Smart Streetlight System

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Abstract: Smart LED streetlight system is one of the enabling technologies for a smart city, giving low-cost, low power outdoor lighting also with benefits for vehicle users as well as pedestrians. Integration of light/ IR sensors and WiFi modules can furnish an optimal platform for an innovative LED streetlight application.

I. INTRODUCTION

Street lights are an essential part of all cities and the highways, that's helpful to prevent accidents and unwanted thefts or robbery. Thousands of Street lights are installed beside the highways and the main roads. But the main problem is these street lights consume about 25-30% of the total energy spent in the city.

In this project, our main aim is to develop a "Smart Street light system" that will reduce electric power consumption and to enable quick maintenance. The normal street lights always glow with high intensity, which consumes high electricity. But in the case of a smart street lights system, it will glow with high intensity if there are vehicles or human movement on the road otherwise the lights will remain dim. Another advantage of this system is, street lights will automatically turn on in the evening, and turn on automatically at day time (presence of sunlight). Fault in any of the LEDs will automatically send an SMS message to the operator for quick and easy maintenance. By using this system we can save enough amount of electricity and off-course money, this saved electricity can be used to lighten few more homes in the rural areas.

II. LITERATURE REVIEW

The project aims to be a multi-functional street lighting model capable of eliminating the manual operation of old street lightning with an automatic switching technique. Design and implement improvements to embedded energy-efficient street lighting systems and their maintenance tasks at a reduced cost. The Smart Street Lightning system has two sensors, the Light Dependent Resistor (LDR) used to mark day / night time and the Infrared sensor to detect movement on the road. In this project, the vehicle movement is detected to TURN ON the traffic light in the front and TURN OFF the rear light upon a fixed time delay to save energy. The location of each pole is addressed with exact GPS coordinates to easily identify the location in case of any fault. Altogether the Smart Street Light system reduces the cost, improves efficiency of lighting, saves energy and enables quick maintenance. Online monitoring with IoT support is enabled and addition of advanced features such as safety/ surveillance equipment and panic buttons can be easily achieved.

III. PROPOSED SOLUTION
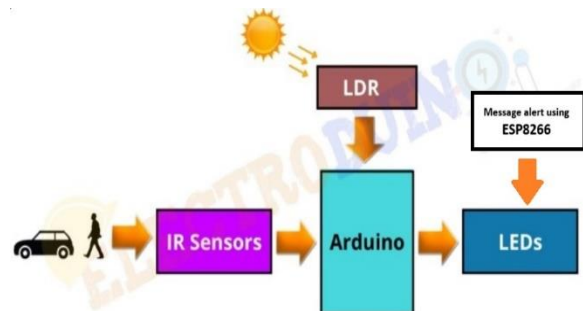
IV. RESULTS AND DISCUSSION

Improved visibility and safety: Adequate Street lighting helps improve visibility on the road, reduces accidents, and enhances overall safety for drivers, pedestrians, and cyclists.

Reduced crime: Good street lighting is known to deter criminal activity and make neighborhoods safer.

Energy savings: The use of energy-efficient LED bulbs can reduce the energy consumption and maintenance costs of street lighting systems.

Environmental benefits: Lower energy consumption translates to a lower carbon footprint and contributes to a more sustainable environment.

Increased economic activity: Well-lit streets can enhance the aesthetic appeal of an area, making it more attractive for businesses to operate and encouraging economic activity.

In conclusion, street lighting systems are an essential infrastructure that plays a critical role in enhancing safety, security, and quality of life in urban areas. An efficiently designed and well maintained street lighting system can deliver significant benefits to both the community and the environment. By using Smart Street light, one can save surplus amount of energy which is done by Replacing sodium vapor lamps by LED and adding an additional feature for security purposes. It prevents unnecessary wastage of electricity, caused due to manual switching of streetlights when it's not required. It provides an efficient and smart automatic streetlight 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.

V.HARDWARE IMPLEMENTATION
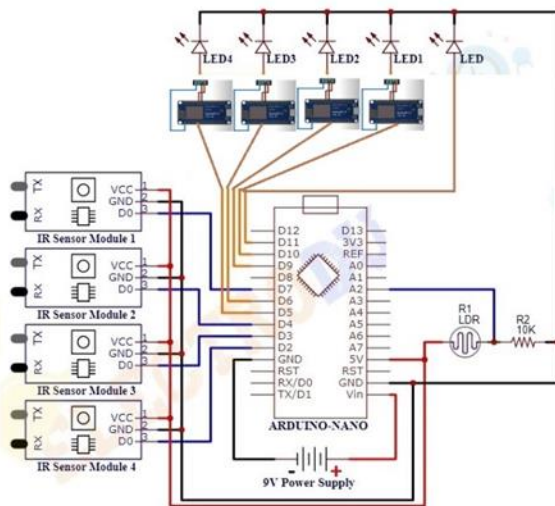
VI.FUTURE SCOPE

Energy efficiency: The use of sensors and control systems in smart street lights can help optimize energy consumption and reduce costs. Advanced monitoring: Smart Street lights can be equipped with cameras and other sensors to collect data on traffic flow, air quality, noise levels, and other environmental factors. Increased safety: Smart Street lights can be programmed to automatically adjust lighting levels based on real time data, making streets safer and reducing the risk of accidents Smart traffic management: By integrating with traffic management systems, smart street lights can help manage traffic flow and reduce congestion in real-time. Environmental sustainability: Smart Street lights can be powered by renewable energy sources such as solar or wind power, reducing the carbon footprint of street lighting systems.

REFERENCES

[1]. P. P. F. Dheena, G. S. Raj, G. Dutt and S. V. Jinny, "IOT based smart street light management system" 2017 IEEE International Conference on Circuits and Systems (ICCS), Thiruvananthapuram, India, 2017, pp. 368- 371, doi: 10.1109/ICCS1.2017.8326023.

[2]. O. Rudrawar, S. Daga, J. R. Chadha and P. S. Kulkami, "Smart Street lighting system with light intensity control using power electronics," 2018 Technologies for Smart-City Energy Security and Power (ICSESP), Bhubaneswar, India, 2018, pp. 1-5, doi: 10.1109/ICSESP.2018.8376692.

[3]. P. Arjun, S. Stephenraj, N. N. Kumar and K. N. Kumar, "A Study on IoT based Smart Street Light Systems," 2019 IEEE International Conference on System, Computation, Automation and Networking (ICSCAN), Pondicherry, India, 2019, pp. 1-7, doi: 10.1109/ICSCAN.2019.8878770.

[4]. Vaishali Gupta, Krutika Thakur, Ritesh Thakur, "Based Smart Street Lights" International Journal of Research (IJR), Volume 2, Issue 10, October Volume 2, Issue 10, October 2015.

[5]. Snehal Bhosale, Komal Gaware, Pradnya Phalke, Dipali Wadekar, Pallavi Ahire,"IoT based Dynamic Control of Street Lights for Smart City",International