i-SPiKE 2023

INTERNATIONAL EXHIBITION & SYMPOSIUM ON PRODUCTIVITY, INNOVATION, KNOWLEDGE & EDUCATION

"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
3rdInternational Exhibition & Symposium Productivity, Innovation, Knowledge, and Education 2023 (i-SPiKE 2023)

SOLAR TRACKER WITH IOT MONITORING

Saathish A/L Kumaran
Abinayashri A/P Srikanth
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Hamshini A/P Ravachandran
SJK (T) Subramaniya Barathee

ABSTRACT
The solar tracker system integrated with IoT monitoring capabilities maximizes the energy generation potential of solar panels by accurately tracking the sun's position, optimizing panel angles, and providing real-time performance monitoring. By utilizing IoT sensors and data analytics, the system ensures precise alignment of panels, detects anomalies, and enables remote monitoring and control. This enhances energy generation efficiency, allows for early detection of issues, and promotes the widespread adoption of sustainable solar power as a reliable energy source.

INTRODUCTION

A solar tracking power station with an IoT monitoring system combines solar tracking technology and IoT capabilities to optimize the efficiency and monitoring of a solar energy generation facility. Solar tracking systems adjust the position of solar panels throughout the day to maximize sunlight exposure and energy production. When integrated with an IoT monitoring system, real-time data collection, analysis, and control become possible.

PROBLEM STATEMENT

Solar power generation has seen significant advancements in technology over the years. However, there are several challenges and limitations associated with old or outdated technology used in solar power generation systems. The problem statement of old technology in solar power generation can be summarized as follows:

Reduced Energy Generation: Fixed solar panel systems can still generate electricity from sunlight but may not capture the maximum amount of solar energy available.

Limited Adaptability: Fixed solar panels have a fixed orientation and are unable to adapt to changing environmental conditions or optimize energy production based on the sun's position.

Lack of Advanced Monitoring and Control: Older technology often lacks advanced monitoring and control capabilities. Traditional systems may not have integrated monitoring systems or remote-control functionality, making it challenging to track performance, identify issues, and optimize energy production.

OBJECTIVES

Increased Energy Generation: Solar trackers significantly enhance the energy generation of solar panel systems by maximizing the amount of sunlight captured. By continuously adjusting the orientation of the panels to face the sun, solar trackers can increase energy output by up to25-35% compared to fixed solar panel systems.

Improved Efficiency: Solar trackers ensure that solar panels operate at their peak efficiency throughout the day. By maintaining a perpendicular alignment with the sun's rays, trackers minimize the angle of incidence and reduce energy losses due to shading or obstructions.

Time-of-Day Energy Production: Solar trackers optimize energy production by generating a more even distribution of electricity throughout the day. They capture the highest intensity of sunlight during peak hours, allowing for increased energy generation during periods of high demand and potentially reducing the need for energy storage systems.

