

INTELLIGENT STREET LIGHT SYSTEM

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Abstract

Active street lighting has emerged as an essential factor in strategies for a resource-efficient economy and realization of sustainable growth. In the outdoor area, lights represent approximately 40 % of the total energy consumption at night and have much energy saving potential. If passers-by or vehicles, summarized as traffic elements, are not located near street lamps, it is not energy-efficient to turn them on. The idea is to activate street lights only when they will be used to maintain secure and safe traffic reasons. An automated lighting or Light on Demand (LoD) system is required to implement moving light. By automating the street lighting system, light automatic on / off in partial road areas based on the IR sensor data. The highest savings, while respecting, secure traffic and safe personal, has been achieved with this designed model.

Keywords: *LDR, IR, Traffic Monitoring, Decision Making, Energy efficient.*

I. INTRODUCTION

Intelligent Street Light System is a self-deciding light controlling system which should glow light whenever it needs. This system will work such that it will read the sensor data and perform operations to turn the light ON/OFF. The main motto of this system is to save the energy by controlling and monitoring light status, temperature of lights and power consumed by each street lights. Also to automatically on/off the street light which is based on the levels of light and sensors. By implementing such type of system that can perform individual dimming and ON/OFF switching of the street lights becomes an easy task.

Municipal road lighting has the task of contributing to traffic safety on roads during the dark hours of the day. For a long time, many municipalities were forced to reduce or switch off street lighting at night due to financial problems. Conventional lighting shutdown has a negative impact on many areas of society. The risk of accidents increases, the quality of life decreases as same as the attractiveness of a city. The LED offers the function of continuous dimming, in contrast to a similar energy-efficient fluorescent energy saving lamp. This essential functional advantage has, so far, hardly been used in LED street lighting.

In the actual state, LED lamps, such as conventional lamps with half-night switching, are either activated or deactivated completely to save power. The pervasive use of LEDs in public street lighting, however, allows new strategies of lighting with the inclusion of dimming. Automatic dimming control, which not only reduces energy consumption but also offers longer life and less maintenance to cut the system cost. The idea is to activate street lights only when they will be used to maintain secure and safe traffic reasons. An automated lighting or Light on Demand (LoD) system is required to implement moving light.

II. LITERATURE REVIEW

Sr no	Paper Name	Author Name	Remark	Future Scope
1	IoT Based Street Lighting And Traffic Management System	Mohd. Saifuzzaman, Nazmun Nessa Moon, Fernaz Narin Nur	The main purpose is to invent an intelligent system which can make decisions for luminous control (ON/OFF/DIM) considering the light intensity.	To develop an android apps to evaluate the traffic load monitoring/ evaluating and establish an identification technology based on image processing like vehicle license plate identification.
2	IOT BASED SMART AND ADAPTIVE LIGHTING IN STREET LIGHTS	B.ABINAYA, S.GURUPRIYA, M.POOJA	The project is implemented with smart embedded system that controls the street light based on detection of sunlight.	-
3	IoT-Based Dynamic Street Light Control for Smart Cities Use Cases	Nabil Ouerhani, Nuria Pazos, Marco Aeberli, Michael Muller	Presents a real-world solution for automatic street light management and control which is open as well as flexible IoT architecture.	-
4	Energy-Efficient Intelligent Street Lighting System Using Traffic-Adaptive Control	Gul Shahzad, Heekwon Yang, Arbab Waheed Ahmad and Chankil Lee,	Smart lighting using electronically controlled light-emitting diode (LED) lights for adaptable illumination and monitoring are bring used to achieve energy efficient system.	To implement the proposed system on a larger scale, equipping vehicle detection sensors on the roadway to provide feedback to the smart controller for adaptive dimming; the ability to make decisions.
5	Intelligent System Design for Variable Color Temperature LED Street Light	Ming Hwa Sheu, Li Hung Chang, Shih Chang Hsia, Chi-Chia Sun	A system design of LED street light which integrates multicolor LED, power driving IC, and embedded image processing.	-
6	Research of Intelligent Street Light System Based On ZigBee	Zhixiong Ke, Chun Xiao	The system gets the street lights parameters and realizes remote monitoring through ZigBee and GPRS wireless communication.	-

