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# Auto Intensity Control of Street Lights cum shading during rain Using Arduino

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***Abstract*—** A vast quantity of electrical power of various countries is consumed in lighting the streets. For a specific period of time, the vehicles passes with low rate and some parts of the streets are not occupied by vehicles, in that time there is wastage. The main aim of this paper is to develop an automatic system by which energy will be conserved as well as public shelter will be given, and doing so, few more homes will be lightened and we will be able to give shelter to everyone in road during sudden rainfall. The proposed work is accomplished by using Arduino UNO microcontroller and sensors to control the wastage of electricity and the shading during rain. Meanwhile, a counter is set to count the rain drops. This proposed work will be useful for reducing the wastage of unused electricity and public shelter in sudden situation.

***Keywords*—** Arduino UNO, Rain sensor, LDR, SG 90

## I. INTRODUCTION

Street lights are necessary, but high-priced, therefore there is need to optimize the system in such a way that it can be accessible and leads to energy conservation. Manually the street lights cannot be controlled as this process will take more time. The main problem is that there would be a lot of time taking during evening time to switch ON the street lights and a remarkable waste of energy at morning as all the street lights cannot be turned OFF together at once.

Natural phenomenon such as rain cannot be controlled by human beings. In sudden rainfall peoples used to run to find a suitable sheltering area, but always everyone cannot run fast in sudden heavy rainfall. Therefore there is a need to build up a new idea for giving the shelter to them.

The idea of designing a new system for the street-light that do not consume huge amount of electricity and illuminate large areas with the highest intensity of light is concerning each engineer working in this field [1]. Lighting can account for 10–38% of the total energy bill in typical cities worldwide [2].

The idea of modelling a new system for shading purpose that will help to give shelter in any sudden rainfall is to be developed as soon as possible.

## II. RELATED WORK

An infrared sensor array is installed on the streets to know the presence of traffic. Lighting can account for 10–38% of the total energy bill in typical cities worldwide [2]. As there is a requirement of light only at night times, light detectors are used in the system to work it only in the absence of sun light when there is a presence of traffic. In this way the maximum power can be saved [2]. Currently, more than 35 billion lamps are operating worldwide, which consume more than 2700 TWh of energy annually. Our first priority should develop energy saving lighting systems while ensuring quality of luminous environment as high as possible [3]. Wireless Sensor Networks interfaced with light fittings to allow for daylight substitution techniques to reduce energy usage in existing buildings [4].

## III. METHODOLOGY

1. **Block diagram: -** The block diagram of Auto intensity control of street light cum shading consists of a LDR sensor, a rain sensor, an Arduino UNO and servo motor as shown in Figure 1.

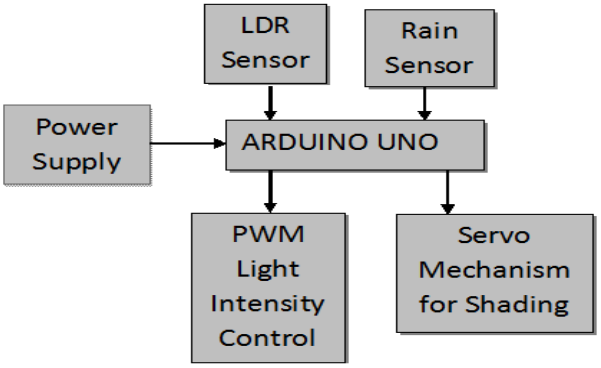



Figure 1: Block diagram of Auto intensity control of street light cum shading.

## 2. Components used:-

**2.1 Arduino UNO: -** Arduino is an open-source physical platform based on microcontroller board having the ATmega32 series controllers and Integrated Development Environment for writing and uploading codes to the microcontroller [1].

**Specifications: -**

- Working voltage – 5V.
- Microcontroller used – Atmega328.
- Recommended Input voltage – 7-12V.
- Digital Pins – 14(out of this 6 pins are used as PWM I/O pins).
- PWM Digital Pins – 6.
- Analog Pins – 6.
- Clock Speed – 16 MHz.
- LED Built-in – 13.
- SRAM – 2KB.
- EEPROM – 1KB.

Figure 2: Arduino UNO Board

**2.2 LDR Sensor Module: -** Light Dependent Resistor Sensor module is a tool by which the presence of light can be detected. It can measure the intensity of light. If the intensity of light is high, the resistance of LDR is low, that kind of LDR is known as negative co-efficient LDR. There are some LDRs that work in the opposite way i.e. their resistance increases with increasing light intensity. It is very sensitive to light intensity. The LDR sensor module is shown in Figure 3.

**Specifications: -**

- Working voltage – 3.3V to 5V.
- Output format – Analog and Digital.
- Adjustable sensitivity.

