

Smart Street Lighting System

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ABSTRACT

The concept of our project is to create Smart Street Lightening System used to turn ON and OFF the supply automatically without any manual help. It works on the process of movement in environment. i.e. vehicle passing through the speed breaker or sensing the intensity of sunlight.

This project tries to find solution for faster depletion of energy resources due to inefficient usage. Nowadays human has become too busy that they don't even have time to switch OFF the lights. This is same in case of Street Light. Basically the street light are turned ON in the evening that is pretty much early and are been turned OFF after there is enough sunlight in morning which lead to Wastage of Electrical Power. Thus this project helps us in Saving Electrical Power.

Electricity generate in this system is used to lighting the road light. But the street light used in the work will be automatic control through the LDR sensor. In street light the bulb is replaced by LED which saves the energy. Entire system will designed as automatic, human involvement is not require to on/off the switch of street light.

Keywords - Street Light, energy, power generation, speed breaker.

INTRODUCTION

1.1 Problem Statement

- To develop a system that controls the streetlights by automatically switching them when there are people or vehicles around the post when it is dark and saves electricity.
- To generate electricity to satisfy daily or basic needs various sources can be used that are normally overlooked in daily life, one of these

sources include mechanical pressure of vehicles on speed breaker.

1.2 Objective

- To develop a system that controls the streetlights by automatically switching them when there are people or vehicles around the post when it is dark.
- To overcomes the disadvantages of the conventional Street Lighting System and saves electricity.
- To Control and monitor streetlights from remote place.
- The generation of electricity using speed breaker is one of the easiest way as now-a -days everyone is having vehicle.
- Energy Required for Street Light during night time would be generated by speed breakers during day time.

1.3 Scope

- Smart street light system tries to find solution for the faster depletion of energy resources due to the inefficient usage and wastage of these resources.
- This project helps to decrease the wastage of electricity by controlling the working of street light system that attributes to a good amount of electricity bills in our nation.
- The energy generated using speed breaker mechanism can be used to store in a batteries and can be used apart for various purposes. The work basically aims to produce free electricity with no fuel cost, no pollution and with minimum requirement of space.

LITERATURE SURVEY

Literature review is an assignment of previous task done by some authors and collection of information or data

from research papers published in journals to progress our task. It is a way through which we can find new ideas, concept. There are lot of literatures published before on the same task. Some papers are taken into consideration from which idea of the project is taken.

[1] Murat Kuzlu;Manisa Pipattanasomporn;Saifur Rahman, -This paper attempts to show how energy can be tapped and used at a commonly used system Assessment of Communication Technologies Supporting Smart Street lighting Applications. By using this system energy consumption is also reduced because now-a-days the manually operated street lights are not switched off properly even the sunlight comes and also not switched on earlier before sunset.

[2] A.Padam Rao -This paper attempts to show how energy can be tapped and used at a commonly used system- the road speed breakers. The number of vehicles passing over the speed breaker in roads is increasing day by day. A large amount of energy is wasted at the speed breakers through the dissipation of heat and also through friction, every time a vehicle passes over it. There is great possibility of tapping this energy and generating power by making the speed-breaker as a power generation unit.

[3] Y. M. Yusoff, R. Rosli, M. U. Karnaluddin and M. Samad- Paper helped us in learning how to program to control the light intensity of the LEDs and about the sensor usage and connection to the board.

[4] R. Müllner, A. Riener - Learning of the paper involves wide-ranging accessibility to the emerging technology like light emitting diodes and their eco-friendly nature to the environment and long lasting ability motivates the user to believe that power conserving street lighting systems are a reality and can be implemented in the country.

[5] M. Castro, A. J. Jara and A. F. G. Skarmeta - In this paper authors described the need of smart lighting system. They have described that the sustainable development of cities affects the overall electricity use of lighting and the curiosity in offering greater control of its use. They have proposed the solution for lightning system through Machine to Machine protocols.

The disadvantages of current system used are:

1. Need a manual operator to operate the lights on the street.
2. Switching time is same in all climates.
3. There are many streets on India where Lights are kept „ON“ even during the day.

PROPOSED SYSTEM

A. Working of Smart Street Lightning System

Generally, street light controlling system is a Simple concept which uses a transistor to turn ON in the night time and turn OFF during the day time. The entire process can be done by a using a sensor namely LDR (light dependent resistor). Nowadays conserving the energy is an essential part and day by day energy resources are getting decreased. So our next generations may face a lot

of problems due to this lack of resources. This system doesn't need a manual operation to turn ON/OFF the streetlights. The street light system detects whether there is need of light or not.

