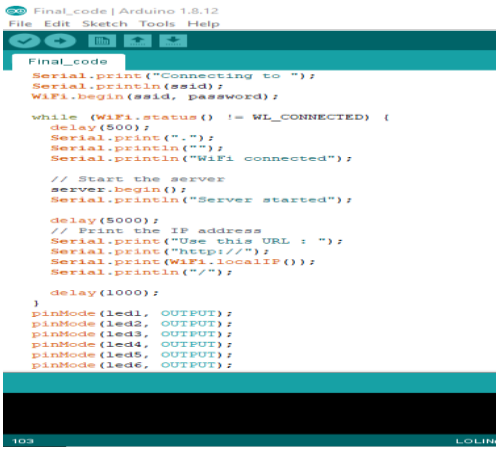
Wi-Fi Test Run Successful:



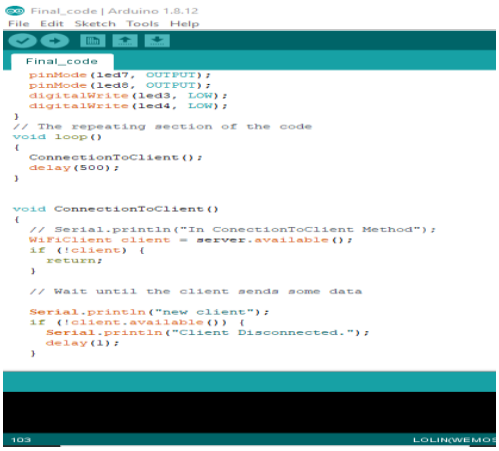
Final Code :

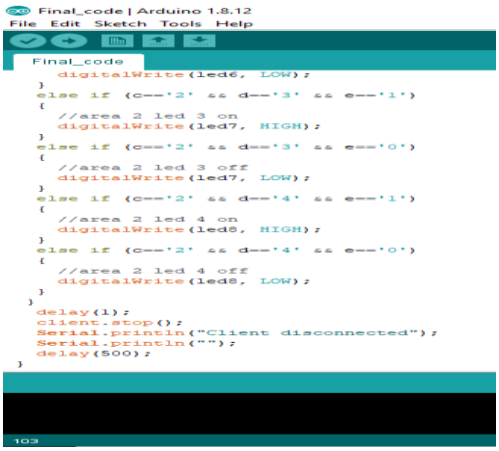


```
Final_code | Arduino 1.8.12
File Edit Sketch Tools Help
Final_code
#include <ESP8266WiFi.h>

void ConnectionToClient(void);

int led1 = D1;
int led2 = D2;
int led3 = D3;
int led4 = D4;
int led5 = D5;
int led6 = D6;
int led7 = D7;
int led8 = D8;

const char* ssid = "street2";
const char* password = "12345678"; //192.168.43.168

WiFiServer server(80);

// The section of code run only once at start-up.
void setup() {

  Serial.begin(9600);

  // Wait for the serial connection to be established.
  while (!Serial)
    delay(50);
  Serial.println();
  // WiFi setup
```



```
Final_code | Arduino 1.8.12
File Edit Sketch Tools Help
Final_code
  Serial.print("Connecting to ");
  Serial.println(ssid);
  WiFi.begin(ssid, password);

  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print("-");
    Serial.println("");
    Serial.println("WiFi connected");

    // Start the server
    server.begin();
    Serial.println("Server started");

    delay(5000);
    // Print the IP address
    Serial.print("Use this URL : ");
    Serial.print("http://");
    Serial.print(WiFi.localIP());
    Serial.println("/");

    delay(1000);
  }
  pinMode(led1, OUTPUT);
  pinMode(led2, OUTPUT);
  pinMode(led3, OUTPUT);
  pinMode(led4, OUTPUT);
  pinMode(led5, OUTPUT);
  pinMode(led6, OUTPUT);
```



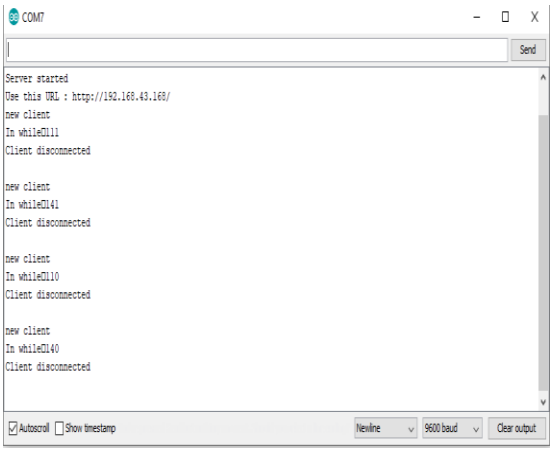


4. RESULTS AND DISCUSSIONS

After all programming work was done , the complying & working of the program was executed.