METHODOLOGY

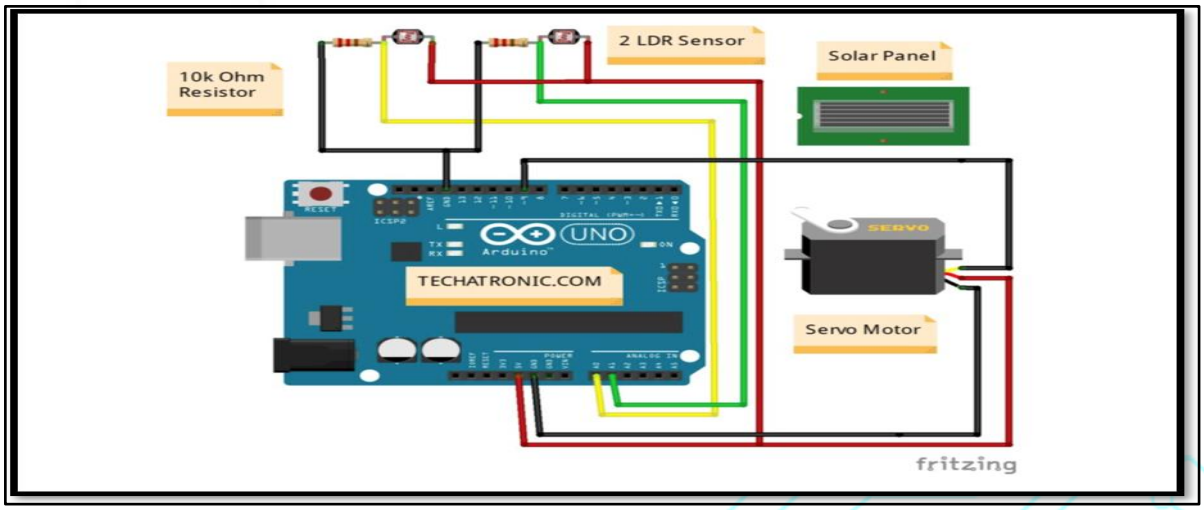

Figure 1. Schematic diagram Solar Panel

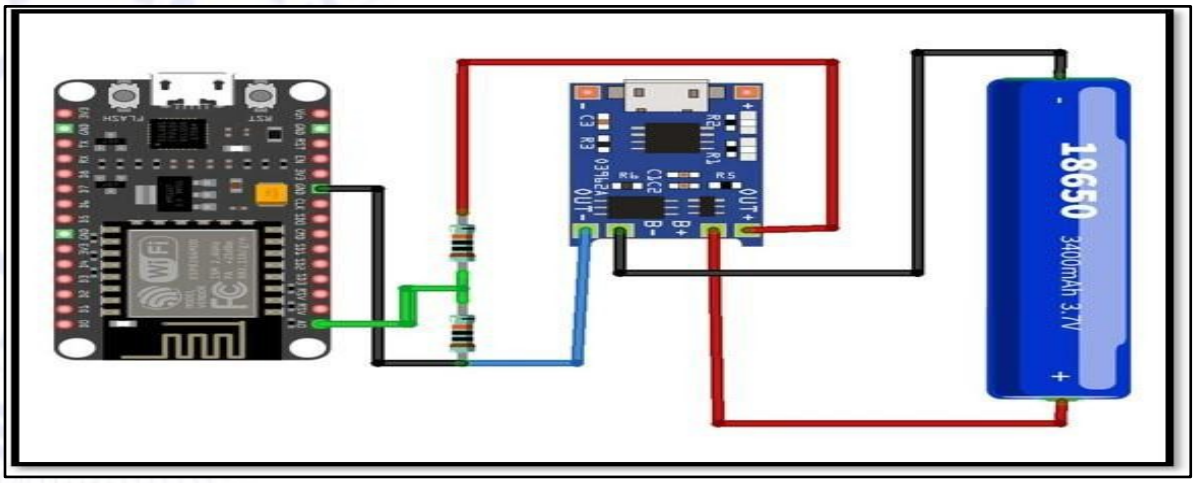

Figure 1.0 IOT power station

The integration of an LDR sensor, voltage sensor, servo motor, and Blynk IoT platform presents a groundbreaking innovation for optimizing solar energy utilization. This system revolutionizes solar panel tracking by precisely detecting sunlight levels with the LDR sensor and dynamically adjusting panel positions using the servo motor. As the sun moves across the sky, the servo motor ensures continuous alignment of the solar panels for maximum sunlight exposure. The voltage sensor measures the energy generated by the solar panels and sends the data to the NodeMCU microcontroller. The NodeMCU then communicates with the Blynk cloud, enabling users to access real-time data regarding the amount of energy collected. This integration addresses the issue of inefficient monitoring by providing users with the ability to monitor their energy production in real-time, ensuring transparency and enabling timely actions. Through the Blynk IoT platform, users gain remote access to energy data, visualizing analytics, and receiving instant notifications for proactive maintenance and efficient energy management.

CONCLUSION

In conclusion, this innovation in solar panel tracking and energy generation holds great promise for driving economic growth, reducing reliance on fossil fuels, and creating a sustainable future. By optimizing solar panel tracking and increasing energy production efficiency, it offers cost-effective and sustainable energy solutions while fostering job creation and economic prosperity. Additionally, it significantly contributes to mitigating climate change, preserving natural resources, and supporting environmental sustainability. With its alignment with the SDGs, particularly Goal 7: Affordable and Clean Energy and Goal 13: Climate Action, this innovation plays a crucial role in advancing affordable and clean energy access and promoting sustainable development on a global scale.

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