

Sensor Based Street Lightening for Vehicle Movement

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Abstract - The project is to designed detect vehicle movement on highways to switch ON only a block of street lights ahead of the vehicle, and to switch OFF the behind lights to save energy. During night all the lights on the highway remain ON for the vehicles, but lots of energy is wasted when there is no vehicle his movement. This proposed system provides a solution for energy saving. This is achieved by sensing an approaching vehicle and switches ON a block of street lights ahead of the vehicle. As the vehicle passes by the behind lights switch OFF automatically. So when there are no vehicles on the highway, then all the lights remain OFF. Sensors used on either sides of the road send logic commands to microcontroller to switch ON/OFF the LEDs. Intensity control is also possible by Pulse Width Modulation (PWM) generated by the microcontroller. Thus this way of dynamically changing intensity ON/OFF helps in saving a lot of energy.

Keywords - . Microcontroller, Sensor, Street Light.

I. INTRODUCTION

Street lighting provides a safe night time environment for all road users including pedestrians. Providing street lighting is one of the most important and expensive responsibilities of a city. Lighting can account for 10–38% of the total energy bill in typical cities worldwide. Street lighting is a particularly critical concern for public authorities in developing countries because of its strategic importance for economic and social stability. Inefficient lighting wastes significant financial resources every year, and poor lighting creates unsafe conditions. Energy efficient technologies and design mechanism can reduce cost of the street lighting drastically. The main objective of the present project is to reduce the power consumption and efficient utilization of renewable sources for the application of street lightening and traffic signalling. Hence, this paper is aimed at design and implementation of an automatic system to control the traffic and reduce energy consumption of streets public lighting system up to the maximum possible extent. The density of traffic is sensed by using an array of Infrared Sensors (IR), which senses the traffic movement.

II. COMPONENTS AND METHODS

- Servo Motor (sg90)
- Solar panel
- Arduino Uno
- LDR's X 2 (Light Dependent Resistor)
- 10K resistors X 2
- Battery (6 to 12V)

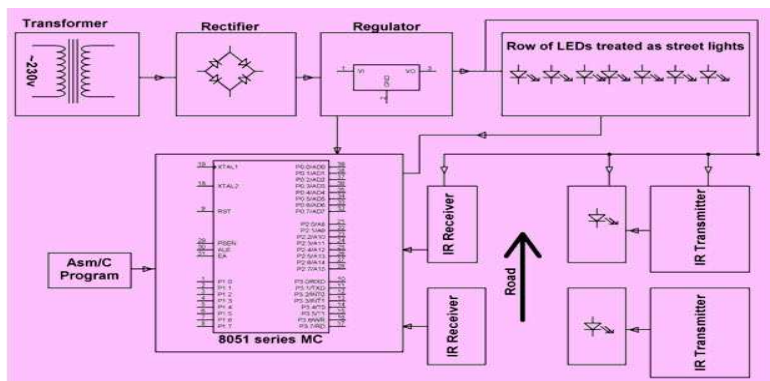


Fig. 1 Circuit Diagram

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III. RESULTS AND DISCUSSION

In this project, LDR's are working as light detectors. Before we go into detail, we will have to understand how the LDR's work. LDR (Light Dependent Resistor) also known as photo resistor is the light sensitive device. Its resistance decrease when the light falls on it and that's why it is frequently used in Dark or Light Detector Circuit. Check the various circuits based on LDR here.

The two LDR's are placed at the two sides of solar panel and the Servo Motor is used to rotate the solar panel. The servo will move the solar panel towards the LDR whose resistance will be low, mean towards the LDR on which light is falling, that way it will keep following the light. And if there is same amount of light falling on both the LDR, then servo will not rotate. The servo will try to move the solar panel in the position where both LDR's will have the same resistance means where same amount of light will fall on both the resistors and if resistance of one of the LDR will change then it rotates towards lower resistance LDR. Check the Demonstration Video at the end of this Article.