7	A Traffic-Aware Moving Light System Featuring Optimal Energy Efficiency	Florian Knobloch and Nico Braunschweig	Paper presents a new deterministic model to control street illumination depending on traffic needs for improving energy efficiency.	-
8	Development of Photo voltaic Hybrid LED Street Lighting System	Liuyi Ling*, Xiaoliang Wu, Mengyuan Liu, Zhiqiang Zhu ,Van Li, Benben Shang	Paper presents the utilization of photovoltaic power applied in LED street lighting and an intelligent street lighting system is developed.	-
9	A Hierarchical Smart Street Lighting System with Brute-Force Energy Optimization	Mohsen Mahoor, <i>Student Member, IEEE</i> , Farzad Rajaei Salmasi, <i>Senior Member, IEEE</i> , and Tooraj Abbasian Najafabadi	Paper presents a smart street lighting (SmSL) system in which energy consumption by street lighting poles is reduced based on Brute-Force search algorithm.	-

Table 1. Literature Review

III. PROPOSED SYSTEM

In the proposed system decision making from street light system is going to be done by using ID3 algorithm for deciding the street light on/off condition. Our first street lights will remain on for security reason. First, we are using the sensor data by which the block of street light will be on when the vehicle is detected. After that another sensor data i.e. second last street light sensor is used for next block of street lights. Here we are reducing the number of sensors on street lights. Then, we are going to identify the time slot at which more traffic is available than usual. Then with the help of previous data and current data best decision will be taken to make the time slot at which street lights will remain ON otherwise our smart light system takes place.

A. Architecture

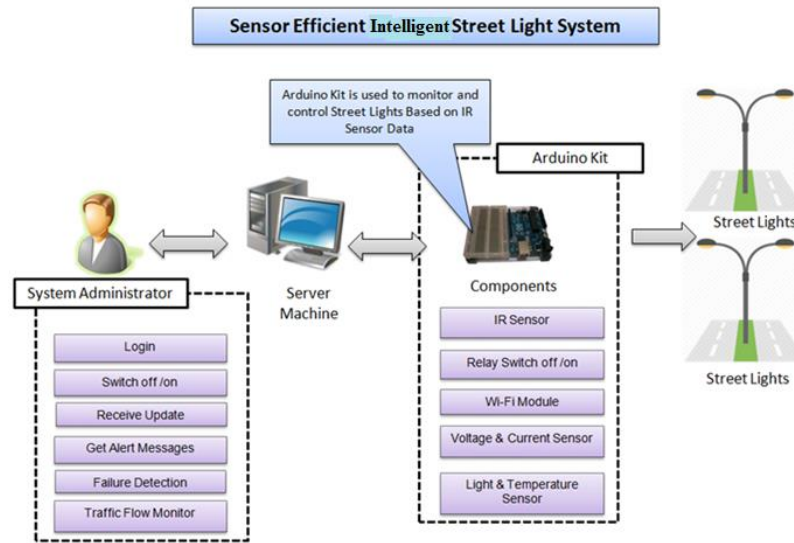


Fig.1 Architecture of Proposed System.

This intelligent street light system will be the next step of not only smart but also intelligent city. The data generated by intelligent street light system will be used for further traffic analysis and government use.

For example, the street light system can be benefited by:

- Saving the electricity.
- Improved decision making by taking better decision.
- Reducing number of sensors.
- Quick maintenance of street lights as well as used sensors.

Working flow of the system is as follows:

1. Get the data from sensor.
2. Turn ON the block of street lights
3. Get the second last street sensor data and turn OFF the previous block of street light and turn ON next block.
4. Store the traffic data in server.
5. Analyze the traffic data and decide time slot on daily or weekly basis.

IV. ADVANTAGES

1. Helps to save the electricity.
2. Admin can analyze and control the street light system at server side.
3. More energy saving with less sensors.

V. APPLICATIONS

1. Street light control system for emergency conditions.
2. Traffic analysis.

VI. FUTURE SCOPE

1. Traffic management using camera fitted on street light.
2. Carbon dioxide level detection using CO₂ sensor.
3. Solar Panel on Street Light to use the solar energy as a source.
- 4.

VII. CONCLUSION

Decreases the energy consumption with minimal overall cost is a popular exploration area in terms of street lighting systems. In this paper, we give a brief review of different methodology of street lighting system. The literature reviewed shows that much research has been devoted to such a systems. The efficiency and accuracy reported in the literature survey can be increased in the future with advances sensor and technologies.

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