

IoT Based Problem Detection of Defective Solar Street Light

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Abstract— Nowadays street light became a vital aspects for various measures like road safety. A lot of electrical energy consumed by the street light so eliminating this we move towards the renewable source of energy that is solar energy. This project mainly design and execution of advanced development in the solar street lights. In solar street light, currently we are using manual inspection and this will take much more time. But this experiments aims to the automatic problem detection system which can be detected by using designed mobile application. This paper will be mainly focus on the designing and development of IoT based solar street lights. This will reduce the heat emission, less power consumption and main thing is the low maintenance and replacement cost. This designed system is work efficiently for both indoor as well as outdoor lighting. On other hand it will increase the efficiency of the system. This system can be installed as energy efficient system for the controlling street lights.

Keywords: Internet of Things (IoT), LDR, PIC microcontroller, Aurdino node MCU, street lights

I. INTRODUCTION

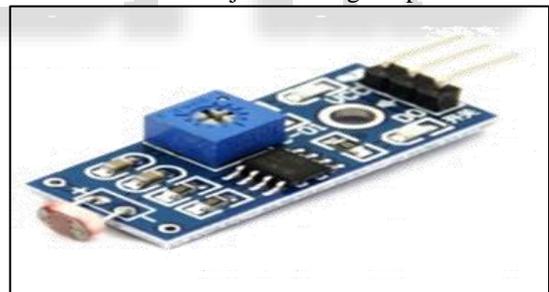
Street light is essential factor of any City or village to make it Smart City or village. But we found that proper maintenance are not carried out of these lights and we found that they will be in off positions. Today's street light system is not flexible. Most of the controlling of the street lights are manual, whereas some are automated based on some environmental parameters. The biggest problem is to handle in the remote area it is because the proper communication not taking place. As government gives the subsidy for the use of solar lights. Solar light system solve the energy efficiency problem of streetlights to make a city smart. Street light monitoring and controlling is an automatic from design to increase the efficiency of an enterprisingly automatic time control switching off the street lights for shop the system will also be include client-server mechanism where a user can directly interact with the web based application to monitor the all street light from the single positions. The base server will run on Java application which will maintain whole streetlights data and record it. This propose system solution for energy saving. Street lighting is one of the largest expenses for any city. And intelligent Street lighting system can cut the expenses of up to 50-70%. And intelligent street light system is a system that adjusts as per the requirement of the environment. The street light controller should be placed on a street pole as well as the reduced in the area of pole. The control system with switch on off the lights at particular required timing and can also wearing the intensity of the straight lines according to the requirements for stop the smart lighting system can reduce the maintenance cost and used according to prepare requirements. With the advance in the technology and good resources planning the cost of the project can be cut down and also with the use of good

equipments, the maintenance can also be reduced in terms of continuous checking. Significant benefits of street lighting include prevention of accidents and increase in safety. Studies have shown that darkness results in a considerable number of crashes and accidents, especially those involving pedestrians; pedestrian accidents are 3 to 6.75 times more prone in the dark than in day. Street lighting has been found to scale back walker crashes by nearly one-half. Street Light Monitoring & control is an automatic system designed to extend the efficiency and accuracy of an enterprise by automatically timed controlled switching of street lights. For a wireless control monitoring system each street light must be equipped with different types of sensors that are connected to a microcontroller to monitor its environment with regards to its working needs like candle power, current capacity, voltage load and temperature which are collected and transferred by the means of frequency communication. The graphical App based mobile controlling gives a user friendly and simply accessible platform to the user.

II. METHODOLOGY

A. LDR Module

LDR stands for light dependent resistor. It is also called photocell. LDR module is used for the measuring presence of light and the intensity of light. The output of the model goes high in the light and vice versa. The sensitivity of the signal detection can be adjusted using the potentiometer.



B. Relay SPDT

Relay is the electromechanical switch used to control high power application through the lower power signal electronic circuit. typically relay containing the electromagnetic coil in which electromagnet will accept float is DC bias and become electromagnet to attract the common terminal liver.



