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“Optimizing Innovation in Knowledge, Education and Design”

EXTENDED ABSTRACT



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Assalamualaikum warahmatullahi wabarakatuh,



First and foremost, I would like to express my gratitude to the organizing committee of i-Spike 2023 for their tremendous efforts in bringing this online competition a reality. I must extend my congratulations to the committee for successfully delivering on their promise to make i-Spike 2023 a meaningful event for academics worldwide.

The theme for this event, 'Optimizing Innovation in Knowledge, Education, and Design,' is both timely and highly relevant in today's world, especially at the tertiary level. Innovation plays a central role in our daily lives, offering new solutions for products, processes, and services. By adopting a strategic approach to 'Optimizing Innovation in Knowledge, Education, and Design,' we have the potential to enhance support for learners and educators, while also expanding opportunities for learner engagement, interactivity, and access to education.

I am awed by the magnitude and multitude of participants in this competition. I am also confident that all the innovations presented have provided valuable insights into the significance of innovative and advanced teaching materials in promoting sustainable development for the betterment of teaching and learning. Hopefully, this will mark the beginning of a long series of i-Spike events in the future.

It is also my hope that you find i-Spike 2023 to be an excellent platform for learning, sharing, and collaboration. Once again, I want to thank all the committee members of i-Spike 2023 for their hard work in making this event a reality. I would also like to extend my congratulations to all the winners, and I hope that each of you will successfully achieve your intended goals through your participation in this competition.

Professor Dr. Roshima Haji Said
RECTOR
UiTM KEDAH BRANCH



WELCOME MESSAGE (i-SPIKE 2023 CHAIR)



We are looking forward to welcoming you to the 3rd International Exhibition & Symposium on Productivity, Innovation, Knowledge, and Education 2023 (i-SPIKE 2023). Your presence here is a clear, crystal-clear testimony to the importance you place on the research and innovation arena. The theme of this year's Innovation is "*Optimizing Innovation in Knowledge, Education, & Design*". We believe that the presentations by the distinguished innovators will contribute immensely to a deeper understanding of the current issues in relation to the theme.

i-SPIKE 2023 offers a platform for nurturing the next generation of innovators and fostering cutting-edge innovations at the crossroads of collaboration, creativity, and enthusiasm. We enthusiastically welcome junior and young inventors from schools and universities, as well as local and foreign academicians and industry professionals, to showcase their innovative products and engage in knowledge sharing. All submissions have been rigorously evaluated by expert juries comprising professionals from both industry and academia.

On behalf of the conference organisers, I would like to extend our sincere thanks for your participation, and we hope you enjoy the event. A special note of appreciation goes out to all the committee members of i-SPIKE 2023; your dedication and hard work are greatly appreciated.

Dr. Junaida Ismail

Chair

3rd International Exhibition & Symposium Productivity, Innovation, Knowledge, and Education 2023 (i-SPIKE 2023)

IOT BASED SMART STREET LIGHTING SYSTEM

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ABSTRACT

Automation, power consumption, and cost effectiveness are the primary factors in the current field of technology. Automation uses clever systems to reduce the need for human labour. Since the supply of electricity is dwindling for a variety of reasons, power conservation is always a priority. We are employing IoT devices to combat these effects because, as we are all aware, energy usage has been rising daily. This research suggests a method for adjusting streetlight illumination with sensors while utilising the least amount of electrical energy possible. When a presence is detected at night, all nearby streetlights turn on to their brightest setting; otherwise, they go into standby mode. The use of LED lights is required because they outperform traditional incandescent lamps in every way. As a result, there will be a decrease in carbon dioxide emissions, power usage, maintenance and replacement expenses, and heat emissions. A real time prototyping internet of things demonstration with costs and implementation steps has been constructed to show the real-time updates of street processing and alerting the changes occur.

INTRODUCTION

In the quest for smarter, more efficient urban infrastructure, street lighting has emerged as a crucial area for innovation. To address the challenges of energy consumption, cost-effectiveness, and pedestrian safety, we present the IoT-Based Smart Street Lighting System. This innovative solution leverages the power of the Internet of Things (IoT) and Light Dependent Resistor (LDR) sensors to create an intelligent and responsive street lighting network. The IoT-Based Smart Street Lighting System is designed to revolutionize traditional street lighting by introducing smart, energy-efficient, and adaptive functionality. By integrating LDR sensors and IoT technology, this system provides illumination only when necessary, ensuring that streetlights are active during nighttime when darkness is detected, and pedestrians are present. This targeted approach not only conserves energy but also enhances safety and convenience for pedestrians or vehicles navigating remote rural areas with limited electricity supply or metropolitan cities seeking cost-effective solutions.

