

Automatic Vehicle Detecting Street Light with Traffic Monitoring System

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Abstract— This paper introduces a framework for a dynamic and energy efficient streetlight switching based on vehicle mobility on the street. It aims at developing a self-operating model which is automatically controlled by the presence as well as position of vehicles on the road. The illuminating duration and power of the lamp is decided by the density of vehicles passing by. The prototype discussed comprises of a LED Panel along with vehicle detecting sensors connected via relays. Initially, street light is dim which supports the movement of pedestrians. With the detection of the vehicle by the sensors, it switches from dim to medium followed by highest intensity and vice-versa, when it leaves. The streetlight lightens with highest intensity when the vehicle is just below it whereas it is medium just after detection and just before leaving. This concept is further merged with an automatic traffic control system which regulate the time duration of traffic light in accordance with the number of vehicles in the particular lane. This collectively formulates an effective and efficient street light with traffic monitoring system.

Key words: LED Panel, HPS, PWM

I. INTRODUCTION

In the present era, street light act as a vital organ of traffic control system but an abundant amount of energy is required to lighten these street lights. These street lights can be replaced by led lights which use 40-80% less electricity and have at least 5 times the life expectancy than regular high pressure sodium (HPS) fixture. Led lamps are 7 times more energy efficient than incandescent and twice as efficient as fluorescent lamp [2]. As the strength of traffic on the street is not constant so there is an undesirable illumination of street light when there is less or no movement therefore, the presented street light changes its intensity in accordance with the number of vehicles on the road. This paper merges the concept of led light with traffic monitoring system which activates the respective red, yellow and green light according to the number of vehicles in a particular lane.

II. LITERATURE REVIEW

For a long period of time enormous efforts have been made to reduce the power consumption of street lights. Various Smart Street Light systems have been proposed in which, light turn on when needed and turns off when not needed [14]. There are some systems which are found to save energy through the method of controlling the light intensity using pulse width modulation (PWM) technique [15]. Monitoring and management software, Internet Protocol, Segment Controller, Lon Works Power Line Communication Technology and Outdoor Lighting Controller. The concept discussed in this paper introduces a street light with traffic monitoring system which change the time period of traffic light on the basis of number of vehicle in that particular lane. The smart street light proposed here, changes its intensity in three different levels (high, medium and dim) in accordance with the distance of vehicles from the street light [12].

A. Algorithm:

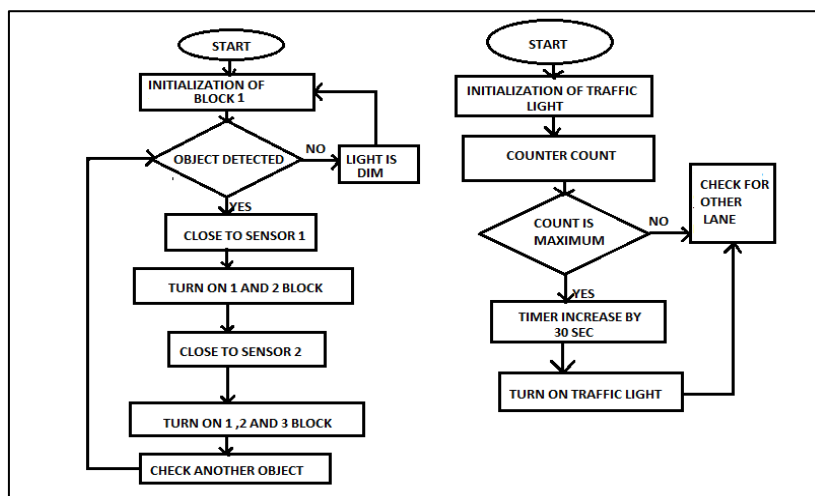


Fig. 1: Algorithm

III. COMPONENT DESCRIPTION

A. Sensor

For the detection of vehicle on the road, inductive proximity sensors are used which are working on the principle of electromagnetic induction. They are able to detect metal as target without any physical contact with the target. They have High response speed, Stable detection even in harsh environments, expose to water or oil splash and Non-contact output, ensuring long service life.

B. Microcontroller

ATMEGA 8 Microcontroller is used for programming so that it can provide automatic switching between three blocks according to the output of the proximity sensor.

C. Relay

Relays are used for the automatic switching of different blocks of the led panel in accordance with the input of the sensor.

D. Led

LED is used for showing the output or working as light source. The led used here is composed of GaInN semiconductor material.

E. Counter

Counter is used for the counting of vehicle in particular lanes, which further varies the time period of traffic light.

IV. BLOCK DIAGRAM

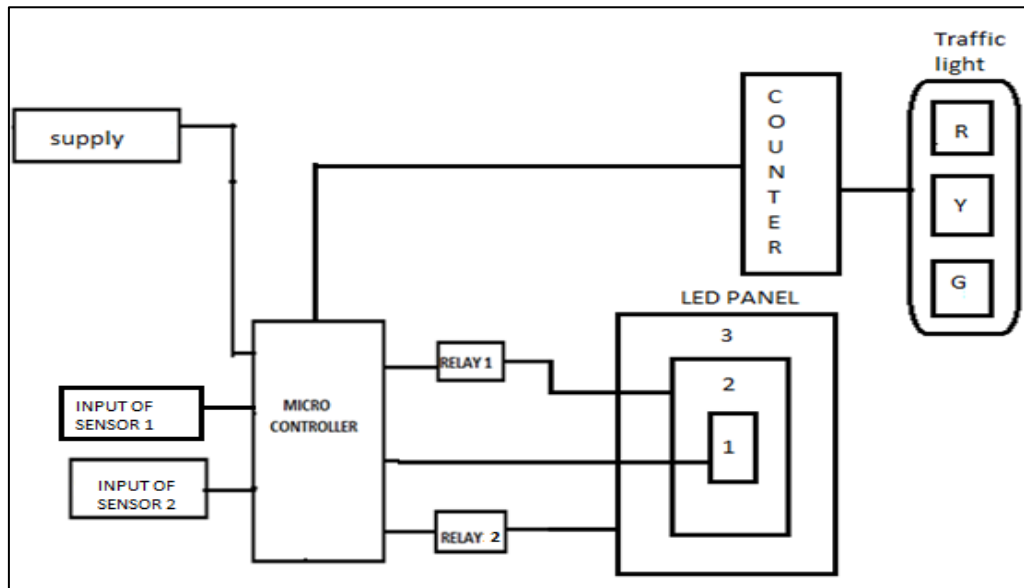


Fig. 2: Block Diagram

V. SIMULATION AND EXPERIMENTATION

This project is simulated on PROTEUS 7 SOFTWARE, some individual parts of circuit are tested on bread board and programming of microcontroller (ATMEGA 8) is done in embedded C on AVR workbench.

VI. CONCLUSION

The developed system is energy efficient, low cost and autonomous. This system will make all the functionality on the road easy and according to the need of traveller.

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