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FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER AND ELECTRICAL ENGINEERING

PROGRAMME: COMPUTER ENGINEERING

FINAL YEAR PROJECT REPORT

TITLE: AN AUTOMATIC SPEED CONTROL AND ACCIDENT-AVOIDANCE SYSTEM

STUDY AREA: UGANDAN HIGHWAYS

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A final year project report submitted to the Department of computer and electrical Engineering in partial fulfilment for the award of a Bachelor of Science in Computer Engineering


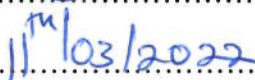
ABSTRACT

Automotive safety has gained an increasing amount of interest from the general public, governments and the car industry. This is more than justified by traffic accident statistics, as each year around 5000 people die due to road traffic accidents in Uganda. This proposal presents a model of cost-effective collision warning system for low budget cars. Rear-end collisions are common accident scenarios and a common cause of these accidents is driver distraction and thus not reacting in time. No vehicle system is a substitute for the most important safety feature in any vehicle the driver. Now a day's many automobile manufacturers are harnessing innovative technologies to help alert drivers to avoid collisions and reduce the potential impact speed when a collision cannot be avoided. One of those systems is Collision Warning with Automatic Braking where the area in front of the vehicle is continuously monitored with the help of long-range sensor and driver is warned in case of collision and along with brake support for collisions with other vehicles, both moving and stationary. Additionally, if the driver does not intervene in spite of the warning and the possible collision is judged to be unavoidable; brakes are applied automatically to slow down the car. This aims at reducing impact speeds and thus the risk of consequences. Finally, it has been discussed how the benefit of such systems can be judged from real life safety perspective using traffic accident statistics.

DECLARATION

I, Kato Hassan Kigozi, (Reg. No. BU/UP/2017/1670) declare to the best of my knowledge that the work presented in this proposal report is my own and has never been presented to any University or higher institute of learning for any academic award.

Here by declare to the best of my knowledge that the work presented in this proposal report is an original piece of me during my internship training course. This work has been uniquely prepared by meand has never been submitted to any university or institution for any award or examination purpose. I confirm that, the report is only prepared for my academic requirement not for other purpose.

Signature.....
Date.....



APPROVAL

This proposal report has been submitted to the Department of computer Engineering for examination with approval from the following supervisors:

MR. ARINEITWE JOSHUA

Signature.....

Date.....

DEDICATION

I dedicate this report to our beloved parents in appreciation for their unconditional love and care, supporting us since childhood, and for the spirit of hard work, courage and determination they taught me, made me able through the Lord to fight to become complete computer engineer.

I also dedicate it to our beloved friends Oscar Bwire, Mayito Isama, Kevin, among others for the motivation and courage they have always given me to focus on education.

ACKNOWLEDGEMENT

At first, I want to express my gratitude to almighty God for giving me the strength and the composure to finish the task within the scheduled time. Secondly, I would like to thank my dear Guardians, Miss. Nampala Hafsah, Miss. Nabalamba Khadijah my brothers and sisters for the guidance, encouragement and financial support during my training

We give great thanks to the almighty God who has given us the strength, courage, protection and good health during our studies and also to enable us to come up with this idea as well as the write up.

Appreciation goes to all my dear supervisors; Mr. ARINEITWE JOSHUA for his selfless guidance, knowledge and encouragement given to us throughout the writing of this report as well as the computer engineering department and Busitema University lecturers.

Finally, we thank all our friends and fellow computer engineering students for all the support and advice they have given me during my final year project report writing.

May the Almighty God reward you abundantly.