PROBLEM STATEMENT

Energy Inefficiency: Traditional streetlights often consume a significant amount of energy, leading to high electricity costs and carbon emissions.

Light Pollution: Traditional streetlights tend to emit a considerable amount of light that spreads beyond the intended area, contributing to light pollution. This not only wastes energy but also

disrupts natural ecosystems and affects the visibility of celestial bodies.

Maintenance Challenges: Maintaining traditional street lighting systems can be cumbersome and costly.

Limited Control and Monitoring: Monitoring the performance of traditional streetlights is challenging, as there is limited visibility into their operational status.

OBJECTIVE

The main objective of this innovation is to

1. To avoid unnecessary waste of light.
2. Provide efficient, automatic, and smart lighting system.
3. Energy Saving

The main objective of this innovation is to revolutionize street lighting by addressing the issues of unnecessary light waste, inefficiency, and energy consumption. By implementing an efficient, automatic, and smart lighting system, the innovation aims to optimize the use of light resources and minimize energy wastage. The system intelligently adjusts the lighting intensity based on the presence of pedestrians or vehicles, ensuring that light is provided only when needed, thus avoiding unnecessary waste. With its ability to automatically adapt to changing lighting requirements, this innovation not only enhances energy efficiency but also provides a more sustainable and environmentally friendly solution for street lighting. By prioritizing energy-saving measures and smart lighting controls, this innovation represents a significant step towards creating a greener and more efficient urban infrastructure.

METHODOLOGY

To produce this project which is “SMART STREET LIGHT”, there are several methods have been carried out which include project production, planning and implementation.

