

Survey on “Smart Street Light”

Madhuri patil
Department of E&TC,
Aitrc,vita.
Maharashtra,indita.

Pooja Tawate
Department of E&TC,
Aitrc,vita.
Maharashtra,india.

Sarika Patil
Department of E&TC,
Aitrc,vita.
maharashtra,india

Vikas R.Nichal
Assistant Professor
Department of E&TC,
AITRC,Vita.
Maharashtra, India

Abstract:- Smart street light system which operates automatically is not only easiest but also the intelligent system. This system can be set to operate in automatic mode, which regulates the street light according to brightness and dimness algorithm and light intensity. When vehicle pass by, the light will increases automatically, later decreases. This design can save a great amount of electricity compare to street lamps that keep a light during nights for this system power supply is given by solar panel and piezoelectric transducer placed on road. When a vehicle is passing on road then pressure is applied on it. According to property of piezoelectric material energy is generated when pressure is applied on it. Another power supply is from solar panel. The solar panel is placed on street light poles. In this system by using solar panels energy is generated. At the input stage, IR sensors used for vehicle detection and output stage, street lights are connected here LDR used, because of street light operation is not required in daylight.

Keywords:- LDR, PIR Sensor, Solar panel, piezoelectric transducer, microcontroller.

I. INTRODUCTION

At present, electricity has become a lifeline for human population. Its demand is increasing day by day. Modern technology needs a huge amount of electrical power for its various operations. Electricity production is the single largest source of pollution in the whole world. At one hand rising concern about the gap between demand and supply of electricity for masses has highlighted the exploration of energy and its sustainable use. On the other hand, human population all over the world and hence energy demand is increasing day by day linearly. This method operates by set up an optical circuit, change the resistance by using of light up sensitive device to control street lamp light up automatically at dusk and turn OFF automatically after down in the morning [3].studies have shown that proper street light in can substantially reduce car fatalities and crashes with pedestrians. Lighted intersections and highways are known to have fewer crashes than their until counterparts street light are large consumers of energy because of high hours-of-use.

In the current scenario, the streetlights are such that as the intensity of sunlight falling on sensor on the streetlight crosses of threshold level, the light automatically increases or decreases. Automatic intensity control is a simple and beneficial concept in which street light controls its intensity according to the brightness of surrounding.

After that object is detected by PIR sensor then light intensity goes up to 100%,otherwise it remains 30%.This project aims to automate the street lights by using embedded system. This method has been explored further in this paper uses the LDR sensor’s light dependent property. Now a days, on road crime is increased. Because of this reason for security purpose CCTV camera is used here.

II. SURVEY OF DIFFERENT TECHNIQUES ON STREET LIGHT

A. Energy efficient lighting control system design for corridor illumination.

Proposed by Jayashri A. Bangali, Arvind d. Shaligram. In this paper, the light control is the on /off system. Or timer centralized control.Photo sensor automatically adjusts the light output of a lighting system based on detected luminance. This can result energy saving through reduction in input power, as well as reduction in pick power demand, and enhanced lighting flexibility. The system has two modes. In mode 1, the input from the LDR is varying according to the light intensity in the corridor. The signal conditioning circuit converts it into voltage which is given as an input to the ADC.The output of the ADC is given to the microcontroller and depending upon the light intensity, the tubes will be turn ON or OFF. The advantages of the developed lighting control system is that it can fitted in existing wiring set up and thus saved the initial installation cost of the system.The developed system is simple and cost effective there is a concern that some lamps have a shortened life if they are switched off and on frequently programmed start ballasts offer the shortest and smoothest and lamp start and are intended to improve lamp life is a frequent on and off occur [3].

B. Design and fabrication of Automatic Street light control system.

The paper proposed by M. A. Wazed, N. Nafis, M. T. Islam. In this paper, the lamppost light remains switched ON at day time also. It is one of the source of power loss for the country. In order to develop the country's power sector, power generation and distribution were opened to both national and foreign private investments in 1996. This was followed by the formulation of private sector power generation policy. Energy saving has become a prime priority for machines working round the clock to provide us various comforts and necessities. Generation of electricity from various sources other than thermal generation is possible but may not be feasible for some situation and some time is not sufficient to stratify the demand of the ever increasing population. The automated control system is working reliably so far, though it has few limitations. The limitation controlled by placing the system in an appropriate location [5].