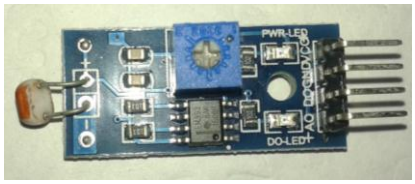


Figure 3: LDR Module

**2.3 Rain Sensor Module: -** The rain sensor module is used here as a receiver. It is a sensor to detect the rainfall. It is used as a switch, when it is raining on the water sensor board. It can measure the intensity of rainfall. The rain sensor module is shown in Figure 4.

**Specifications: -**

- Input voltage – 5V
- Output – Digital and Analog.
- Small board PCB size – 3.2cm × 1.4cm.

Figure 4: Rain Sensor Module

**2.4 Light Emitting Diode (LED): -** A Light Emitting Diode is a semiconductor device which emits light while current is flowing through it. Electroluminescence is the working principle of LED.

**2.5 Servo Motor: -** A servo motor SG90 is used here as an actuator. It has three wires for connection. The colors of those wires are brown (used for ground), red (used for power supply) and orange (used for taking PWM signal).

**Specification: -**

- Speed – 0.1s/60˚.
- Working voltage – +5V.
- Torque – 2.5kg/cm.
- Rotation – 0˚ to 180˚.
- Weight – 9g.

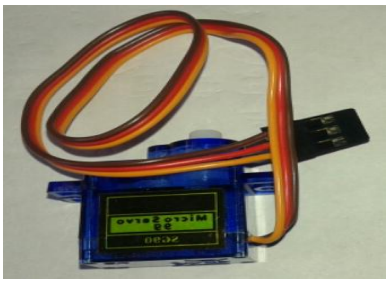


Figure 5: Servo Motor

### 3. Circuit Diagram: -

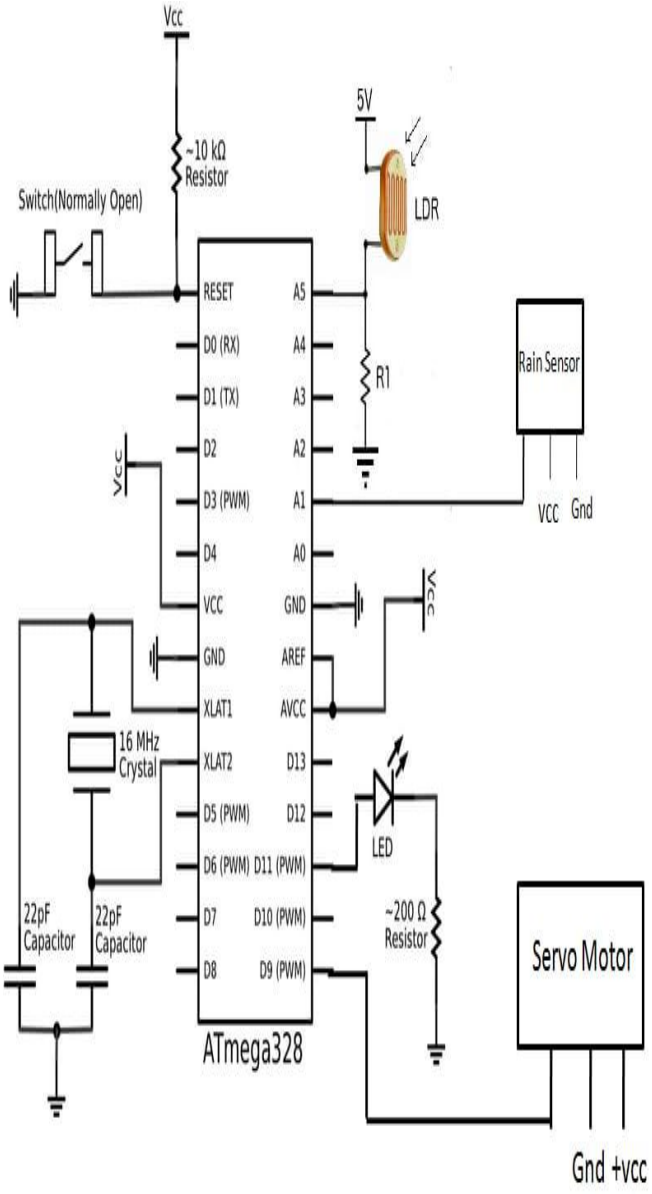
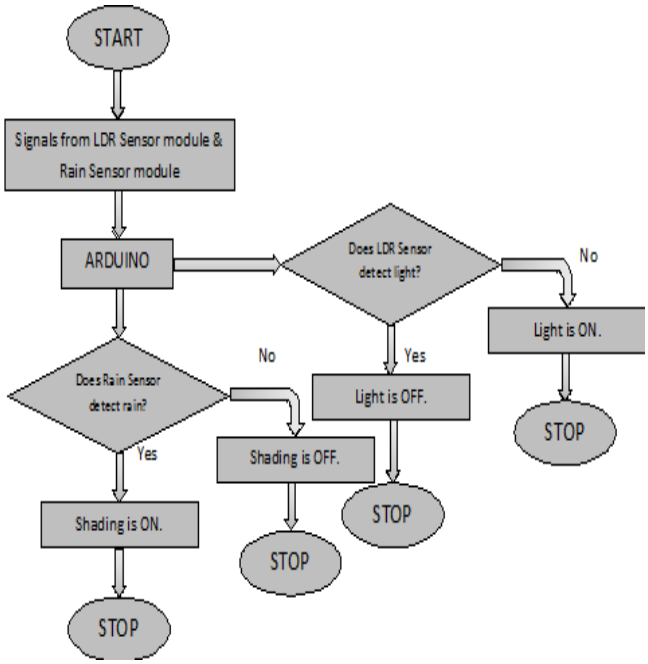