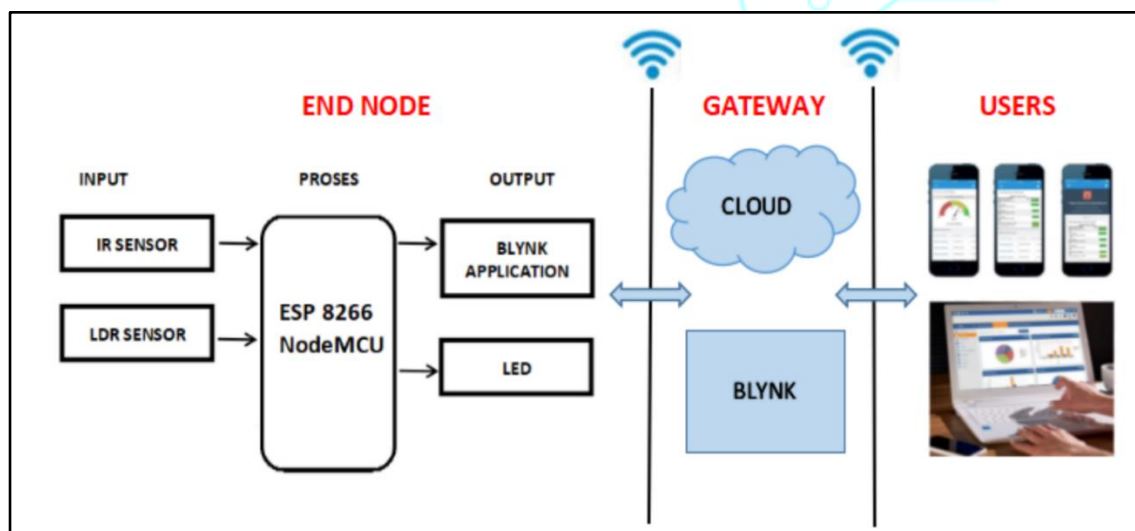


Figure 1. Block diagram of this project

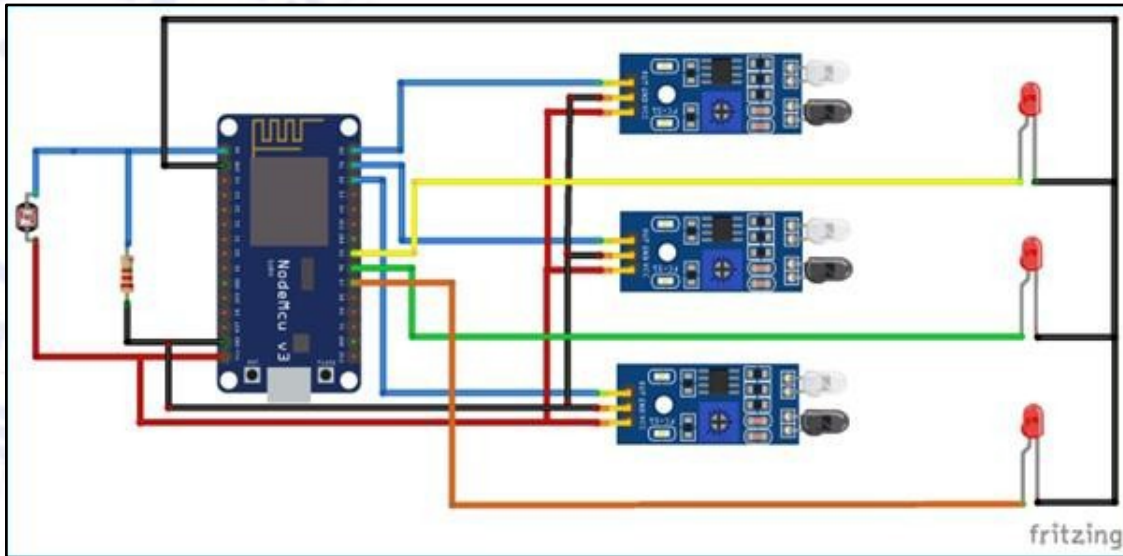


Figure 1.0 Schematic Diagram of this project

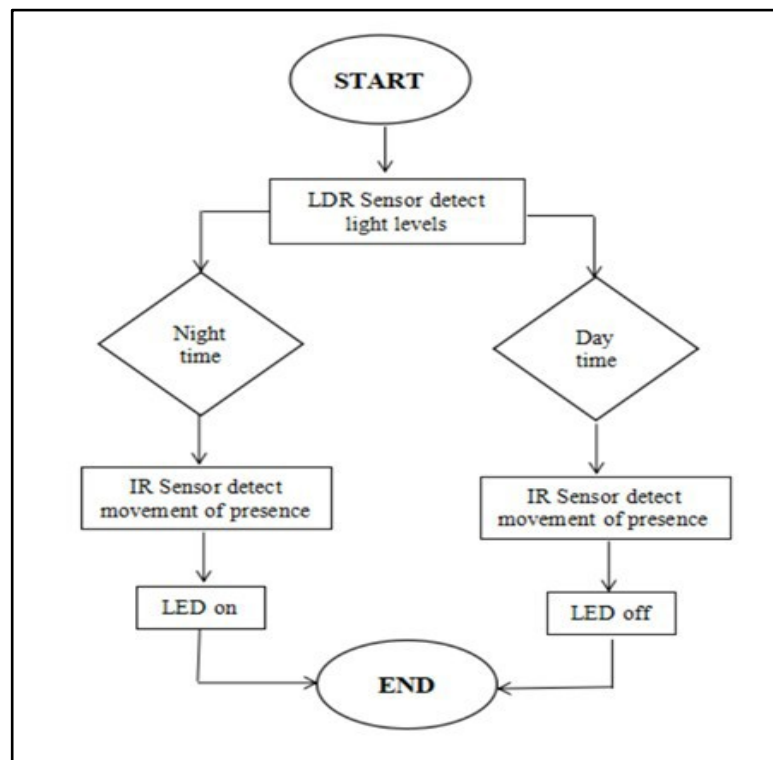


Figure 1.1 System Flow Chart

The IoT-based smart street lighting system, powered by NodeMCU, LDR, LED, and the Blynk IoT platform, operates by utilizing the capabilities of each component. The NodeMCU serves as the central controller, receiving input from the LDR sensor, which detects ambient light levels. When the LDR sensor detects darkness below a predefined threshold, it sends a signal to the NodeMCU. The NodeMCU then activates the LED lights, providing illumination for the

street. Through the integration with the Blynk IoT platform, users can remotely monitor and control the system, accessing real-time data, adjusting settings, and receiving notifications. This seamless integration of NodeMCU, LDR, LED, and Blynk creates an intelligent and efficient street lighting system that responds to lighting needs, conserves energy, and enables remote management for enhanced control and convenience.

CONCLUSION

In conclusion, the IoT-based smart street lighting system offers significant economic benefits and contributes to achieving Sustainable Development Goals (SDGs). By reducing energy consumption and optimizing lighting resources, the system generates cost savings for municipalities and governments, allowing for the allocation of funds to other crucial areas. Furthermore, the long-term investment in energy-efficient street lighting creates job opportunities and stimulates economic growth. In terms of SDGs, the system supports SDG 7 (Affordable and Clean Energy) by promoting energy efficiency and sustainability.

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