Research Article

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Smart Street Light System Based on IOT

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Abstract

People in today's modern environment expect to have all of their needs met. Scientific and technological advancements are speeding up to meet this human demand. The Internet of Things (IoT) is a critical component of technology's rapid advancement. For example, we now use a manual technique to turn on street lights, which wastes a lot of energy throughout the world and should be changed. The Smart Street Light System, which is powered by the Internet of Things, aims to conserve energy by reducing electrical waste while simultaneously reducing operating costs. The LDR sensor is used to switch the street light on and off dependent on the amount of ambient light. It's a simple light/dark switch. This project makes use of a programmable Arduino UNO board to deliver the proper light intensity at different times. When compared to the current system, the proposed work outperforms it.

Keywords: *Arduino UNO, LDR sensor, IR sensor, smart street light, Automation.*

Introduction

A smart street light is an automated version of the street light that will help us save the energy and also its operational cost. Lighting the streets is one of the expensive things done by the cities. If the smart street lights are installed in places, it can reduce the cost up to 50%. To make the street lights smart, we use the LDR sensor and IR sensor. light dependent resistor has variable resistance which changes with the intensity of light falling upon it while IR sensor measures the flow of people or vehicles in the street. Using this property of LDR and IR sensors we can make our street lights smart and efficient. According to the model we have presented, the lights will be completely off during the day light and will glow dimly when it starts to get dim, the lights will glow with more intensity when it senses the flow of vehicles or people in the street saving us 50% or more energy.

Existing System

The street lights in the current system must either be manually switched on and off or left on 24 hours a day, wasting electricity.

Proposed System

In our suggested system, we utilize the characteristics of LDR, whose resistance fluctuates with light intensity, and IR sensors, which measure the flow of vehicles or pedestrians in the street. The LDR sensor in this system distinguishes between day and night. The lights won't glow during the day, they will automatically start to glow when the IR sensor detects the low intensity of light. As the movement of cars is detected, the light intensity rises, and vice versa.

Components Used

4.1 LDR Sensor Module: A tool used to detect light is called an LDR Sensor (light dependent resistor). It has variable resistance that varies depending on the amount of light hitting it. They may now be employed in light sensor circuits as a result. A photoresistor, photocell, or photoconductor are other names for an LDR, or light-dependent resistor.

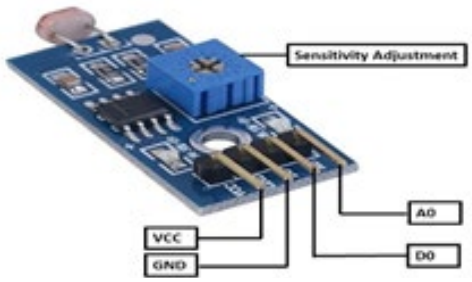

Figure1: LDR Sensor Module

4.2 IR Sensor: An electrical gadget known as an IR sensor emits light in order to detect nearby objects. Both the heat and motion of an item may be measured by an IR sensor. Typically, all items emit some kind of heat radiation in the infrared range. Although these kinds of radiations are undetectable to the human eye, infrared sensors can pick them up.

Figure 2: An IR sensor

4.3 LED: A light source known as a light emitting diode produces light when current flows through it. The semiconductor's electron is recombined with electron holes, releasing energy in the form of photons.

Figure 3: LEDs

4.4 Arduino UNO: The Arduino UNO is a Microchip product built on a microcontroller board with an open source design. The board is equipped with a number of analog and digital I/O (input or output) pins that may be connected to other circuits, shields, and evolution boards. The interface employs the original STK500 protocol.

Figure 4: An Arduino UNO

Method

The LDR sensor, IR sensor and Arduino UNO are tested individually and then integrated aas per the setup. The smart street light system uses the LDR's property of variable resistance to identify day and night and IR's general property to identify the flow of traffic. During the day, the light remains completely turned off. During the night wheen the IR sensor doesn't sense any traffic, the light remains turned on but dim and when the IR sensor senses some traffic, the light gglows with higher intensity. I used the device during different times of day and also with different intensity of lights to check the performance and accuracy of the device.

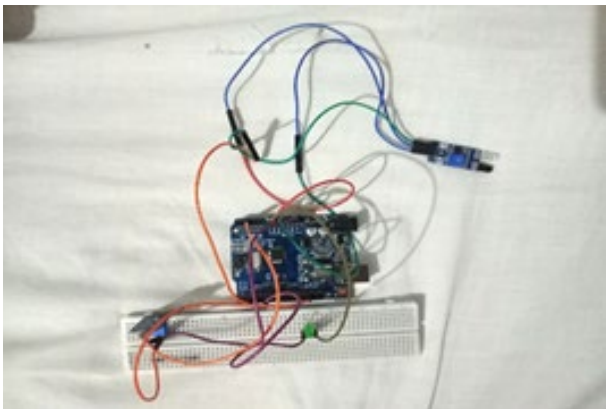

Figure 5: Top view of the arrangement

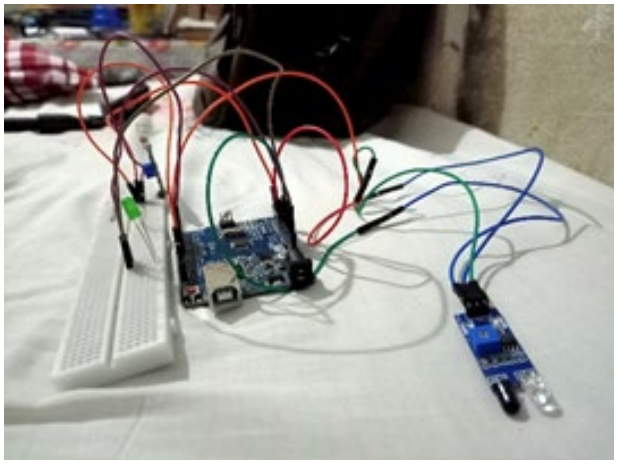

Figure 6: front view of the arrangement

Conclusion

This project is the cost effective, eco-friendly and safest way to save energy and also reduce its expenses. It tackles the two main problems the world is facing today: saving of energy and also disposal of incandescent lamps.

We can also keep track of the status of light by replacing the arduino uno with node mcu and integrating it with the blynk application; an app that tracks the real time status of the IoT projects.

Though, this system is not yet developed as a device to launch in the market. It will be very useful if done [1-3].

References

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