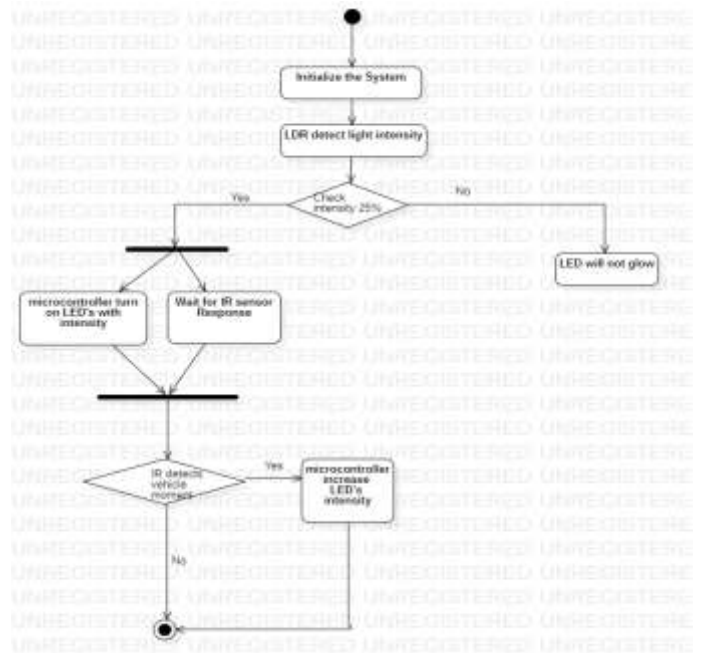


Figure 1: Working of Smart Street Lightning System
Following are the main steps of our proposed algorithm:

- When the sun is about to set till sun is about to rise, our purposed system will glow lights at default intensity, that is 40%.
- During the day time, the street lights will be switched off.
- If there is motion on the road near the street light, as detected by IR sensor, our purposed system will check time interval and glow the light according to the interval set intensity.
- The next 3 lights will glow from the light where motion is detected.

B. Power Generation using Speed Breaker

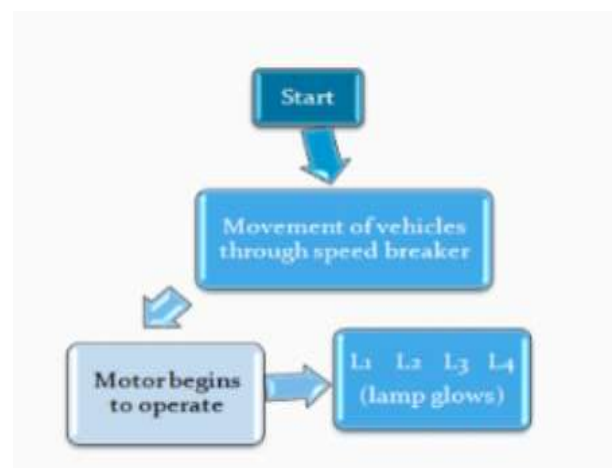


Figure 2: Flowchart of Power Generation using Speed Breaker

Electricity is generated by replacing the traditional speed breakers with some simple mechanism. As vehicles pass over the speed breakers, they spin the rollers which are connected to a generator which in turn generate electricity.

A large amount of energy is wasted by the vehicles on the speed breakers through friction, every time it passes over it. Energy can be produced by using the vehicle weight and speed. So here we propose a smart speed breaker that generates power. The reciprocating motion of the speed breaker is converted into rotary motion. We design a smart speed breaker that can pass vehicles coming from both sides and yet generate energy from it. The system makes use of mechanical assembly with metal sheets with link ages that press down with spring arrangement.

ADVANTAGES

- Save-Energy by turning off the lights when the vehicle is not detected.
- Easy to install in offices, house, streets etc.
- Reduce elimination of manpower.
- Simplicity and Easy to control.
- There is no problem in transporting fuel.
- Cheap and easy to maintain.
- Low energy consumption.

CONCLUSION

The proposed method concludes that the Smart Intelligent Street Lighting system helps in providing minimal power consumption in towns, municipalities and cities. Since saving of energy plays an important role, this proposed method provides a good solution for reduced power consumption.

By using Smart Street light, LDR prevents unnecessary wastage of electricity, caused due to manual switching of Street lights when it's not required. It provides an Efficient and smart automatic street light control system With the help of IR sensors. It can reduce the energy Consumption and maintains the cost. The system is versatile, extendable and totally adjustable to user needs.

- The system is now used only for one way traffic in highways.
- Continuous use of LDR and IR sensors even in day time.
- Not switched on before the sunset.

The Smart light system can be further extended to make the current system in two-way traffic, making the system more flexible in case of rainy days.

FUTURE SCOPE

In coming future fixing of security cameras will be central feature for the system we proposed. The job of the cameras would be to automatically capture the image of an object in motion across the streetlight and save it in its memory which can be used as a reference in future to ensure the safety at nights. This system can also be customized by upgrading ordinary LED lights to the solar LED lights which are new & renewable energy sources we could serve the same purpose of automatically controlling the street lights much more effectively in both aspects of cost and manpower. The system now is only to be used for one-way traffic on highways. The system has bright feature in two-way traffic environment which enables the system more efficient.

With the advancement in science & technology future Scope of automatic solar street lights is very bright. Demand for power affects human life in many ways. It is Not only important but essential to find ways to conserve power in order to prevent exhausting resources.

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