Vehicle Movement Tracked Street Lighting

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***Abstract*- This project is to track vehicular movements on Flyovers/Highways, sensing a vehicle approaching and automatically turning ON Street lights (LED/bulb) ahead of vehicles while the trailing lights are turned OFF.**

The lights would be OFF in the absence of vehicular presence on the streets. On the other hand, the Intensity of the street lights can be changed dynamically, so as to avoid complete darkness across the area, say 10% intensity can be kept as a default intensity in the absence of vehicles, the same block of street lights switch ON with 100% intensity as vehicle passes by, the trailing lights revert back to 10% intensity again. This kind of intensity control can be achieved by using Pulse Width Modulation (PWM) generated by the microcontroller.

I. INTRODUCTION

Street lights are much required in today's life of transportation for safety purpose (including accidents). In today's busy life no one bothers to switch it off when not required. This project here by gives solution to this, by eliminating manpower used in turning the street lighting arrangement ON/OFF and reducing the total power consumption required.

This implementation needs three basic components i.e. photo-resistors (LDR), IR Sensors and microcontroller. During daytime the circuit can be turned off i.e., since there is no requirement of street lights, the street light is kept off until the light level is low or the frequency of light is low the resistance of the LDR is high. This prevents the current from flowing to the base of the transistors, if not, which can cause critical scenario. Thus the street lights do not glow. Photons absorbed by the semiconductor gives bound electrons enough energy to jump into the conduction band, when the light level goes high or if light falling on the device is of high enough frequency, resulting in the free electrons to conduct electricity, thereby lowering resistance.

1.1 Block Diagram

When LDR allows the current to flow this block diagram of circuitry goes into working condition. IR sensors start emitting IR rays via IR transmitters. As soon any vehicle crosses or obstructs the path of IR rays and prohibits it to reach at IR receivers the microcontroller starts getting the blockage signals. The programming installed in microcontroller starts running which basically presented here allows three street lights to glow that are- the light in front of vehicle, behind the vehicle and parallel to vehicle making backward and forward street visible. Transformer converts the high 230V AC to 12V AC, Rectifier converts it into DC. For voltage regulation we are using LM

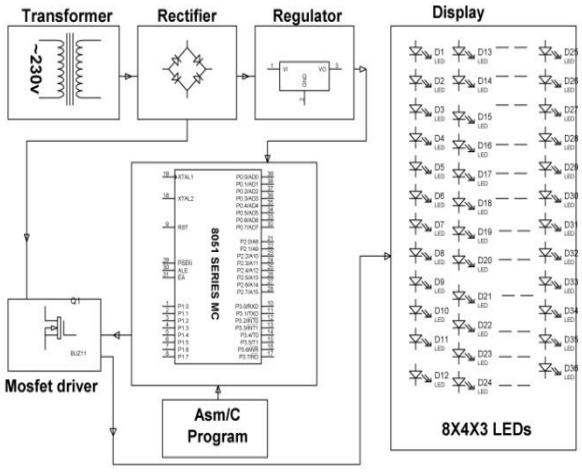


Figure 1.1: Block Diagram.

II. SECTIONS

2.1 Required Hardware/Software

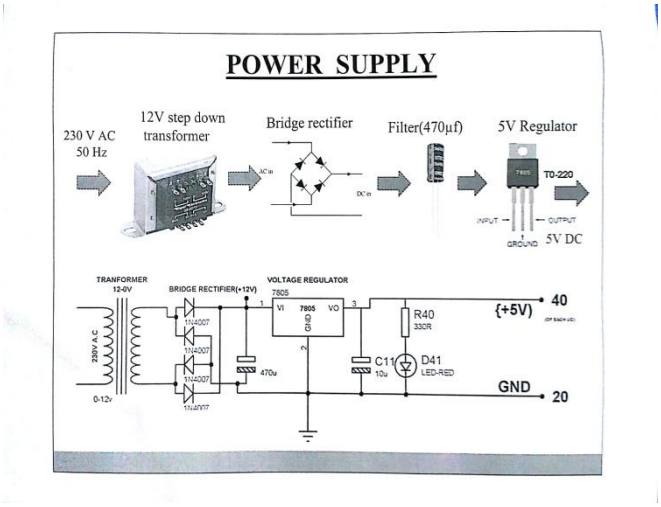
Software Requirements:

Sl.no	Components
1	Keil compiler
2	Proteus simulator
3	Assembly language or C language

Hardware Requirements:

Sl.no	Components
1	• Transformer (230 – 12 v ac) • Voltage regulator (lm 7805)
2	• IR sensors • Batteries
3	• Rectifier • Filter
4	• Microcontroller (at89s52/at89c51)
5	• LEDS • Photodiodes
6	• Resistors • Capacitors

2.2 Power Supply Diagram



III. MODES OF OPERATIONS

There are two basic modes of operation,

1. Transition of streetlights from dark to bright state.
2. Transition of streetlights from dim to bright state.

First mode of operation:

In the first mode of operation, when the vehicle is not present, all the streetlights will be in dark state. When a vehicle is sensed then the window of streetlights is illuminated in front of the vehicle.

Second mode of operation:

- In the second mode of operation, initially when the vehicle is not sensed, all the streetlights will be in dim state. This is achieved by use of pulse width modulation technique through the program stored in the microcontroller.
- When a vehicle is not present on the highway, then the streetlights are made to glow for about 1ms and then for 100ms they are switched off. Thus, we get streetlights with less brightness.
- When a vehicle is sensed, all the streetlights are illuminated for 1ms and the window of streetlights are illuminated for 100ms. Thus we have a PWM wave of 99% duty cycle.

IV. ADVANTAGES

- Elimination of manpower
- Saving electrical energy consumption
- Reduced emission for green house gases
- Reduced cost for maintenance

V. FUTURE ASPECTS

- Assuming there is a traffic jam over the flyover during the night (busy hours); every vehicle would have its headlights ON. Considering this situation the street light can automatically reduce its intensity to 10-50% than regular intensity so as to further reduce the power consumption.
- On a smaller scale, interior housing stair lighting can apply the same logic while climbing and descending from the stairs by a person, here the movement of the human being is to be sensed.

VI. CONCLUSIONS

This project is a cost effective, feasible, practical, eco-friendly and a most efficient way of energy saving. It overcomes the main problems that the world is facing today, saving of energy, very efficiently. According to survey reports collected periodically, we can save more that 40 % of electrical energy that is consumed on the highways. Initial cost investment and maintenance could be draw backs of this project. With the advances in technology in future and better resource planning, the cost of the project can be cut down. The LEDs have long life, emit cool light, donor have any toxic material and can be used for fast switching. For these reasons our project presents far more advantages which can over shadow the present limitations. Keeping in view the long term benefits and the initial cost would never be a problem as the investment return time is very less.

The project has scope in various other applications like for providing lighting in industries, campuses and parking lots of huge shopping malls. This can also be used for surveillance in corporate campuses and industries.

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