C. Street lighting system based on vehicle movements.

The paper proposed by K. SanthaSheela, S Padamadevi. In this paper, this method is using high pressure sodium lamp in their system. It can be seen that this method is widely used in the country now a days. This method operates by setting up an optical control circuit, change the resistance by using of light up sensitive device to control street lamp light up automatically at dusk and turn OFF automatically after dawn in the morning. This paper highlights the energy efficiency of street lighting designing used LED lamps through intelligent sensor interface for controlling and managing. The main advantage of the present system is power saving. Due to the technological development nowadays, road lighting can be categorized according to the installation area, performance and their use, for an example, lighting for traffic routes, lighting for subsidiary roads and lighting for urban centre and public amenity. The original contribution of this thesis is to design of a streetlight node based on which the system can be set to run in automatic mode, which control streetlight according to sunrise and sunset algorithm and light intensity. This control can make a reasonable adjustment according to the seasonal variation.

D. Wireless streetlight control system.

The paper proposed by Deepak Kapgate, G.H. Raison. A wireless sensor network (WSN) is a wireless network consisting of spatially distributed autonomous devices using sensors which work corporately to monitor physical and environmental condition, such as temperature, sound, light, vibration, pressure at different locations. This system comprises of control station(PC), GUI to display and update status of streetlight, and network processing devices. The nodes and NPD are Jennic 513x wireless microcontroller with different programming. The master, nodes and NPD have light sensor embedded in them. A threshold value (in LUX) is set up at the master. The nodes will sense the light intensity and send the value to the master. The master compares these values with the threshold value and appropriately decides whether to switch ON/OFF the nodes. The GUI gives us a

representation of the streetlight i.e. their status (ON/OFF). Use of the sensor for street light application which aims to reduce the power consumption. The control centre will monitor and control all streetlights at real time. [4]

E. Survey of Smart Street light using different techniques.

This system can be set to operate in automatic mode, which regulates the street light according to brightness and dimness algorithm and light intensity. When vehicle pass by, the light will increase automatically, later decreases. This system overcomes the problem of electricity and electric consumption. The power supply consist of 12volt step down transformer, a bridge rectifier IC, a 50volt/2000uf capacitor and 12v voltage regulator. The step down transformer transforms the alternating current voltage from 220volt to 12volt ac. The bridge rectifier IC comprises of four rectifiers diodes internally and convert ac voltage to dc voltage. 50volt/2000uf capacitor filters the output dc voltage from the rectifier ic into a pure dc voltage while the 12v ic voltage regulator ensure that the voltage is stabilized at 12volts.

- LDR

LDR is small component which works on light intensity. Light intensity is increased LDR resistance will be also increases and decreases if light intensity is decrease.

- IR Sensor

The IR transmitter is placed directly in line of sight with IR receiver, so that the IR receiver continuously receives infrared rays. Once the IR receiver receive infrared ray, the microcontroller will detect logic 1. If the infrared rays are blocked by any object, the microcontroller will detect logic 0.

• *Block Diagram*

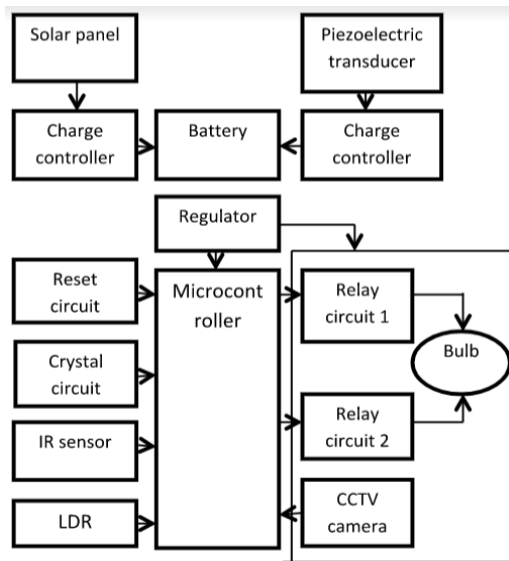


Fig1:-block diagram of Smart Streetlight

• *Solar Panel*

Solar street lights are raised light sources which are powered by photovoltaic panels generally mounted on the lighting structure or integrated in the pole itself. The photovoltaic panels charge a rechargeable battery, which powers our project.

• *Piezoelectric transducer*

Piezoelectric material converts the pressure applied to it into electrical energy. The source of pressure can be either from the weight of the people walking over it.

• *Microcontroller*

The microcontroller waits for the LDR and when the intensity of light on LDR decreases, the output of the microcontroller is activated and the street lights start to glow. If any object is detected brightness of street light will automatically increases, otherwise brightness of street light will decrease. This event occurs only when LDR output decreases. Hence, the auto intensity control of street light is achieved with the above circuit which has an LDR, IRsensor, microcontroller and lamps.

