IOT BASED SOLAR STREET LIGHT MONITORING SYSTEM

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ABSTRACT

In the current scenario street lights are turned as an imperative ingredient. As we know plenty of electricity is squandered by street lights. So there is a necessity to rescue power as much as possible. As there exists decay in energy which is proportional to escalate the price of electricity. It is the necessity to save energy, street light monitoring system is fully automated to ameliorate the effectiveness of switching operations of street light monitoring. The Street Light Monitoring System focus is to model an astute advancement in technology by utilizing wireless technology (GSM). Each and every street light is supervised by the server based operated system which sends a information using wireless network (GSM Module) which incorporates client server solicitation which leads for effective supervision and energy economy dominance of street light monitoring system is very crucial..

Keyword - *street lighting system , Weather* sensor

1. INTRODUCTION

In the current scenario, street lighting is one of the paramount segments of a city or rural infrastructure where the foremost concern is to brighten the city or rural streets during unilluminated hours of the day. A Street light or lamp is preferred as an originator of illumination on the roadside or walkway, which can be turned on at a definite time periods during dark hours. Lighting is repeatedly substantial electrical load in workrooms, however cost of illuminating energy utilization is less when collated with personnel costs. Thus its energy frugality prospective is usually for saken. Studies have flaunted that concerning 4500MW of power is particularly consumed in India on public illumination. Hitherto, the quantity of street lights in rural and city is comparatively less. Accordingly street lights are comparatively uncomplicated although with the evolution of urbanization operation of street lights escalated speedily.

Street light Monitoring and supervision is an automated system delineated to improve the effectiveness and exactness of an action by automatically controlling the street lights. The system moreover encompasses with client server technique where a user can forthwith his/her reciprocal actions with the web based requisitions to handle the street light of any location from distinct locality. Street light Monitoring system with the help of Microcontroller and GSM Technology has been progressed to lessen the utility of power in city public street lighting system. It is incorporated with examined circuits of street lights as well as discrete lights with network employable protocols. For most versions of lights, accordant hardware with definite protocols is utilized.

LED is a solid state semiconductor device which can convert electrical energy into visible light. It is characterized with small size, low power consumption, long service life, environmental protection and durance. The spectrum of the LED is almostly concentrated in the visible light spectrum, so it has a high luminous efficiency which can be described as the great reform in the solid light source.

This essay briefly describes the solar led street lighting system. It uses the solar radiation energy to charge the battery with the solar panel during day time, and offer energy to the LED light equipment at night. This system has a double advantage in both utilization of new energy and energy-saving

2.LITERATURE REVIEW

In this paper [1] the author experimented, the energy reducing system by automatically switching ON and OFF the street lights. Where there is an object movement, the sensor will capture it and make it automatically ON and OFF. These systems are more energy-efficient, reliable, and reduce cost. This architecture is to sense the object and to act accordingly. The sensor used to sense the object is an IR sensor, IR LED is used to transmit infrared rays and is made of gallium arsenide. Wi-Fi is used to provide high-speed internet and network connection. The implementation includes that light that comes from LED is triggered by multi-sensor captures the objects and turns ON the light.

In this paper [2] the author experimented, an energy-efficient Zig Bee-based outdoor light monitoring and control system which can monitor and control the outdoor lights more efficiently. These laps regularly monitor the intensity of the sunlight by using a sensor and based on it, the MCU decides ON or OFF lamps. The microcontroller used here has Wi-Fi, programmed like any other GPIO, SPI, 12C, UART, 12S, and 802.11b/g/n. The light sensors are connected to MCU through the 12C interface and observe light status. It measures the brightness of sunlight and acts accordingly. Based on sunlight intensity, MCU drives lamps to maintain the same level of illumination, which is horizontal and vertical illuminance of 15 lux and 50 lux respectively. The design and operation include when voltage is supplied to the primary circuit, current flows through a coil to ground. As the magnetic field builds, it pulls together the switch contact in the secondary circuit, hence supplying current to the component being operated. The magnetic field is removed when the relay is switched OFF and the spring plate returns the switch to an open circuit position, thus switching OFF the power.

In this paper [3] the author experimented, a circuit contains a sensing component known as LDR, followed by Relay, the input is given from the direct supply and the relay converts them to a required voltage and then the switching ON the street lights takes place. As per the analysis, Street lights are On from 6:30 pm to 7:00amand hence there occurs a wastage of energy. The bulb used here includes 150w and the power consumed per day is 39kwhr. Hence, the bill generated per month is 3150. The smart system includes, 0% utilization state from 7 am to 7 pm and 55% utilization as a result of the diminishing procedure utilized state from 2 am to 6 am. The main aim is to preserve the consumption of power that is being used in normal streetlights.

