

# Advanced Tracking Based Power Saving Smart Solar Street Light Systems- A Review

K. Tarun S.S, M., School of Engineering & Technology  
Department of Mechanical Engineering,  
Jain University, Bangalore, 562112,  
Karnataka, India

Dr. Alok Kumar Rohit, Assistant Professor, School of  
Engineering & Technology, Department of Mechanical  
Engineering, Jain University,  
Bangalore, 562112, Karnataka, India

**Abstract:-** We need to keep or preserve electricity because maximum of the power sources we rely on, like coal and herbal fuel cannot be replaced. Once we use them up, they're long past all the time. Saving energy may be very vital, instead of using the energy in unnecessary instances it must be switched off. In any town "road mild" is one of the important energy ingesting factors. Maximum of the time we see road lights are ON even after dawn for this reason losing lot of strength. Over here we're avoiding the trouble by having an automatic device which activates & OFF the street lighting fixtures at given time or when the ambient light falls below a particular depth. Each controller has an LDR which is used to discover the ambient mild. If the ambient light is below a specific cost the lighting are became ON. A mild dependent sensor is interfaced to the micro controller it is used to tune the solar mild and when the sensors is going dark the led might be made on and whilst the sensor founds light the LED can be made OFF. It genuinely demonstrates the working of transistor in saturation area and reduce-off place. The working of relay is likewise regarded micro controller and the code is written in C language in the resulted cost may be seen with the assist of UART or liquid crystal display. Automated street mild control device is an easy but powerful idea, which makes use of transistor as a switch. By using this machine manual works are 100% eliminated. It routinely switches ON lighting fixtures when the daylight goes below the visible place of our eyes. This is finished by means of a sensor referred to as mild established Resistor (LDR) which senses the mild sincerely like our eyes. It automatically switches OFF lighting whenever the daylight comes, visible to our eyes. Purpose of this seminar is to manipulate the street mild the usage of LDR.

**Keywords:-** LED, LDR, Solar Panels, Micro Controller, GPS System.

## I. INTRODUCTION

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### A. Any Time Street Light Monitoring Machine

➤ Energy conservation is frequently the most economical way to reduce electricity shortages and is more environmentally benign alternative to expand electricity production. There's a developing demand and need to conserve strength amidst growing electricity costs and call for deliver skew to herald performance in maintenance and managed operation of public lighting structures, including the ones observation on streets and in public locations. Those efficiency and fee optimizations/savings may be performed through remotely controlling each lamp and dealing with its brightness in step with the cutting-edge need, upgrading lightning technology to enhance life and derive electricity and price financial savings.

### B. Solar Tracking Description

The device consists of 4 modules, sun tracking device, automatic lightening, fault Detection and car strength supply switching. Sun monitoring machine is used to convert solar electricity into electrical power. Automatic lightening is used to control the intensity of LED at night time and day time. At day time LED which is been used in the system will get turned OFF with the help of sensors and at night time LED turns ON according to the requirement. Any fault associated with connection which is happened, at that point GSM will dispatch the message to the surveillance room. Any uneven incidents happened can be detected by the GPS and sends information to the nearby control room.

### ➤ Background of Problem

Whilst you get up at morning you could have observed that street lights are still ON while it's now not vital & while you travel to rural areas either there may be no avenue lamp or there aren't such a lot of vehicles to completely make use of that facility. Honestly its method the wastage of strength.

At the start, road lamps had been managed manually wherein this became set of tradition in each of the road lamps. That becomes referred to as the first technology of the original street light. Another technique that has been used after that became based totally at the optical manipulates method. On this technique the excessive strain sodium lamps have been used.

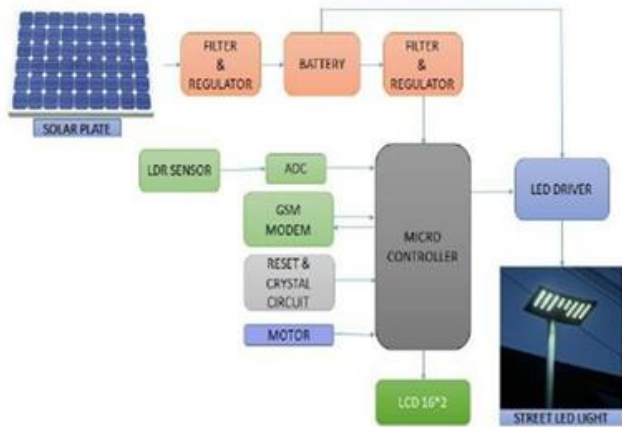


Fig 1:- Circuit Diagram

➤ *Hassle Announcement*

The primary purpose of this challenge “advanced tracking-based power saving smart solar street light” is to minimize the cost & lack of energy and also to reduce man power to manually on- off the road mild.