The result was monitored using Serial Monitor.

Results:



Here is the running process of the hardware. Here, we can see that Hardware is connected to the Wi-fi then the Server is started & the URl for sever is provided. Then we will provide this server URL to the android application. Once the URL is entered and login is done. We can see that 'new client' is noticed on the Serial Monitor. Then 'In while 111' means: Area, Light no. , ON=1/OFF=0. After Switching ON/OFF the light it is observed that 'Client Disconnected'

Android Aplication Results:

Here in first window Light no.1&4 are ON and in Second window Light no.1&4 OFF.

This means 111 & 141 for first window.

In second window 110 & 140.

5. SOME COMMON MISTAKES

In Today's world many manual working is not managed properly, one of the manual working process is turning ON/OFF the Street Lights OFF in day and Turing ON in night time. Sometime the person assigned for the same work may forget to turn ON/OFF the Street Lights. For this the Intelligent Street Light System is been proposed.

6. FUTURE SCOPE

Today's existing system is controlled manually, which leads to various inefficiencies. Every time the human is responsible to look after the controlling of the system personally go to the workplace and manage all the activities like ON/OFF the street lights. Todays Street light system is not flexible, biggest problem is to handle remote area locations and manual mistakes results into power wastage. This facilitated the idea to develop a smart system which could minimize the human intervention. The proposed system will be controlled using an android applications which there by minimizes the human intervention also the labor cost needed to operate the system. The system efficiently manages the ON/OFF of lights in turn making efficient utilization of energy avoiding wastage which is the case in existing system. Various patterns are being designed

to ON/OFF the lights depending upon the traffic conditions thus focusing on reduced energy wastage. We are also taking in LDR sensor in our consideration for this project in future. So that intelligent street light can detect daylight and vehicles and vary the intensity of the light based street lamps as per the traffic flow.

7. CONCLUSION

In this paper Intelligent street light system is described that integrates new technologies offering ease of maintenance and energy saving. It tackles the problem of energy wastage which in turn reduces power consumption, increases road safety and gives efficient way to handle switching ON/OFF streetlight by using automatic and time scheduling approach.

ACKNOWLEDGMENT

Every work is source which requires support from many people and areas. It gives us proud privilege to complete the project "INTELLIGENT STREET LIGHT SYSTEM" under valuable guidance and encouragement of my guide Prof. Sanika Patankar. We are extremely grateful to our respected H.O.D.(DESH Dept.) Prof. Chandrasekhar. M for providing all facilities and every help for smooth progress of project. We would like to thank all the Staff Member of DESH Department for timely help and inspiration for completion of the project.

REFERENCES

[1] Fabio Leccese, Marco Cagnetti and Daniele Trinca (2014), "A Smart City Application: A Fully Controlled Street Lighting Isle Based on Raspberry-Pi Card, a ZigBee Sensor Network and Wi-Max", Sensors 2014

[2] Noriaki yoshiura and Naoya Ohta (2013), "Smart Street Light System Looking like usual street Light based on Sensor Networks", IEEE international symposium on Communication and Information Technology.

[3] Wu yue, shi chang hong (2010), "Design of New Intelligent Street Light Control System", IEEE international Conference on Automation.

[4] Saravanan V,Karthikeyan M (2014), "Cloud Based Automation Street Light Monitoring system"

[5] Rodrigo Pantoni, Cleber Fonseca and Dennis Brandao, "Street Lighting System Based on Wireless Sensor.

[6] D. A. Devi and A. Kumar, Design and Implementation of CPLD based Solar Power Saving System for Street Lights and Automatic Traffic Controller, International Journal of Scientific and Research Publications, Vol. 2, Issue11, November 2012