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FACULTY OF ENGINEERING

DEPARTMENT OF ELECTRICAL ENGINEERING

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

FINAL YEAR PROJECT REPORT

TITLE: SMART SOLAR MONITORING SYSTEM

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SUPERVISOR

Mr. BWIRE JOHN BOSCO AND Mr. ARINEITWE JOSHUA

A PROJECT REPORT SUBMITTED TO THE DEPARTMENT OF ELECTRICAL ENGINEERING AS A PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF A BACHELORS OF SCICENCE IN ELECTRICAL ENGINEERING

Declaration.

I **EKUU AARON**, a student of Busitema University hereby declare that this project report is prepared by myself after the research work and consultations carried out and has never been submitted to any academic institutions.

SIGNATURE……

DATE ……

APPROVAL.

This report is ready to be submitted to the department of Electrical Engineering for examination after approval from the following supervisors, compiled by **EKUU AARON** of registration number **BU/UP/2020/1212.**

UNIVERSITY SUPERVISORS

MR. ARIENAITWE JOSHUA

SIGNATURE .....

DATE.....25/06/2024.....

MR. BWIRE JOHN BOSCO.

SIGNATURE .....

DATE.....4/7/2024.....

ACKNOWLEDGEMENT

Firstly, I want to give thanks to the Almighty God for His care and love for me throughout my academic journeys. I also want to thank my parents for their tireless support that they rendered to me, mentally, physically and financially.

I also want to thank our supervisors for their continuous guidance in this project

Lastly, I want to extend our gratitude to the entire students of Busitema University more so the course mates and classmates for the discussions and exchange of knowledge. I learnt a lot from them.

May God bless you all.

DEDICATION.

I dedicate this work of mine to my parents Mr. Ogwal.W. Chandwong and Mrs. Milly Acen for their tireless effort to see that this project and report has come to a completion.

I will also dedicate this report to all my brothers and sisters who always kept supporting me and advising. All was a success!

ABSTRACT.
This report detailed a smart solar monitoring system, aimed at detecting a fault on a panel promptly and allowing both remote and near monitoring.

It involved a combination of both hardware and software and incorporating with the internet of things to be able to monitor the system. I had Arduino microcontroller to keep all the connections on, helping in the processing of all data input from the sensors used. The parameters monitored were the input voltage and current values respectively being obtained by DC voltage sensors of 25V dc and current sensors 30mA range.

An android app application was also developed for this project where a message could be obtained as it obtained the data from firebase database. This was implemented using a no code interface, MIT App Inventor.

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CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Solar energy is widely available throughout the world can contribute to minimize the dependence on energy imports. In 90 min, enough sunlight strikes the earth to provide the entire planet's energy need for one year. Solar PV entails no greenhouse gas emissions during operations and does not emit other pollutants also. According to the International Energy Agency (IEA), Renewable will be the fastest growing source of electricity, in which wind and solar PV are technologically mature and economically affordable. But still there is increase in world's demand for energy.

At present, the solar photovoltaic (PV) energy is one of the pivotal renewable energy sources. The solar energy is becoming a potential solution towards sustainable energy supply, thus there is need for carrying out smart solar monitoring to ensure efficient utilization of solar energy, analysis, and optimization of solar panel performance. [1]

Smart Solar Monitoring System is a combination of Hardware and Software which provide the complete solution and improves the performance of the solar PV.
A predictive maintenance which includes localization and definition of related faults and failures in a PV system is very important. In what follows, concentration has been given on the most widely used ones. Remote monitoring and control of PV system based on Zigbee technology is proven inefficient in large scale because it can't face up huge distance.
Remote monitoring systems have to fetch, analyze, transmit, manage and feedback the remote information, by utilizing the most advanced science and technology field of communication technology and other areas. [2]
It also merges comprehensive usage of instrumentation, electronic technology and computer software.
Prevalent monitoring solar system approaches present, poses some problems like low automation and poor real-time. These problems can be averted with an efficient remote environment information monitoring and controlling system. This system should include automatic diagnosis techniques the PV station. [3]

6.6 References

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