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BUSITEMA UNIVERSITY

FACULTY OF ENGINEERING

DEPARTMENT OF ELECTRICAL ENGINEERING

FINAL YEAR PROJECT REPORT

2023/2024

**DESIGN AND DEVELOPMENT OF AN OVERHEAD TRANSMISSION LINE FAULT
DETECTION SYSTEM INTEGRATED WITH A GSM MODULE.**

BY:

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BU/UP/2020/1240

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**Final Year Project Report Submitted to the Department of Electrical Engineering in
Partial Fulfillment of the requirements for the Award of Bachelor of Science in Electrical
Engineering Degree.**

JUNE 2024

DECLARATION

I, WANJA BRIAN, Registration Number BU/UP/2020/1240, under the supervision and guidance of the University supervisors, declare that this report is my own work, and that the information gathered and used has not been used to obtain any academic award in any other learning institution, with the exception of extracts and summaries for which the original references are stated here.

Signature:

Date: ..3rd/07/2024....

APPROVAL

This is to certify that WANJA BRIAN created this report and submitted it for scrutiny. With my permission as a university supervisor, it is now ready for submission to the Department of Electrical Engineering.

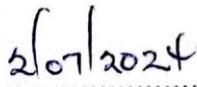
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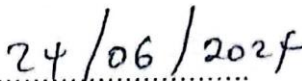
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MR. RWENDEIRE ANDREW

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Date:


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DEDICATION

I dedicate this report to the special people in my life who, with or without my knowledge, have made substantial sacrifices to assist me get here. I am especially grateful to my beloved dear ones, Mr. and Ms. Maiki and Mr. and Ms. Muhwezi, for their words of support and push for persistence. My colleagues and supervisors have never left my side and are incredibly special. May God definitely bless them.

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First and foremost, I'd like to thank the Almighty God for allowing me to reach this point in my academic career despite various obstacles.

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I'd want to thank my coworkers for their persistent encouragement when I felt like giving up.

Finally, I'd like to thank my parents and guardians, who have always been financially supportive and never disappointed me.

ABSTRACT

The goal of this project is to create an improved fault detection system that will increase the efficiency and dependability of Uganda's power transmission networks. With the help of this project, frequent power outages and fault management inefficiencies will be lessened. A system that can identify issues with overhead transmission lines and report the findings via GSM technology will be made possible. The system uses sensors, microcontrollers, and GSM modules to monitor transmission lines for defects such as line breaks, short circuits, and grounding difficulties. Fault detection units are strategically located along transmission lines to continuously monitor electrical parameters and environmental conditions. When a malfunction is identified, an embedded microprocessor processes the data and activates the GSM module, sending an SMS alert to the maintenance crew. This warning contains detailed information about the fault's location and nature, allowing for timely and targeted maintenance interventions.

The project includes hardware and software development. The hardware design comprises selecting and integrating sensors, microcontrollers, and GSM modules that are appropriate for Uganda's ambient conditions. On the software side, essential components include programming the microcontroller for fast data processing and fault detection, as well as establishing the GSM module's connection protocol.

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LIST OF ACRONYMS

AC	Alternating current
BTN	Button
DC	Direct Current
FPI	Fault Passage Indicator
GSM	Global System for Mobile Communication
L-G	Line to Ground
L-L	Line to Line
LCD	Liquid Crystal Display
RF	Radio Frequency
SIM	Subscriber Identity Module
SMS	Short Message Service

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CHAPTER ONE: INTRODUCTION

1.1.BACKGROUND

For the previous number of years now, power supply networks are developing continuously and their reliability getting more significant than ever. The complexity of the whole network comprises a number of components that can fail and interrupt the power supply to the end user. For most of the worldwide low voltage and medium voltage distribution lines, overhead cables have been used for many decades, however they are being influenced frequently by heavy rains, storm, and pollution causing electric faults. Faults in overhead lines can be classified into open circuit fault, over voltage faults, under voltage faults

1.2 PROBLEM STATEMENT

The overhead lines are exposed in air, they become susceptible to physical damages caused by wind or birds which turn into electrical faults. On other hand the end user may lead to the faults for example over loading or poor connections. Theses faults may cause the overhead line to burn, burn the fuse and the fuse dropout links leading to massive damage if not earlier detected.

In order to tackle the above problem, we designed a system that can detect a fault and send a message to the service line for the fault to be easily solved hence reducing massive damages. The

system received an instruction from the utility phone to change the contact to which the SMS alert was sent.

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