GIET UNIVERSITY JOURNAL, 2024, VOL.3, NO.2, PP. – 67-71

Manuscript received 26th April, 2024; revised 29th April, 2024; Accepted 30th April 2024.

AUTOMATIC STREET LIGHT CONTROLLER

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Abstract: The goal of this paper is to design and implement cutting-edge embedded system development for street light energy conservation. People these days are so busy that they barely have time to turn off the lights when not in use. At the moment, street lights are turned on in the evening before the sun sets and turned off the next morning once the roadways have enough light. The greatest way to reduce electrical power waste is provided. Additionally, the lighting system no longer requires manual activation. Two sensors are utilized: an ultrasonic sensor to detect movement and a light-dependent resistor (LDR) sensor to determine whether it is day or night. The object glows at a low intensity when the ultrasonic sensor detects no movement, and it glows at a high intensity when someone crosses the sensor's path. The item automatically switches from high intensity to low intensity after it leaves the sensor's field of view.

***Keywords*- Sensor, power saving, energy efficiency.**

1. Introduction

Every engineer in this discipline is concerned by the idea of creating a new street light system that uses the least amount of electricity while providing the best possible level of illumination over wide areas. One of a city's most significant and expensive duties is to provide street lighting. 10-38% of the entire energy bill in most cities across the world can be attributed to lighting. Because street lighting is strategically important for social and economic stability, public authorities in developing nations are especially concerned about it. Every year, inefficient lighting wastes large sums of money and contributes to dangerous situations. The cost of street lighting can be significantly decreased by utilizing energy-efficient technology and design principles [11]. Automatic street light controllers often use sensors to detect environmental conditions and control the operation

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of street lights accordingly. The most common types of sensors used in these systems include photocells (light sensors), infrared (IR) sensors, and motion sensors. Here's a general overview of how these sensors work in the context of automatic street light control. [12]. There are numerous issues with the current street lightning framework that need to be fixed. The current framework has the drawback of requiring human intervention in order for the system to function. One of the primary issues with the current street light systems is that the timing of the lights' ON and OFF periods fluctuate noticeably during inclement weather [13]. Light Emitting Diode (LED) technology is widely used in energy-efficient street lights. Since LEDs provide more light per watt than conventional lighting sources like incandescent or fluorescent bulbs, they are more energy-efficient [14].

2. Literature review

Gowthami.C, Santhosh.C, Pavankumar.A, karthik.A, Ramya. K.R, “Design and implementation of automatic street light control system using light dependent resistor. the paper focuses on the design and implementation of a system for automatically controlling street lights based on the ambient light conditions, using a Light Dependent Resistor (LDR) [1].Mustafa Saad, Abdalhalim Farij, Ahamed SalahandAbdalroofAbdaljalil,” Reviews relevant literature on automatic street light control systems, microcontroller applications, and related optimization techniques in engineering [2]. Monika Vaghela, Harshil Shah, Hardik Jayswal, Hitesh Patel” Arduino Based Auto Street Light Intensity Controller. Makes use of Arduino technology to automatically adjust street light intensity. Arduino is a well-known open-source electronics platform that may be used to manage different kinds of equipment. When it comes to street lights, an Arduino-based controller might be able to change the lights' brightness according on the lighting surroundings or other variables [3]. Prakah, Prabhu.V, Dandu Rajesndra “Internet of Things Based Intelligent Street Lighting System for Smart City.This could incorporate functions like energy-efficient operation, remote monitoring and control, and lighting that adjusts to the surroundings in real time. Increasing energy efficiency, cutting expenses, and adding to a city's overall sustainability and smart functionality are frequently the

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goals of such systems [5]. VamshiKrishna.V,Ramesh Babu. N, Pradeep Kumar S, Ronald Lawrence J, “street light automatic intensity controller”, in order to maximize energy efficiency, automatic intensity controllers are usually used to modify the brightness of street lights in response to outside variables like motion, ambient light, or predetermined time intervals [6].

3. Design

We have used proteus for our circuit simulation, and completed this circuit by using LED, LDR, Transistor, Resistor.

