



Vehicle Movement Based Street Lights with External Light Sensing

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Abstract- The main aim of this project is that it saves energy by putting on the lights of the system only when the system detects movement of vehicle. The system switches on the street light ahead of the vehicle and switches off the trailing lights simultaneously. In order to detect movement of vehicles, sensors are used. The system automatically puts on the lights that are ahead of the vehicle detected and as soon as the vehicle moves ahead, the trailing lights are switched off. This is better than the existing system where the street lights are kept on always unlike this system where the street lights are put on only when movement of vehicle is detected which helps in saving lot of energy. During day time these lights are dim as this system has the capability to sense external lights. Thus this system senses the external light and then accordingly puts ON or OFF the street lights. It uses PWM to control the intensity through microcontroller. The sensors sense the vehicle movements and send it to a microcontroller that initiates commands for switching the lights ON/OFF.

I. INTRODUCTION

This project based on the embedded system is used for the control of the street lights. Embedded System is a combination of computer hardware and software. An embedded system can be defined as a computing device that does a specific focused job.

The proposed system consists of microcontroller, LDR, IR sensor and RTC. This system controls the street lights using light dependent resistor and IR sensor.

Street lights are switched on depending on the intensity of the Sun light on LDR. If the intensity of Sunlight on light dependent resistor is low, its resistance value is high. This value increases and becomes high when it is completely in dark. This resistance value decides when the street lights are required to switch ON.

As the resistance value is maximum in the midnights, real time clock comes into the play. The controller checks peak time during which there is no traffic and switch OFF the lights. When there is any vehicle on the road, it is detected by the IR sensor.

II. Concept

There are two basic modes of operation,

- A. Transition of streetlights from dim to bright state.
- B. Transition of streetlights from dark to bright state.