• *Circuit working*

The model consist of 6led as streetlights and 6 pairs of IR transmitter and IR receiver used as sensors. The IR transmitter are placed on one side of the road and IR receiver are placed on the other side of the road, directly facing the IR transmitter.

Input	Output
Ambient condition for LDR sensor	LEDs dependent on LDR
Dark	ON at maximum intensity
Light	OFF

Table 1. Shows Led Status Indication For LDR Sensors

Table 1 shows the output of the LEDs that are connected to the LDR sensor for the different light conditions. The LEDs work at maximum intensity under dark conditions and slowly reduces its intensity when light is present around the LDR.

Input	Output
Obstacle In Front Of IR Sensor	LEDs Dependent On IR Sensor
Present	ON at Maximum Intensity
Non Present	ON at Minimum Intensity

Table 2. Shows The LED Status Indication For IR Sensors

Table 2 shows the LEDs condition in presence and absence of a vehicle. The intensity is maximum when an obstacle is present and vice-versa.

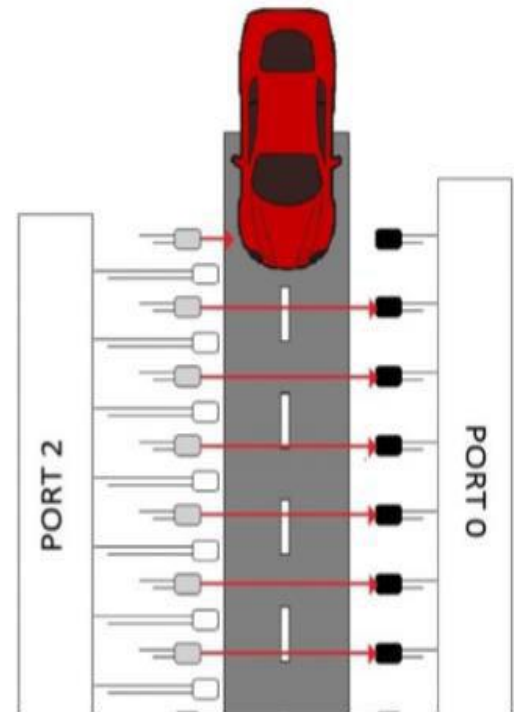


Fig2:- Demonstration of vehicle sensing system

III. ADVANTAGES

- No Man Power required.
- Simple Construction.
- Efficient method.
- Less Consumption of electrical energy.
- Less maintenance.
- Cheap& economical.

IV. APPLICATION

- This circuit can be used in real time street lights and highways also.
- This can be used for lights in parking areas of industries, hotels, restaurants etc.
- Garden lights.
- Township management.
- Museums.

V. CONCLUSION

This paper presents an survey on different solar street light idea of reducing power consumption in the existing street light systems.

REFERENCES

- 1)Jayashri A, bangali, arvind D, Shaligram, “energy efficient lighting control system design for corridor illumination”, international journal of scientific and engineering research volume 3,issue 4,april-2012,ISSN 2229-5518.
- 2)M. A. Wazed, N. Nafis, M. T. Islam, “Design and fabrication of automatic street light control system”, pp 27-34 Vol. 5, No.1, June 2010.
- 3)K. Santhasheela, s. padmadevi, “Street light system based on vehicle”.
- 4)Deepak kapgate, “wireless street light control system”, G. H. Raisoni college of engineering, Nagpur University, international journal of computer applications(0975-8887),Volume 41-NO.2,march,2012.
- 5)Elvik, R., “Meta-analysis of Evaluation of public lighting as accident counter measure .” transportation research record 1485, TRB, National Research council, Washington, D.C.,PP. 112-123,(1995).
- 6)Mendlka,M., Gadaj, M., kulas, L, Nyka, K, WSN for intelligent street lighting system, Information Technology(ICIT),2010 2nd international conference on, vol. no., 99, 100,p 28-30 June 2010.
- 7)ReinhardMullner, Andreas Riener Commission International de l’Eclairage. (1992) Road lighting as a accident count measure1 “An energy efficient pedestrian aware smart street lighting system”, International Journal of pervasive computing and communication, vol.7 iss:2, pp.147-161,(2011).
- 8)GiuseppeParise, Fellow, IEEE, Luigi Martirano, Senior member, IEEE, and Massimo mitolo, senior member,