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**FACULTY OF ENGINEERING**

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**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**FINAL YEAR PROJECT REPORT.**

**TITLE:**

**DESIGN OF AN AUTOMATIC OBSTACLE DETECTION SYSTEM FOR TRAINS**

**BY**

**OJANGOLE SOLOMON**

**BU/UP/2020/1235**


*Presented to the Department of Electrical Engineering as a partial fulfilment of the requirements for the award of a Bachelor of Science in Electrical Engineering of Busitema University.*

***JUNE 2024***

## DECLARATION

I, **OJANGOLE SOLOMON**, hereby declare that this proposal report being submitted is my very own authentic work and the content of this document has never been submitted before to the Department of Electrical Engineering of Busitema University or any other higher institution of learning.

OJANGOLE SOLOMON

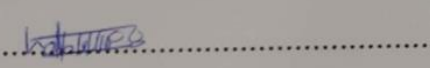
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Date.....11/07/2024

# APPROVAL

This report has been submitted to the Department of Electrical engineering, Busitema University showing that we fully and successfully proposed my project idea with the approval and supervision of;

SUPERVISOR

Ms. NABWIRE LUCY	
SIGNATURE	DATE
	12/07/2024

## **DEDICATION**

I dedicate this project report to my beloved parents Mr. Okiror Francis and Mrs. Amulen Martha for the love and support they have provided to me throughout this project period, my brothers Apunyo Daniel and Ejulun Luke for the advice and financial support, they rendered to me during the research period. I also dedicate it to my project supervisors Eng. Kigozi John W and Mrs. Nabwire Lucy for their tremendous effort and guidance in relation to my project report, the courage, and the moral & support they offered to me during our research period, MAY the almighty God bless them abundantly.

## **ACKNOWLEDGEMENT**

My supervisors, Eng. Kigozi John W and Mrs. Nabwire Lucy, have been a vital requirement in helping me to accomplish this project report. Thank you so much for the aid offered to me. Also, I acknowledge all the other department lecturers who have always given me time for consultation regardless of whether they are my supervisors or not, thank you for the helping attitude. Many fellow students offered help in form of advice and information and it is also greatly recognized. Special thanks to my family members for their never ending financial and advisory support. May GOD reward them abundantly. Above all, I acknowledge the Almighty GOD for the gift of life, wisdom and guidance for without Him, I would not have been able to accomplish this project report.

## LIST OF ACRONYMS

IEEE:	Institute of Electrical and Electronic Engineers
AI:	Artificial Intelligence.
PC:	Personal Computer
Wi-Fi:	Wireless Fidelity
mAh:	Milliamp Hour.
GPIO:	General Purpose Input / Output
IDE:	Integrated development environment
HDMI:	High-Definition Multimedia Interface.
USB:	Universal Serial Bus
PCB:	Printed Circuit Board
Service	SMS Short Message
FTDI:	Future Technology Devices International Limited

## **Abstract:**

This project aims to develop an automated obstacle detection system for trains. Utilizing advanced machine learning algorithms and computer vision methods, the system will process real-time data from onboard sensors to detect potential track obstructions. The automated model will improve train safety and efficiency by delivering timely alerts and aiding in proactive obstacle avoidance. By incorporating innovative technologies, this project intends to advance rail transportation and tackle crucial safety issues related to railway track obstacles.

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# CHAPTER ONE:

## 1.1 BACKGROUND:

The railway is the most widely recognized and popular eco-friendly transportation system. It is generally utilized for a comfortable and safe voyage. Because of low fare and high-volume capacity, nearly everybody can bear the cost of it [1]. But nowadays, we see the number of accidents occurring in railway communication. The accidents have occurred due to the obstacles in the railway track which cannot be identified at the right time. This has caused the loss of lives of many passengers [2].

In our country, the capacity of a train is almost 2000 people [3]. But sometimes it turns into destruction when the train makes a collision with other objects. Regarding the Bangladesh Railway officials, 80% out of a total of 2541 level crossings had been illegitimately set up in several places across the country. Sources in the Bangladesh railway said at least 201 people were wiped out and 349 others wounded in 264 accidents at different level crossings in the last 7 years until 2017 [4]. In the whole world, train collision with an object is a common accident in the area of train communication. The accidents occurred due to track cracking and not identifying the opposite train [5].

Conventionally, these kinds of accidents cannot be maintained a strategic distance from as the train driver or security personnel do not have sufficient time to respond unless they are going under special auspice because of an exceptional situation. Such accidents cause immediate and circuitous harm to human and nature, particularly when they involve trains conveying cargo, human or dangerous or poisonous substances [6]. To ensure a collision-free train communication system, we try to develop a system that will help us to avoid collision of the train. G.S. Reddy proposed the project to develop and design a low-cost system with high integrity & reliability for enhancing to prevent the trains collision in unfavorable weather conditions such as foggy or rainy and identify the tracking problem [7]. G.K. Warnan represented the project to alert the train driver to prevent the collision using an Android-supported embedded system [8]. K. Ajith Theja focused on preventing skilled workers from operating the railway crossing and established a model to open and close the railway gate automatically using Wireless Sensor Network (WSN) and thus avoiding accidents caused by human errors [9]. Prof. Shyam Agrawal proposed the project an Arduino-based method for detecting cracks and obstacles in railway tracks [10].

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