

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL ENGINEERING

FINAL YEAR PROJECT REPORT

**AN INTELLIGENT PV SOLAR PANEL MAINTENANCE AND
MONITORING SYSTEM FOR ENHANCED ENERGY
EFFICIENCY.**

By

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*A final year project report submitted to the Faculty of Engineering in partial
fulfillment of the requirement of the award of a Bachelor's Degree of Science in
Electrical Engineering at Busitema University*

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ABSTRACT

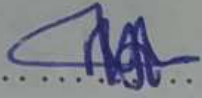
Solar energy is the most abundant source of renewable energy. Constant soiling and wind storm further reduce the efficiency of production of solar energy because the soil particles accumulate the solar photo voltaic cells and this limits the number of solar radiations striking solar PV cell. Therefore, it is essential to have regular and proper cleaning of panel. In most of the parts the cleaning is done manually. This type of cleaning is not uniform and it may cause health issues to the workers, and also solar Photovoltaic cells are prone to damage. This can be solved by the designing and developing an intelligent PV solar panel maintenance and monitoring system for enhanced energy efficiency. the system enables an operator to check on the daily working of his/her solar systems remotely which is enabled through the use of an online website blynk. The remote operator is able to check the solar parameters like the voltage output, current levels, dust concentration, and the times of the day without physically being at the Solar panel site or plant. The system has the sensors which help in determining the different parameters necessary. The system does automatic cleaning of the panels when Arduino triggers the cleaning process due to dust concentration level sensed, ensuring maximum energy efficiency.

The system was developed using a combination of hardware and software components, including Arduino Uno microcontroller, and a cloud-based system that stores real-time data and performance for a remote monitoring. (Blynk software) solar panel among others. The system was tested and evaluated for its performance, accuracy, and remote monitoring of performance and automated maintenance, demonstrating excellent results.

DECLARATION

I, **Komakech Francis Mario**, do hereby declare that this project report is my original work and has never been submitted for any other degree award to any other university or institution of higher learning.

Komakech Francis Mario

Signature.....

Date.....09/07/2024

APPROVAL

This is to certify that the project reports on an intelligent PV solar panel maintenance and monitoring system for enhanced energy efficiency was compiled and completed by **KOMAKECH FRANCIS MARIO** under the guidance and supervision of the university supervisors. It is now ready for submission to the Department of Electrical and computer Engineering

UNIVERSITY SUPERVISORS

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Date... 09 / 07 / 2024

DEDICATION

I dedicate this project report to God Almighty who has always been with me and to my parent for the endless courage and support ever since I started this academic journey. And a special thanks to my supervisors with stood with me from the beginning till now

ACKNOWLEDGEMENT

I herein express my sincere gratitude and thanks to the Almighty God, who has provided me with the steady health, wisdom, knowledge and guidance in all my academic endeavors. I also want to extend my appreciation to the administration, staff and colleagues, who made this academic journey, a conducive one.

I also extend my sincere thanks to the Electrical Department and my supervisors for the final year project, for their time, guidance, knowledge and hospitality that they rendered to me.

Special thanks go to the entire fraternity at Busitema University Department of Electrical Engineering for the knowledge, guidance and skills instilled or imparted to us. I also want to express my gratitude to our colleagues with whom we shared ideas and experiences; this did enable me to enrich my knowledge.

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LIST OF ACRONYMS

LCD	Liquid Crystal Display
IoT	Internet of things
PCBs	Printed Circuit Boards
EDA	Electronic Design Automation vulnerable
LED	Light Emitting Diode
PV	Photovoltaic
API	Application Programming Interface

6.5 References

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