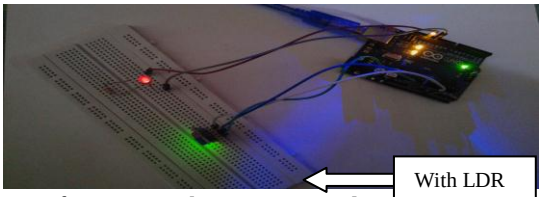

Figure 6: Circuit Diagram of Auto intensity control of street light cum shading.

## IV. Working Module

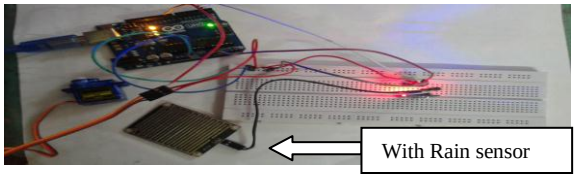
**Flow Chart: -**



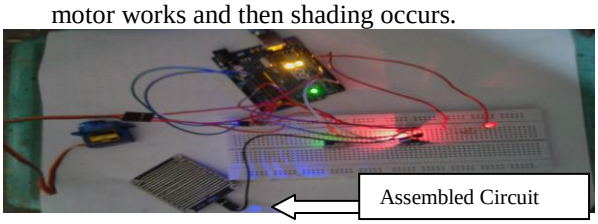

## V. Implementation of Hardware




- After giving the power supply to the circuit, if the LDR can detect light, then the street light is off through the signal from arduino




- After giving the power supply to the circuit, if the rain sensor can detect rain drops, then the servo motor works and then shading occurs.



## VI. CONCLUSION

The design and verification of Auto Intensity Control of Street Lights cum shading during rain is done successfully Using Arduino UNO microcontroller. To reduce the usage of excess power by the street light can be monitor by the LDR sensor and microcontroller. The advantage of the present system is that we will be able to give shelter to everyone in road during sudden rainfall. It requires the initial cost only for designing and installation and not for utilization. Hence, such systems are very much useful for the government to reduce the utilization of conventional power. Therefore, such systems are once implemented on a large scale can bring significant reduction of the power consumption caused by street lights. This initiative will help the government to save this energy and meet the domestic need. In the proposed system, we can do dual work for mankind.

## REFERENCES


[1] Aishwarya.N. Patil, Ashwin Tripathi, S. A. Fanan, "Intelligent Street-Light System using Arduino UNO", Volume 7 Issue No.5, International Journal of Scientific and Research Publications.

[2] D. A. Devi and A. Kumar, "Design and Implementation of CPLD based Solar Power Saving System for Street Lights and Automatic Traffic Controller", International Journal of Scientific and Research Publications.

[3] Y. K. Tan; T. P. Huynh; Z. Wang," Smart Personal Sensor Network Control for Energy Saving in DC Grid Powered LED Lighting System", IEEE Trans. Smart Grid.

[4] A.A.Nippun Kumaar, Kiran.G, Sudarshan TSB," Intelligent Lighting System Using Wireless Sensor Networks", International Journal of Ad hoc, Sensor & Ubiquitous Computing (IJASUC) Vol.1, No.4, December 2010, pp 17-27

[5] Y. K. Tan; T. P. Huynh; Z. Wang," Smart Personal Sensor Network Control for Energy Saving in DC Grid Powered LED Lighting System", IEEE Trans. Smart Grid.

[6] Mustafa Saad, Abdalhalim Farij, Ahamed Salah And Abdalroof Abdaljalil "*Automatic Street Light Control System Using Microcontroller*" Department of Control Engineering College of Electronic Technology/ Baniwalid Baniwalid- Libya LIBYA, Mathematical Methods and Optimization Techniques in Engineering.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