In this paper [4] the author experimented, 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 light intensity, current capacity, voltage load and temperature which are collected and transferred by the means of ratio frequency communication. The system has a transmitter and a receiver, where the transmitter is almost placed 500m away from the receiver so that first the transmitter detects the presence of road user and sends data to receiver then light will ON and in case transmitter fails to detect the road, the receiver detects the road user by itself and the light will be ON. Then the light will go to the OFF position when no road users are using the road. The transmitter side of the street light system is constructed using Raspberry pi, LoRauart module, and ultra sensor. The receiver side of the street light system is constructed using Raspberry pi, LoRauart module, Lidar Lite V3, PIR sensor, and a LED light. The Arduino tends to make the light ON at the proper time.
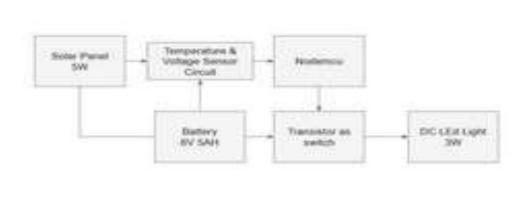
In this paper [5] the author experimented, the solution for energy saving is intelligent lighting. Control and energy management system in public lighting management. It recognizes remote ON/OFF and dimming of light, by using the light-dependent resistor. LEDs will only light up if you align the legs accurately. The long leg is often positive and connected to a digital pin on the Arduino board. The short led is GND. Arduino structures and creates single- Vol-6 Issue-6 2020 IJARIIE-ISSN(O)-2395-4396 13382 www.ijariie.com 2471 board microcontrollers and microcontroller units for building advanced gadgets and aggregate items that can detect and control. First, we make ground and 3.3v pin of Arduino has common using breadboard so that connecting LEO's and IR sensor. IR sensor's VCC pin is connected to 3.3v of Arduino, ground of IR sensor to ground of Arduino and output pin of IR sensor to A1 of Arduino board. Now LED is connected by a positive pin of LED to digital pin 3 of Arduino and negative to the ground of Arduino. LED's long leg is connected to 5 of Arduino and the other pin of LDR is connected to analog A1 pin of Arduino. Then after the connection, the code is run in Arduino software, and results are seen. Thus, the working model of the smart street light system has successfully avoided the wastage of electricity.

Features Authors	Issues Addressed	Proposed work	Query language supported	Tool supported/ Impleme-ntation
Ms. M. Kokilavani, Dr. A. Malathi	The energy reducing system by automatically switching ON and OFF the street lights.	These systems are more energy-efficient, reliable, and reduce cost. This architecture is to sense the object and to act accordingly.	SQL based	In pubs database+ ETRI
K.Tamilselvan, K.S. Deepika, A.Gobinath, S.Harhini, S.Gokhulraj	The light sensors are connected to MCU through the 12C interface and observe light status.	Based on sunlight intensity, MCU drives lamps to maintain the same level of illumination, which is horizontal and vertical illuminance of 15 lux and 50 lux respectively.	Not provided	Implemented in Java
Nithyashree CM, Vinutha TS, M. Dakshayini, P. Jayarekha	As per the analysis, Street lights are On from 6:30 pm to 7:00amand hence there occurs a wastage of energy.	The smart system includes, 0% utilization state from 7 am to 7 pm and 55% utilization as a result of the diminishing procedure utilized state from 2 am to 6 am.	Not provided	Not mentioned

Jessin Mathew, Riya Rajan, Rangit Varghese	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.	to make the light ON at the proper time.	SQL based	Not addressed
Dr.A.S.C.S.Sastry, K.A.S.K.Bhargav, K.Surya Pavan, M.Narendra	microcontroller units for building advanced gadgets and aggregate items that can detect and control.	the working model of the smart street light system has successfully avoided the wastage of electricity.	SQL based	SUN OS 5.5+ GAlib+ Simulation software

3.THE PROPOSED WORK

A street light, lamppost, street lamp, light standard, or lamp standard is a raised source of light on the edge of a road or walkway, which is turned on or lit at a certaiin time every night. Modern lamps may also have light-sensitive photocells to turn them on at dusk, off at dawn, or activate automatically in dark weather. In older lighting this function would have been performed with the aid of a solar dial. It is not uncommon for street lights to be on poles which have wires strung between them, or mounted on utility poles. This project exploits the working of a transistor in saturation region and cut-off region to switch ON and switch OFF the lights at appropriate time with the help of an electromagnetically operated switch Automatic Streetlight needs no manual operation of switching ON and OFF. The system itself detects whether there is need for light or not. When darkness rises to a certain value A good LED street lighting system is characterized with high efficiency, energy-saving, long-life, high color rendering index and environmental protection, which not only has a great significance on energy-saving of the city lighting , but also has close relationship with people's health and the economic development. So it is a noticeable issue how to design a reasonable LED street light system. In my opinion, following basic requirements on a qualified solar LED street light system shall met during design process The main issue of the solar LED street light is the battery and the panel get stolen after few days of the installation specially by the government. To solve the issue we made this project which is intelligent smart street light operated by the panel. The light consist of the sensor mechanism to inform police control room that the panel or the battery get stolen.

Working of LED Light

3.1.Hardware Requirement

1)Solar panel
 A Solar panel intended to engage the sun's emissions as a basis of dynamism for producing power.

2)LED
A Light Emitting Diode is a light source that releases light when current drifts through it. It recombines an electron in the semiconductor with electron holes, liberating power in the mode of photons.

3)Rechargeable battery
A rechargeable battery is a kind of electrical battery and recharged several times, as divergent to a throwaway or primary battery, which is provided entirely charged and discarded later use.

4)Sensors

For a prolonged time, different kinds of sensors have been used in various industries and organizations but the IoT (Internet of Things) innovation of has taken the growth of sensors to the extreme level .Using different sensors, IoT provides various type of data and intelligence. They serve to collect data, push data and share data with an entire network of combined devices.

4. CONCLUSIONS

- The network is going to resolve the energy efficacy issues of traditional street light systems. The transmission speed is 99 to 100% depending upon deployment of sending and receiving units in the system.
- The proposed may appear to be exorbitant but can be compensated with the availability of power system and significantly less price for maintenance. There can be less light pollution and power utilization.
- Costmdeduction can be done with the help Led technology thus which can lead to a perceptive management technology. The system can be flexible, elongated, and utterly adaptable to the user needs.
- The street light system competes at low power which can be acquired by GSM technology any one can receive the data from any point of the world.

5. REFERENCES

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