IoT Based Automatic Street Lightning System

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Abstract: Along With the development of urbanization, increasing necessity electricity, the street lighting system has become one of the crucial agitations of people. However, in street lighting system, the efficient management and energy-saving control of lighting system is very important. In system based on LDR The aim of automated streetlight system using LDR is to do the conservation of energy by reducing electricity wastage as well as to reduce the manpower. Streetlights are the elemental part of any city since it facilitates better night visions, secure roads, and exposure to public areas but it consumes a quite large proportion of electricity. In the manual streetlight system lights are powered from sunset to sunrise with maximum intensity even when there is sufficient light available. This energy wastage can be avoided by switching off lights automatically. The saved energy can be efficiently utilized for other purposes like residential, commercial, transportation etc. This can be achieved using smart street light system. The project uses Ultrasonic sensor & LDR to switch ON or switch OFF the LEDs according to the property of light dependent resistor it will pensive high resistance in full light and will allow the LEDs to turn ON and when light on its decreases the resistance will also decrease and lights will get turn on. Ultrasonic sensor is used to detect the physical body in time interval of 12am to 4am here lights will glow only when the vehicles are get detected all this is done using arduino programming board. The proposed system has achieved a better performance compared to the existing system.

Keywords: Ultrasonic sensor, LDR, LED, Light intensity

INTRODUCTION

Like this system is beneficial as well as Economic as Street light system is very important part of any urban area, and to avoid the wastage of electricity this system has develop. It uses LDR to turn on Street light when dark and them it automatically changes its intensity according to time changes as follows

In the session of 7pm to 10pm LEDs will with their full intensity, after that up to 12pm LEDs will glow with half intensity after 12pm when crowed is less the system will turn off LEDs and it will turn on them when ultrasonic sensor will detect the vehicle up to 4am after 4am LEDs will glow with their full brightness and as light will start falling on LDR resistance of LDR will increase and LEDs will get turn OFF.

LITERATURE SURVEY

Generally, we have seen that street lights are remains on in the day time also or they are working on their full intensity and it is nothing but waste of energy. To make the system more efficient we have studied many systems related to this concept and we have developed easy and cheap system to manage street light.

We Studied SMART STREET LIGHT SYSTEM LOOKING LIKE USUAL STREET LIGHTS BASED ON SENSOR NETWORKS

Currently, in the whole world, enormous electric energy is consumed by the street lights, which are automatically turn on when it becomes dark and automatically turn off when it becomes bright. This is the huge waste of energy in the whole world and should be changed. This paper discusses a smart street light system, whose concept is proposed by Fujii et al. The main aim of smart street light systems is that lights turn on when needed and light turn off when not needed. Moreover, the smart street light system in this paper behaves like usual street lights that turn on all night. The ideal behavior of the smart street light system is that no one finds turn-off of street lights at night. Whenever someone sees street lights, they turn on and whenever no one see street lights, they turn off. The smart street light system consists of LED lights, brightness sensors, motion sensors and short-distance communication networks. The lights turn on before pedestrians and vehicles come and turn off or reduce brightness when there is no one. It will be difficult for pedestrians and drivers of vehicles to distinguish our smart street lights and the conventional street lights because our street lights all turn on before they come.

<table>
<thead>
<tr>
<th>Time period</th>
<th>Intensity</th>
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<tbody>
<tr>
<td>7pm to 10pm</td>
<td>Full intensity</td>
</tr>
<tr>
<td>10pm to 12am</td>
<td>half intensity</td>
</tr>
<tr>
<td>12am to 4am</td>
<td>Lights will glow on detecting vehicle.</td>
</tr>
<tr>
<td>4am to 7am</td>
<td>Full intensity</td>
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</table>
We Studied SMART STREET LIGHTING

The electric power in most of the countries in the world is utilized in lighting the streets. However, the electrical energy consumed by street lights is not efficiently used because the need of street lamps is not essential in every street in all periods of time. In this paper, we propose a system that automatically switches off the light for the parts of the streets having no motion detection and turns on the light for the parts of streets where motion is detected when it is dark. The smart street lighting also controls the luminosity of light based on the motion and performs automatic light dimming which is an aspect that serves to reduce energy consumption. The intensity of light can be controlled based on the number of vehicles and the weather conditions. In the intention to efficient energy consumption solar energy is used instead of electrical energy. In this paper the LED lights are used to increase the lifetime of lamp.

1. PROPOSED WORK

![System Architecture](image)

1.1 Hardware Components:
The proposed system consist hardware components mainly:

A. ATmega328p
B. Ultrasonic sensor
C. LDR
D. LCD Display
E. LED bulb

A. ATmega328p

The Arduino Uno is a microcontroller board based on the ATmega328. It has 20 digital input/output pins (of which 6 can be used as PWM outputs and 6 can be used as analog inputs), a 16 MHz resonator, a USB connection, a power jack, an in-circuit system programming (ICSP) header, and a reset button.

Node MCU

NodeMCU is an open-source firmware and development kit that helps you to prototype or build IOT product. It includes firmware which runs on the ESP8266 Wi-Fi SOC from Espressif Systems, and hardware which is based on the ESP-12 module.
B. Sensors

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses transducer to send and receive ultrasonic pulses that relay back information about an object's proximity.

C. LDR

A light-emitting diode (LED) is a semiconductor device that emits visible light when an electric current passes through it. The light is not particularly bright, but in most LEDs it is monochromatic, occurring at a single wavelength.

D. LED bulb

A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. ... Modern LEDs are available across the visible, ultraviolet, and infrared wavelengths, with high light output.
1.2 IOT in Project:

The Internet of things (IoT) is the network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these things to connect, collect and exchange data. The Internet of things (IoT) is the network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these things to connect, collect and exchange data.

Advantages and Applications

There are various advantages and applications of the proposed system.

5.1 Advantages

The advantages of the proposed system are as follows:

- Works according to the light intensity
- Low cost and reliable circuit
- System can reduce the energy consumption.
- System can be switched into manual mode whenever required

5.2 Applications

The applications of the proposed system are as follows:

1. To Save the wastage Energy.

2. RESULTS

Following figure shows the actual model and the result of the system.

(fig.21: First Module of the System)

(fig.2 : Actual System)
3. CONCLUSION

This paper presents the low cost intelligent street light system through sensors for the reduction of waste of electrical energy. This Dynamic Street Lighting System is experimented through ultrasonic sensors and the outputs are obtained through working model. By introducing this system, the energy crisis in today’s world can be reduced to some extent.

REFERENCES