C. Microcontroller 8266

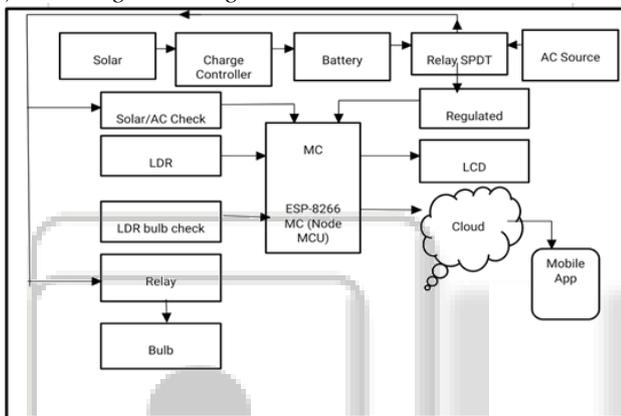
Features of microcontroller 8266

- 32 KiB instruction RAM
- 32 KiB instruction cache RAM
- 80 KiB user data RAM
- Up16 KiB ETS system data RAM
- 16 GPIO pins
- 10 bit ADC

D. Regulated Power Supply

Are regulated power supply is an embedded circuit that converts uninterrupted AC into to the constant it is DC supply with the help of rectifier. Its main function is to suppliers table voltage to a circuit or device that must be operated within certain power supply limits. The output from the regulated power supply may be a terminating and unidirectional.

1) Working with Diagram



Dia. Block Diagram of IoT Based Problem Detection of Defective Solar Street Lights

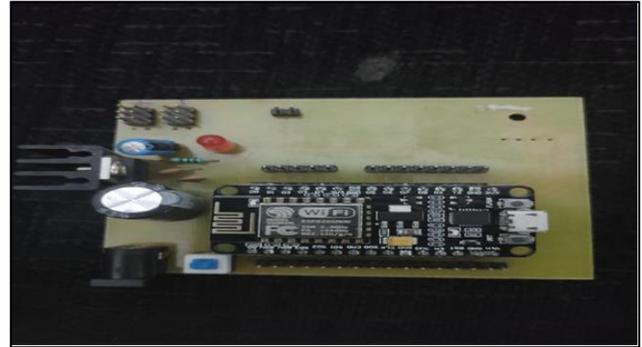
III. WORKING

Solar panels will collect all the rays from sunlight and the solar energy will be stored in a battery. Using the solar controller we will regulate the power supply. If the power supply is regular then bulb will be glow but in the case of any fluctuation or damage it won't glow. The LDR will check whether the bulb is glowing or not and the status will be send to the cloud with the help of a micro controller. The status will be shown on the mobile app and if the bulb is not glowing then a notification will be send on mobile application. Also if the weather is cloudy and appropriate amount of solar energy has not been stored on the battery then the power will automatically switch with the help of relay SPDT to a backup or AC current. The status of the same will be stored on cloud and will be reflected on mobile application. Mobile application is connected to the cloud hence rapid actions will take place. Mobile application providing the following information:

- ON/OFF status will be shown on mobile application
- If the light is faulty then it will be shown on mobile application
- Whether it is working on solar power or backup this is also shown in the application
- Total power consumption

- Intensity of light
- Durability of particular light

A. Actual setup



IV. CONCLUSION

This project IoT based problem detection of defective solar street light is a cost-effective, practical, eco-friendly and the safest way to save energy and maintain. Main thing is that we access this system from anywhere and anytime. Nowadays solar street lights maintenance must be carried out by the manual inspection but above experiments provide the rapid inspection of solar street lights. This system mainly used in the remote area where the electrician is not easily available for the maintenance of street lights. All the system is connected to the cloud since the no maximum requirements for the human inspection is required. The main advantage of this system is that we easily get the query in the system and it can be operated from anywhere. This system is more reliable due to the sudden action taking by an authority. The system will be one time investment system in which the capital cost is not that much high but once it set up then the capital cost will be reduced and performance of the system is steadily increased.

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