# Automation of Street Light System

**K. Govinda [1] A. Ravi Teja [2] B. China raja[3]**
[1, 2, 3, 4, 5, 6]Electronics & CommunicationDepartment
[1] SCSE, University, Vellore, India [2,3] SENSE, VIT University, Vellore, India

*Abstract*---One of the major challenges at the moment is the improvement of the present street lighting system. The existing systems are considered outdated due the lack of communication capabilities, not allowing system feedback. Public lighting managers can lower the operating costs of the lighting system. Lighting engineers have conceived of new designs to improve public safety and reduce energy consumption only to be stymied by an inability to economically control every luminaries in the system. This paper describes street lighting control system based on power line communication in an automatic manner and also reduces the consumption of energy. For present days this automatic street light management is very useful.

## I. INTRODUCTION

Most of street lighting systems today do not have communication capabilities. Its energy consumption, which is currently estimated by number of installed devices, and status information, cannot be readily obtained. Lights are switched ON/OFF by photoelectric relays and there are no ways of transfer control commands.

Street lighting is used to illuminate the roads we drive on, the pedestrian paths we walk down, and the public areas where we gather. It provides us with safe roads, stylish and inviting public areas, and enhanced security in our homes, businesses and city centers. Unfortunately, while traditional public lighting systems provide significant benefits to all our lives, they do so at significant expense to the community. They're usually very costly to operate, however, and they use a lot of money that almost 40 percent of a city's electricity spending.

## II. LITERATURE REVIEW

Streetlight is an indispensable part of a city's infrastructure. The main function of it is to lighten up the city's streets during the dark hours of the day. It also has a function to decorate street and also reduce some street accidents [1, 2]. This smart system was used to switch street lighting on and off automatically based on sunrise/sunset times light intensity of controller surroundings [3] at each transformer station. Generally a wireless sensor network system consists of sensor nodes, sink nodes, Internet or information transport network and user computers [4]. The node of wireless sensor network often consists of three layers: a physical layer, a medium access control (MAC) layer and an application layer. Each layer provides services for the above layers using well-defined interfaces. [5]. DALI stands for Digital Addressable Lighting Interface. IEC has adopted it as a lighting standard for ballast control of fluorescent lamps. It is a proven technology, used by many manufacturers in the world. However, it is restricted to home or commercial buildings. As the protocol can address just a few nodes, it is not suitable for a large network like a street lighting system, which can have thousands of nodes [6].

It is much purposed and very useful in our daily busy world. It is also failure in some cases. When day light is very low during cloudy days then there will be a decrease in day light intensity as per given ahead. Then lights will turn ON. But the cloud light is far enough for us and we don't need of any light.

In China, the methods of time-control, optical-control and time-optical-control are in common used to control street lamp, particularly in small and medium-sized cities. But due to the backward lighting control and administrative method, the precision is bad, and the result of work is also poor. And it generally based on time. It may not be that effective due to seasonal changes. But in this system the entire unit runs under light .So there will not be any effect on seasonal changes and we can also adjust the intensity according to it.

## III. PROPOSED METHOD

Of course we cannot forget about the LDR which is the prime sensing component of the circuit. The transistors are basically arranged such that they both complement each other oppositely, meaning when the left hand side transistor conducts, the right hand side transistor switches OFF and vice versa. The left hand side transistor T1 is rigged as a voltage comparator using a resistive network. The resistor at the upper arm is the LDR and the lower arm resistor is the preset which is used to set the threshold values or levels. T2 is arranged as an inverter, and inverts the response received from T1.

Initially, assuming the light level is less, the LDR sustains a high resistance level across it, which does not allow enough current to reach the base of the transistor T1. This allows the potential level at the collector to saturate T2 and consequently the relay remains activated in this condition. When the light level increases and becomes sufficiently large on the LDR, its resistance level falls, this allows more current to pass through it which eventually reaches the base of T1.

The transistor T1 conducts, pulling its collector potential to ground. This inhibits the conduction of the transistor T2, switching OFF its collector load relay and the connected lamp. The power supply is a standard transformer, bridge, capacitor network, which supplies a clean DC to the circuit for executing the proposed actions. The whole circuit can be built over a small piece of Vero board and the entire assembly along with the power supply may be housed inside a sturdy little plastic box.

The LDR must be placed outside the box, meaning its sensing surface should be exposed toward the ambient area from where the light level is required to be sensed. Care should be taken that the light from the lamps does not in any

All rights reserved by www.ijsrd.com

way reach the LDR, which may result in false switching and oscillations.

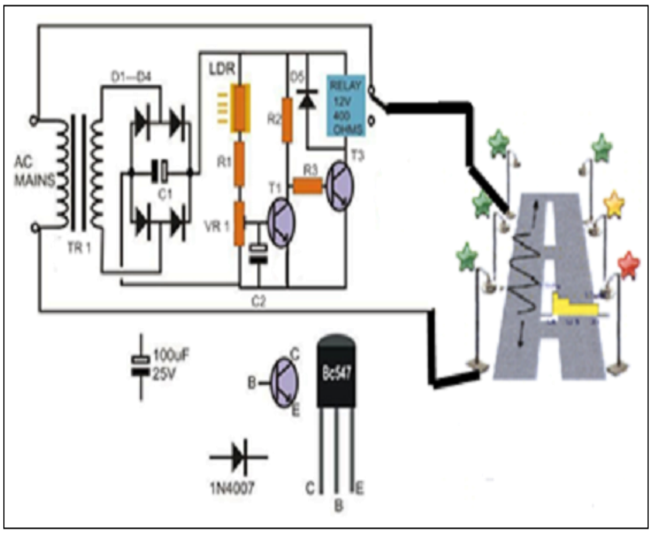


Fig. 1: Circuit Diagram

There is a condition when there is a cloudy day when the day intensity is very low as shown in table1.

