



DESIGN AND IMPLEMENTATION OF AN AUTOMATED SOLAR STREET LIGHT SYSTEM

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Abstract Most of the street lights in Bangladesh use high-pressure sodium vapor lamps and energy saving bulbs running from the national grid electricity to light the street. Due to improper maintenance, most of the street lights are under the fault condition and roads are under dark condition. In this paper, an arduino based low-cost solar street light system has been designed. The objective of this work is to design an automatic control and fault and obstacle detection system for street lamps. The lighting system is based on renewable energy which is low cost. With the development of urbanization, the number of streets increases rapidly with high traffic density. This work includes three features: the sunlight sensing and control on/off of the street lights, the traffic sensing and fault reporting system. The microcontroller used is arduino mega 2560 which has to be programmed for these three tasks. This could be applicable in Bangladesh, which might provide a low-cost alternative to the existing street lighting system.

Keywords: Automatic control, use of solar energy, fault detection, energy saving.

1. Introduction

Street lighting system is an important issue should be designed well to allow users for traveling at night with good visibility in respect of safety and comfort. An efficient system ensure comfort tracking and reduces the accident during late night. On the other hand, poorly designed lighting systems can lead to poor visibility which may not be helpful for pedestrians who are passing through that street. Street Lighting can cost about 10–38% of the total energy bill in typical cities worldwide (D. A. Devi, 2012). Street lighting is a particularly critical concern for public authorities in developing countries because of its strategic importance for economic and social stability (L. Prasad Naik, 2013). Inefficient lighting wastes significant financial resources every year, and poor lighting creates unsafe conditions (L. Prasad Naik, 2013). Energy efficient technologies and design mechanism can reduce cost of the street lighting drastically (L. Prasad Naik, 2013). Manual control is prone to errors and leads to energy wastages as manually

dimming of lights during mid night is impracticable. Also, dynamically tracking the Obstacle or vehicle are imposed by manual control. The current trend is the introduction of automation and remote management solutions to control street lighting (J. Mohelnikova, 2008).

In this paper, two kinds of sensor are used which are light sensor and photoelectric sensor. The light sensor is used to detect darkness and to activate the ON/OFF switch, thus the streetlights will be ready to turn on. On the other hand, the photoelectric sensor is used to detect vehicle movement to activate the streetlights. LDR, which varies according to the amount of light falling on its surface (K. S. Sudhakar, 2013), gives an indications for whether it is a day-night time, the photoelectric sensors are placed on the side of the road, which can be controlled by Arduino Mega 2560. At the photoelectric sensor will be activated generally during the night time. Moreover, if any object crosses the photoelectric beam, a particular light will be automatically ON. By using this as a basic

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