**GRAPHENE COATED LED BASED AUTOMATIC STREET**

**LIGHTING SYSTEM USING ARDUINO MICROCONTROLLER**

**ABSTRACT**

This paper describes about efficient automatic street lighting system using Graphene coated (Light Emitting Diode) LED. Nowadays, LED street lighting is becoming more and more popular among developing countries. But the normal LEDs are not provided with heat sink which degrades the performance of overall lighting system. Here, we are introducing GaN based LED which acts as a heat sink and it is proved that it is 10% efficient than the normal LEDs. At present, street lights are illuminating at all the time unnecessarily even in the midnight and also in the absence of human beings or vehicles, it is merely wastage of energy. In order to overcome this problem, we have introduced automatic street lighting system using Arduino- UNO microcontroller. In this paper, the intensity of the Graphene coated LED light is adjusted based on the requirement using LDR and PIR sensors via controller. An automatic street lighting system using Graphene coated LED conserves more energy and it is cheaper too. Simulation results are provided for adjusting the intensity of the controller using Arduino controller.

**INTRODUCTION**

Illumination is to be considered as one of the major concerns of energy today. Hence, there must be a need to utilize renewable resources of energy [1] for illumination to conserve energy with reduced cost. Street Lighting is a chief outfit in emerging nations. Inefficient usage of lighting deeply impacts the economic level and social stability [2]. We are intending to use solar energy for illumination which is available in abundance. In existing, street lights are continue to glow or illuminate even when there is no presence of humans/vehicles. It consumes more energy that slow down the reliability of the whole system. In this paper, we have designed a prototype which automatically adjusting the lighting system for illumination by sensing the presence of human beings or vehicles. LED street lighting is in use due to its.

EXISTING SYSTEM

LED street lighting is in use due to its higher illumination and longer lifetime but when coming to high power applications heat sink is inevitable. Heat exchange across LED lights affects its lifespan and also the reliability. On the other hand when traditional LED is subjected to high current the illumination will be reduced after a certain level which degrades the performance of the system. To overcome this deficiency a small change has to be implemented. Even though, solar energy is abundant in nature, world is often meeting the power demand. Since it is proved that the street lighting consumes more power, in order to conserve energy solar street lighting system can be utilized. The solar street lights also known as stand-alone street lights because it is independent of electrical grid. Solar panels help to convert solar energy into electricity and specifications of solar panels are depending upon the loads. The electrical energy obtained from solar panels is stored in batteries during daytime and discharged during night time. Usually, 12 volt battery is used but Ampere-hour varies with the capacity of batteries. with the capacity of batteries. On the contrary, the streets lights are glowing unnecessarily even in midnights of no use so that the energy is harvested to an extent. In order to avoid this, the street lighting system needs of automation. Based on this, it will give maximum brightness only when it is needed, which is detected by Light Dependent Resistor (LDR) and Passive Infra-red (PIR) sensor. LDR senses the surrounding intensity light; whenever the environment becomes dark it triggers the controller and switches the primary circuit ON. PIR sensor senses the vehicles and humans upon a certain distance of six meter and send signal to Arduino-UNO controller which would turn on the secondary circuit too and produce maximum illumination. So by implementing this, we can save energy to an extent which is now hard to produce.

EXISTING DISADVANTAGE

* Huge power loss.
* Unnecessary LED turned ON
* Heat sink is not efficient.
* Cost is high.

**PROPOSED SYSTEM**

The overall prototype of automatic street lighting system. Solar energy is absorbed by solar panel and it is converted into electrical energy which is stored into the battery with the help of buck converter. There are two major sensors, PIR and LDR are used, where PIR sensor is used to detect the presence of human whereas LDR sensor is used for sensing the light intensity. The output from these sensors is given as input to Arduino board, which controls the primary and secondary circuit individually. The whole set up The street lights are used to glow 12 hours unnecessarily. In the midnights also it glows at its full illumination even when there is less vehicles and human beings. To make it smarter and to conserve energy we have proposed a system that by using LDR and PIR sensor so that the illumination of street lights is controlled and by determining the intensity of surrounding light the street lights may be switched ON/OFF. The array of LLO-LED street lights have been divided into primary and secondary circuits. The ON/OFF movement of LLO-LEDs depends upon the input/output of sensors [4]. Light Dependent Resistor is used to detect and measure light intensity. It increases its resistance when the light intensity around the surrounding is less. When the environment is dark, LDR gives output to the microcontroller, it will switch ON the primary circuit through relays. The passive infrared sensor that measures infrared (IR) light radiating from objects in certain direction. These are mostly used for motion detection. PIR sensor is used to detect every object that has temperature above zero and emits radiation in the form of thermal energy and to detect the human beings and vehicles that arrive in its proximity. It has a range of 6-8 meters in which they detect the human and vehicles. Whenever output from PIR sensor is received, the secondary circuit will be switched ON by the controller. The corresponding program is given to controller to obey as given criteria.

PROPOSED ADVANTAGE

* Cost effective.
* Less power loss
* Better heat sink protection
* Lifetime increases
* Better thermal conductivity.

**BLOCK DIAGRAM**

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HARDWARE REQUIREMENT

* Arduino
* LDR
* LED
* Graphene
* PIR
* Battery
* Solar Panel

SOFTWARE REQUIREMENT

* Arduino IDE