| Illuminance | Example |
|---|---|
| 120,000 lux | Brightest sunlight |
| 110,000 lux | Bright sunlight |
| 20,000 lux | Shade illuminated by entire clear blue sky, midday |
| 1,000 - 2,000 lux | Typical overcast day, midday |
| <200 lux | Extreme of darkest storm clouds, midday |
| 400 lux | Sunrise or sunset on a clear day (ambient illumination). |
| 40 lux | Fully overcast, sunset/sunrise |
| <1 lux | Extreme of darkest storm clouds, sunset/rise |

Table. 1: Daylight intensity in different conditions

Then we can adjust the intensity difference by decreasing the intensity then there will be an overcome of this problem. But we have to develop an another unit of adjusting the intensity. This can be changed during different conditions whether it is cloudy or very lightening. But in summer rains with thunders and lightening there will be very problematic to it due to repeated lightening. Then we better disable this unit and continue in the regular process.

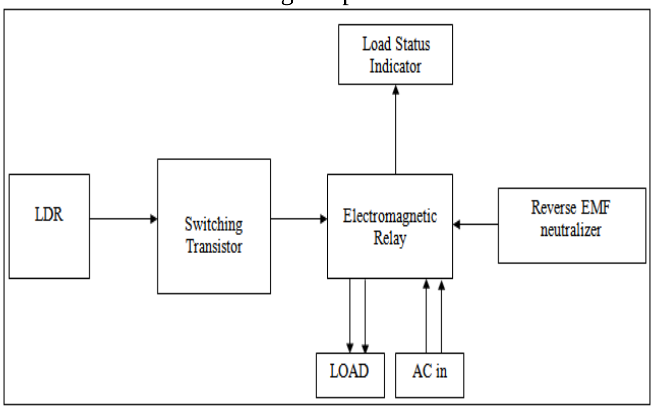


Fig. 2: Block diagram of the system.

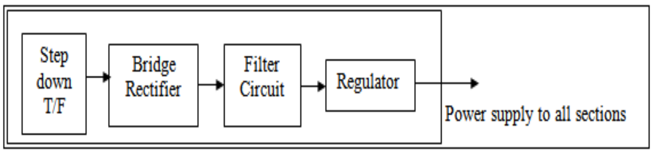


Fig. 3: Transformer block diagram

Firstly after sensing of LDR then the information is send to switching transistor. This transistor then sent to electromagnetic relay. At this relay there will be junction of all the circuit by load, AC input, reverse emf which is used as neutralizer and load status indicator. The transformer which is used in this circuit acts as step up and step down system as the above block diagram of transformer and then to regulator

### *A. Applications*

- It is used as street light management
- We can also use in our houses for lights in garden and in outside by keeping light detector on the house roof top.
- It can be used in factories
- It can be used in lightening house to detect lightening
- It is used to detect storms while travelling in ships

## IV. CONCLUSION

Streetlights are a large consumers of energy for cities, using up to 40 percent of a city's energy budget. This work has presented the design of a automatic data network-based intelligent system capable of controlling and monitoring a automatic street lighting system. If every city installed this system there would be a long way to reducing energy use worldwide the monitored streetlight market was a high-volume and high-valued market in 2007. But by this system there will be a huge amount of energy consumption. 30 cities that piloted installations in 2006 will decide to deploy the solution and fully benefit from it. Also, we expect that more than half of the cities that evaluate a Lon Works Power Line based streetlight monitoring solution will deploy it and then further extend the network to other application domains within the next 24 months. Lon Works Power Line based streetlight monitoring solutions will become city monitoring solutions. If it is applied in large, medium and small scale cities and towns, communities and various types of campus, there will be a large scale of economic and social benefits

## REFERENCES

[1] Eduard Zaloshnja Ted R. Miller, Maury S. Galbraith, Bruce A. Lawrence, Lemyra M. DeBruyn, Nancy Bill, Kenny R. Hicks, Michael Keiffer, Ronald Perkins, "Reducing injuries among Native Americans: five cost-outcome analyses," Accident Analysis and Prevention, vol. 35 no. 5 pp. 631-639, 2003.
[2] B. A. J. Clark, "Outdoor lighting and crime," Astronomical Society of Victoria, Inc., Australia, 2003.
[3] Robinson, Gail M., "Smart photoelectric control senses lighting problems," Design News, vol. 50, no. 8, pp. 99, Apr. 1995.
[4] J. Hill, R. Szewczyk, A. Woo, S. Hollar, D. Culler, K. Pister, David Culler, Kristofer Pister, "System architecture directions for networked sensors", ACM

SIGPLAN Notices, vol. 35, no. 11, pp. 93-104, November 2000.

[5] C. Chien, I. Elgorriaga, and C. McConaghy, "Low-power direct-sequence spread-spectrum modem architecture for distributed wireless sensor networks". Presented at In Proceedings of the International Symposium on Low Power Electronics and Design (ISLPED), Huntington Beach, CA, August 2001.

[6] DALI AG Digital Addressable Lighting Interface. DALI Manual. DALI AG of ZVEI, Division Luminaires. Germany, 2001, pp. 62. Available at http://www.dali- ag.org/c/manual_gb.pdf. Z. Tafoya, L. Ping, C. Jiangtao, 'Study of Interval Type-2 Fuzzy Controller for Twin-tank Water level system', vol. 20, pp. 1102-1106, 2012 .

All rights reserved by *www.ijsrd.com*