IV. RESULTS AND DISCUSSION

To make the prototype, you will have to follow the below steps:

The power supply of this project comprises of a step-down transformer, which steps down the voltage from 230v to 12V AC. This is transformed to a DC using a Bridge rectifier. A capacitor is used to remove the ripples using a capacitive filter, and it is then regulated to +5V from 12v using a 7805 IC voltage regulator, which is compulsory for the microcontroller as well as other components.

Furthermore, this project can be extended by using suitable sensors for detecting the street light failure, and then sending an SMS to the control department through a GSM modem for suitable action.

By using this project a lot of energy can be saved. The proposed system uses LEDs instead of other lamps. The project is especially designed for street lighting in remote rural and urban areas where the traffic is low at times. The system is multipurpose, extendable and totally variable to user needs. The applications of this street light that glows on detecting vehicle movement mainly involve in highways, real time street lights, hotels, parking areas and restaurants, etc. The advantages are; low cost, more life span and energy can be saved.

Thus, this is all about street light that glows on detecting vehicle movement circuit and it working. We hope that you have got a better understanding of this concept of the information which we have given in the above. Furthermore, any queries regarding this topic or microcontroller based projects, please give your valuable suggestions by commenting in the comment section below.

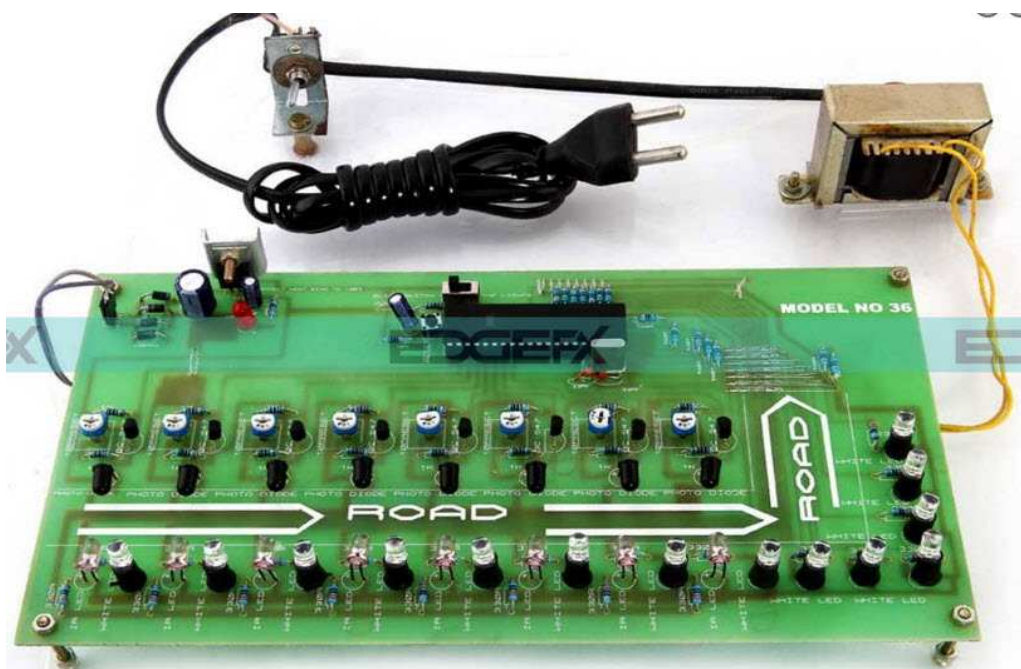


Fig. 2. Sensor Based Street Lightening Kit

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V. CONCLUSION

In Proposed system During the night time all the lights on the highway road remain on throughout the night, so the energy loss will be high when there is no movement of vehicles. This project gives a solution for saving the energy. This is attained by detecting an approaching vehicle by turning ON the street lights. As the vehicle passes away from the street light, then the lights get turn OFF. If there are no vehicles on the road, then all the lights will turn OFF.

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