➤ *Methodology Used in this Project*

They be many technologies are used for solar tracking systems however integrated my venture we're integrated the Smart Automation, wireless system by using IR, LDR, GPS sensors as shown in Fig. 01.

➤ *Introduction of GPS*

Global power systems foremost built integrated is to present safety for all vehicles This new technology, popularly known as GPRS which created many wonders built- in-integrated for protection of the society. This hardware is geared up on to the automobile built-in in recent days which indicates the advancement in technology

➤ *Working of GPS Solar Tracking*

The mission integrated built-in GPS receiver and GSM modem with a micro controller. The entire device is attached to the solar system or if already present in automobile. Built-inside the integrated other GSM cell smart phone is attached to the pc with VB software. So, the GPS built-in-integrated will ship the longitudinal and latitude values of the automobile to GSM Modem. Assume initially the vehicle is travelling on a highway and if it crashes some other vehicle, as soon as the vehicle makes crash sound, sound sensors near the pole receives the information and sends information to the microprocessor and thus passes the information to the control unit.

The SMS dispatched might come through the GSM provider company after which reaches the automobile, which is because the has a GSM device with sim card.

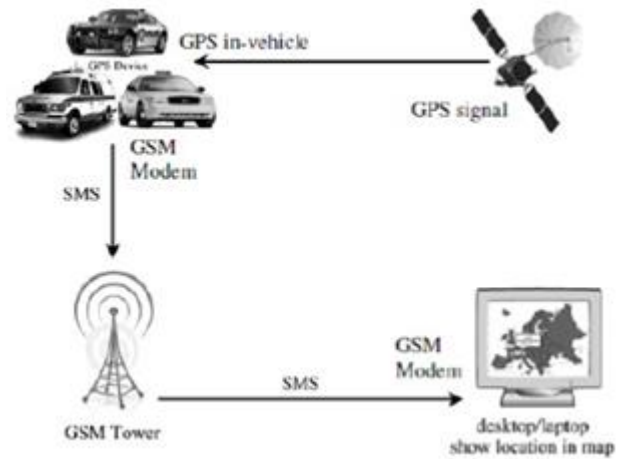


Fig 2:- GPS Tracking System

➤ *Block Diagram and Explanation*

The block diagram of the vehicle tracking is proven underneath. The block diagram shows the general view of the device. The blocks which might be related here are Micro controller, LCD show, GPS, GSM, energy supply, Infrared sensor, hearth detect Built-in its miles proposed to design an embedded machine which is used for tracking and position integrated of any vehicle via integrated built-in Position (GPS) and global system for cell conversation (GSM). In assignment 8052 micro controller is used for integrated to diverse hardware peripherals. The present-day layout is an embedded application, screens a car and files the reputation of the automobile on call. For 8052 micro controllers is integrated serially to a GSM Modem and GPS Receiver. A GSM modem is used to ship the position (range and Longitude) of the automobile from a far-off place.

The GPS modem offers many parameters because the output, however integrated built-in is read and displayed directly to the LCD. The identical built integrated is dispatched to the mobile at the alternative end from where built integrated the location of the automobile is demanded.

➤ *Design and Comparison of System Using Software*

PV system software and solar modelling software, Hoper software are used to compare the existing systems to aid in the development of cost-effective micro grids. A micro power system is an electrical generation system that gives a specific load. It may draw power from a panel arranged, or it may be an autonomous power system. PV syst models a system's physical behavior and incorporates life cycle cost (i.e., costs of purchase, replacement, installation).

15/2/19	18:05:11	18:05:16	MOTION SENSOR	00:00:05
15/2/19	18:07:07	18:07:15	MOTION SENSOR	00:00:16
15/2/19	18:07:25	18:07:31	MOTION SENSOR	00:00:31
15/2/19	18:08:00	18:08:31	MOTION SENSOR	00:00:17
15/2/19	18:08:45	18:09:02	MOTION SENSOR	00:00:06
15/2/19	18:09:45	18:09:51	MOTION SENSOR	00:00:04

Table 1:- Sample of Raw Date

➤ Solar Panel

The sun panel comprises of cluster of solar orientated cells. A solar orientated cell is any machine that straightforwardly changes over the power in mild into electric power through the procedure of photo voltaic impact. Sun panel boards can produce electricity with no waste or infection, or on the earth's commonplace assets. Solar panel forums don't have any moving elements so they're extraordinarily dependable and have an extended life compass.