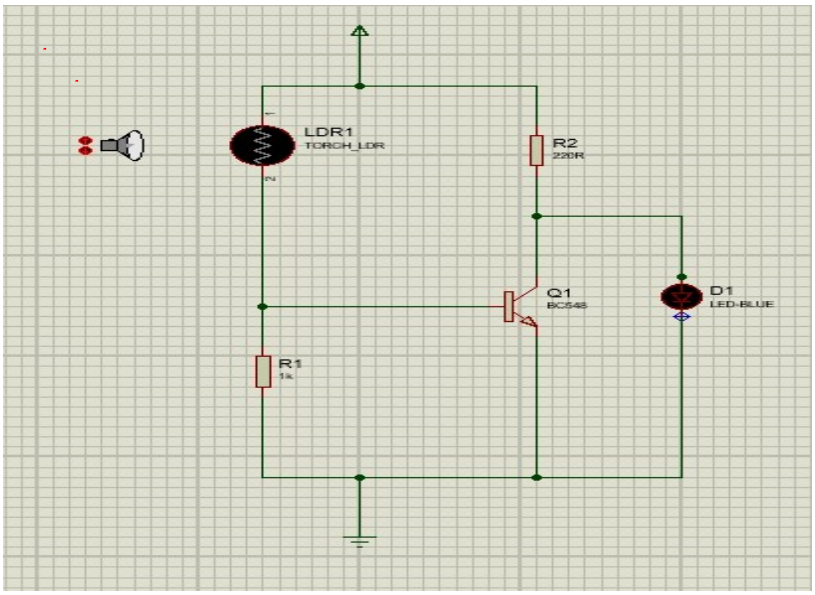

Figure 1: - Circuit Diagram of Automatic Street Light Controller

4. Simulation parameter:

i. LDR (LIGHT DEPENDENT RESISTORS)

ii. Resistor(220R2, 1KR1)

iii. Transistor(BC548)

iv. LED (LIGHT EMITTING DIODE)

5. Result Analysis

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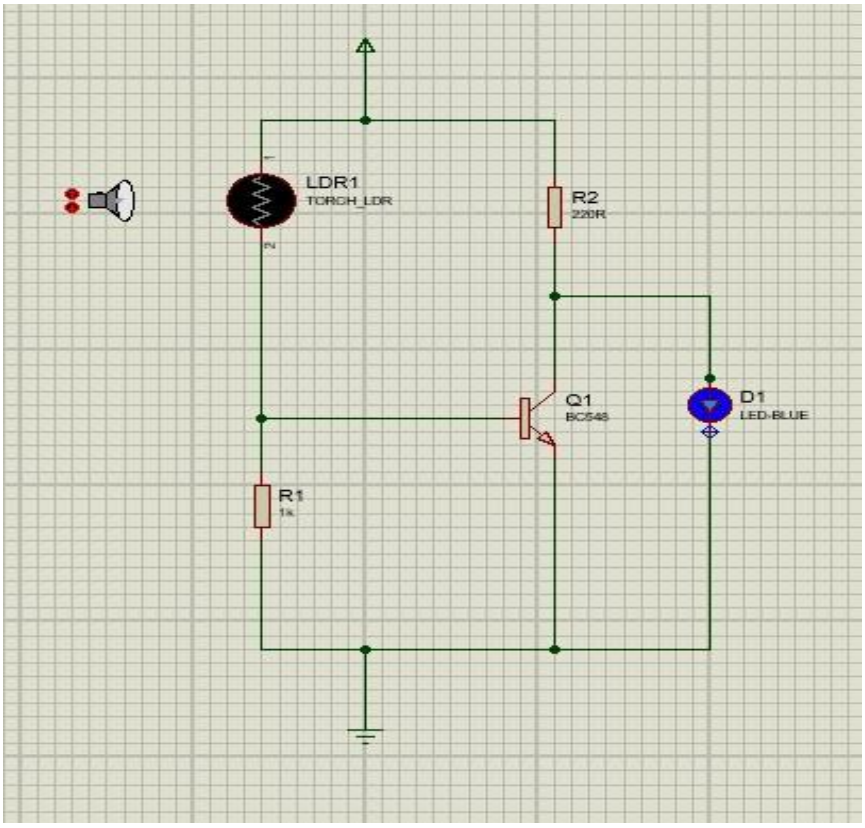
Though the authors note that the control system is light-sensitive, the circuit can function consistently, which may help to minimize energy loss by ensuring that the system is turned on and off at the proper times. Even though this research produced a well-designed system, there are a few things that need be taken into consideration. For example, the circuit should be adjusted for light at least twice a year, and it should be kept in a location where it receives daylight.



(Figure 2:- Circuit Diagram of Automatic Street Light Controller)

6. Conclusion

The goal of this research is to solve the current system's manual operation and high-power consumption. In both cases-on university roads and in streets this project is performing as planned. This technology solves the manual operation problem with the current system. When an ultrasonic sensor detects values from its surroundings, this system operates automatically. Moreover, if motion is not detected, the light stays off or in dim mode. The

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lights turn on or get brighter as soon as they sense motion. Only large-scale projects are intended to use this technology. It's also incredibly affordable.

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