1. In the first 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 for those seven leds.

2. In the second 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.

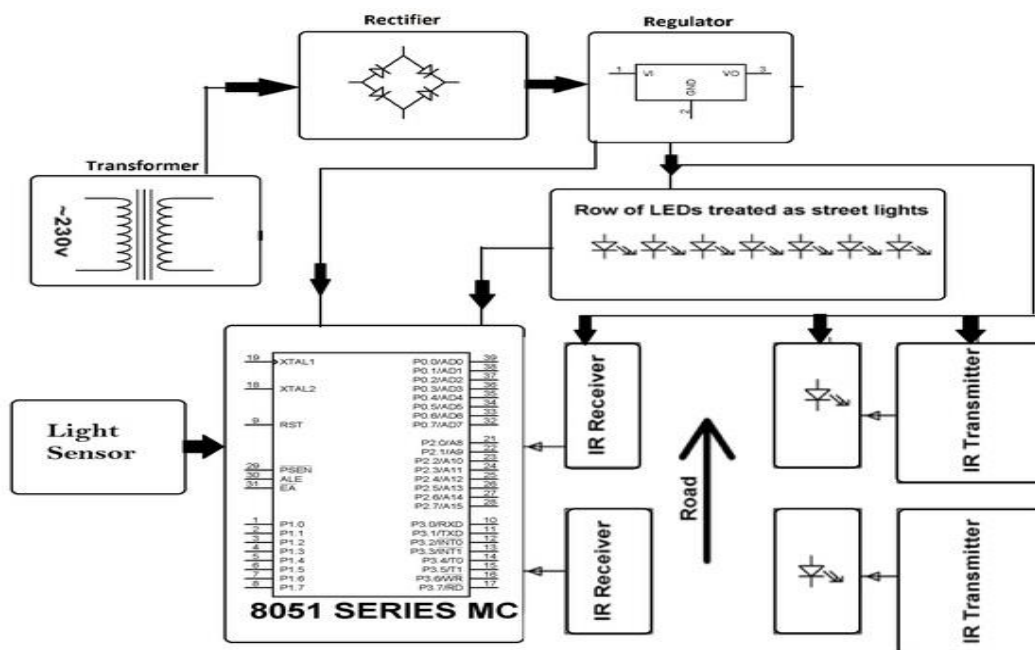


Fig.1:Block Diagram

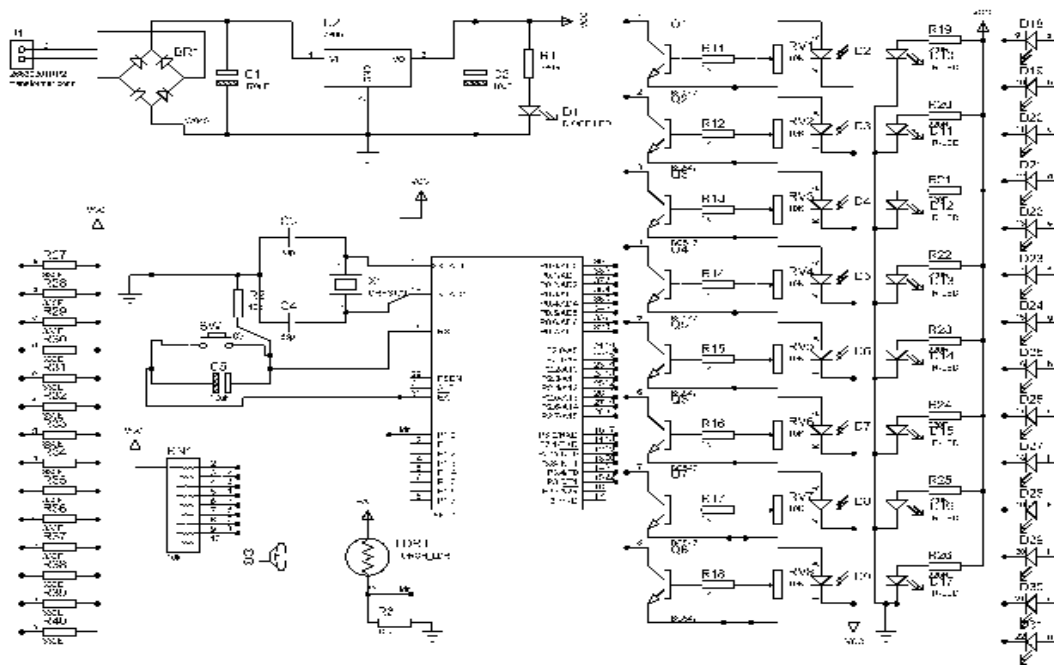


Fig.2:Circuit Diagram

III. HARDWARE AND SOFTWARE SPECIFICATIONS

Hardware

1. Transformer (230 – 12 v ac)
2. Voltage regulator (lm 7805)
3. Rectifier
4. Filter
5. Microcontroller (at89s52/at89c51)
6. Ir led
7. Photodiodes
8. Ldr
9. Bc547
10. Led
11. Resistors
12. Capacitor

Software

- 1.Keil μ Vision IDE
- 2.MC Programming Language Embedded c

IV. CONCLUSION

This project of Vehicle Movement Based Street Lights With External Light Sensing is a cost effective, practical, ecofriendly and the safest way to save energy. It clearly tackles the two problems that world is facing today, saving of energy and also disposal of incandescent lamps, very efficiently. According to statistical data we can save more than 40 % of electrical energy that is now consumed by the highways. Initial cost and maintenance can be the drawbacks of this project. With the advances in technology and good resource planning the cost of the project can be cut down and also with the use of good equipment the maintenance can also be reduced in terms of periodic checks. The LEDs have long life, emit cool light, do not have any toxic material and can be used for fast switching. For these reasons our project presents far more advantages which can overshadow 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.

V. APPLICATIONS

1. The street light control circuit can be used in normal roads, highways, express ways etc.
2. The project can also be used in parking areas of malls, hotels, industrial lighting, etc.

VI. ADVANTAGES

1. If the lighting system implements all LED lights, the cost of the maintenance can be reduced as the life span and durability of LEDs is higher than Neon based lights which are normally used as street lights.
2. As the lights are automatically turned ON or OFF, huge amount of energy can be saved.

VII. REFERENCES

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