➤ Mechanical Data

Items	Standard values	Unit
Module dimensions	80.0*36.0	Mm
Viewing area	66.0*16.0	Mm
Dot size	0.56*0.66	Mm
Character size	2.96*5.56	Mm

Table 2:- Current Time Curve in a Software

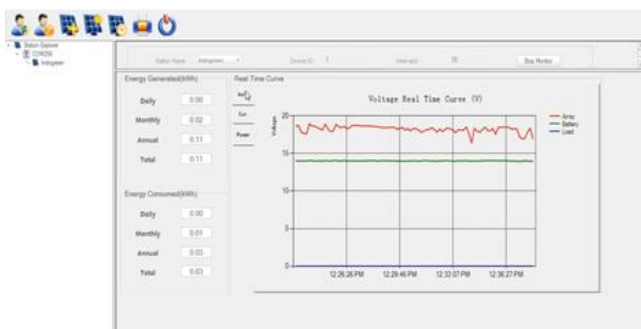


Fig 3:- Voltage Real Time Curve

➤ Micro Controller 8051

Port 0 and Port 2 of AT89C51 are used to provide cope with to an outside memory. The micro controller programming is done in  $\mu$  vision using C++. The relay gets input from Port 3.0 of the micro controller. Port 2.0 of the micro controller is used with the IR sensor. To begin with, port 2 zero is set to excessive (1) and port three.0 is ready to low (0). Whilst the IR sensor turns excessive, the relay turns on and switches on the LED and vice versa.

II. RESULTS AND DISCUSSION

The results acquired for the implementation of computerized avenue light intensity variation gadget are tabulated below. Those results were implemented and effects obtained signified that it green for actual time use. The output of the manner is signified by way of the LED.

Input	Output
Ambient condition for LDR sensor	LED <sub>s</sub> relay on
Dark	ON
Light	OFF

Table 3:- LED status Indicator for LDR sensors

Input	Output
Obstacle In front of IR sensor	LED relay on IR sensor
Present	ON at maximum intensity
Not present	ON at minimum intensity

Table 4:- LED status Indicator for IR sensors

Component condition	Theoretical values	Practical values
LDR(OFF)	0V	3.6V
LDR(ON)	5V	5.9V
IR(OFF)	5V	5.8V
IR(ON)	12V	7.39V

Table 5:- Practical operating values of LED

PARAMETERS	PROPOSED STREET LIGHT SYSTEM	ORDINARY SYSTEM	COMPARISON
Energy generation efficiency	88.45%	68.35%	Dual-axis sun tracking panel stores more solar energy than stationary panel by 20.05%
LED power consumption	59.02	70watts/day	Traffic monitoring system saves energy 15.7%
Battery efficiency	96%efficiency	65%efficiency	LEP solar battery is more efficient
Wireless control and monitoring features	YES	NO	Usage of nRF and GPRS technology

Table 6:- Comparison with different methods

### III. FUTURE SCOPE

The street lighting fixtures are a first-rate safety requirement consequently; the issues associated with the road lights have to be looked after correctly. The technique proposed in our mission minimizes energy ate up by means of road lighting. It uses real time sensing module to exchange the intensity of road light based on ambient mild. A drawback of the circuit proposed is the renovation aspect associated with the sensors and their sensitivity after continuous usage. Dirt can effortlessly acquire on the sensor floor and could require occasional cleansing. The decrease restrict of LDR does now not healthy with the lower restrict of IR sensor due to which included operation is not possible. A future prospect that can be integrated into the circuit would be using Wi-Fi communication for automated fault detection of the circuit the use of a centralized manage device. Dust accumulation on the sensor surface may be avoided by the use of the modern nano-cleansing generation which continues to be within the improvement section and might be pricey.

### IV. CONCLUSION

This project of Advanced tracking-based power smart solar street light systems is a cost effective, realistic, and the safest way to keep strength and also reduces man power. It surely tackles the two troubles that are going through today, saving of energy and additionally disposal of incandescent lamps and usage of man power by paying high wages. According to data we get from this project, we can say that on an average of 18-20 % of the efficiency is getting increased in all aspects compared to the existing systems. With the advances in generation and exact usage of resources and usage of appropriate gadgets required for smart for smart systems gives us fruitful results. The LEDs which we use have long existence, do not have any toxic substances and may be used for instant switching. For those motives our mission provides some distance greater Wi-Fi that can triumph over the present limitations. The project has scope in diverse different programs like for offering lighting fixtures in industries, campuses and parking plenty of massive purchasing department shops.

This can also be used for surveillance in company campuses, industries, and agricultural sectors.

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