List of figures

Figure 1 SHOWING SYSTEM DESIGN..... 13
Figure 2 showing micro controller..... 14
Figure 3 shows ultrasonic sensor 15
Figure 4 showing blue tooth model..... 16
Figure 5 showing infrared sensor 17
Figure 6 showing buzzer 17
Figure 7 showing led..... 17
Figure 8 showing l298n motor driver 18
Figure 9 showing tt gear motor 18
Figure 10 showing flow chart/logic diagram Error! Bookmark not defined.
Figure 11 showing physical design 21
Figure 12 showing data graph 24
Figure 13 showing the bottom of robot design..... 28
Figure 14 showing the top of robot design..... 28
Figure 15 showing front view of the robot..... 29
Figure 16 showing side view of the robot 29
Figure 17 showing the code of the project..... 30
Figure 18 showing code used 31
Figure 19 showing the system design..... 32

Table of Contents

ABSTRACT	i
DECLARATION	ii
APPROVAL	iii
DEDICATION	iv
ACKNOWLEDGEMENT	v
CHAPTER ONE PROJECT BACKGROUND	1
1.1 Introduction	1
1.2 Problem Statement	2
1.3 Objectives	2
1.3.1 main objectives	2
1.3.2 Specific objectives	2
1.4 Significance of the study	2
1.5 Project Scope	3
1.5.1 Geographical Scope	3
1.5.2 Technical scope	3
CHAPTER TWO: LITERATURE REVIEW	4
2.1 Introduction Safety problem	4
2.2 Accident Statistics	5
2.3 Economic Costs of accidents in Uganda	6
2.4 The need for new solutions to safety problem	6
2.5 Existing safety systems with their disadvantages for the technology	6
2.6 The working of the system	8
CHAMPTER THREE: METHODOLOGY	10
3.2 Requirement gathering	10
3.3 Literature review	10
3.4 Consultations	10
3.5 Observation	10
3.6 Requirement analysis	10
3.7 System Design	11
3.7 The architecture Design	11
3.8 System Implementation	11
3.9Testing and Validation	11

3.10 Unit testing	11
3.11 Integration testing	11
3.12 System validation	11
CHAPTER FOUR (System analysis and Design)	12
4.1 Introduction	12
4.2 Functional analysis	12
4.3 Requirement analysis	12
4.3.1 Functional requirement	12
4.3.2 Functional requirement	12
4.4 System Design	13
4.6 Logical design of a system	18
4.8 Physical design	21
CHAPTER FIVE (Implementation and Testing)	22
5.1 Development and design platforms	22
5.1.1 Arduino	22
5.2 Testing	22
5.2.1 Unit Testing	22
5.2.2 Integration Testing	22
5.2.3 System Testing	22
5.2.4 System Evaluation	22
5.3 RESULTS AND DISCUSSION	23
CHAPTER SIX (Discussion and Recommendations)	25
6.0 Summary of my work	25
6.1 Critical analysis/appraisal of the work	25
6.2 Conclusion	25
6.3 Future work/ Recommendations	26
6.4 References	27
6.5 Appendix	28
6.6 Robot design diagram	28
6.7 Robotic Design	29
6.8 defining variables in the code	30
6.9 Code Continuation	31
6.10 System design Diagram	32

CHAPTER ONE PROJECT BACKGROUND

1.1 Introduction

In Uganda road transport system is inseparable from people's daily lives. Many people often drive to work or travel. For some people, driving is their work. So, driving safety is an absolutely important part for them. According to the annual report of the Ministry of works and Transportation of Uganda, for the last four years, at least 2,634 pedestrians and cyclists are killed on Uganda roads every year. Between 2016 and 2019, at least 10,537 pedestrians and riders were knocked dead in urban areas, highways and village roads. About 6,210 of the victims are pedestrians followed by motorcyclists at 3,651 and cyclists at 676. [1], [2] This is attributed to Unsafe practices of road contractors, bad driving, overloading of vehicles, lack of critical road signs and warnings, poor condition of vehicles, bad weather, failure by police to enforce road discipline. Even in April 2020, when the Uganda was under a total lockdown with restricted vehicle movement, there were 470 road crashes registered, followed by May with 631 crashes. This means that even with fewer vehicles on the road, road crashes are bound to happen. The reasons for the top most accidents on the highways of Uganda that includes Maya along Kampala-Masaka-Mbarara highway, Lugazi-jinja highway Katuna to Kampala are as follows.

- i. Not maintaining the driving safety distance
- ii. Not appropriately changing lanes or directions
- iii. Not paying attention to the state in front of the car
- iv. Over speeding of the vehicles on the road
- v. Backing the car without accordance with regulations
- vi. Wheel shedding or tire burst
- vii. Loading goods not safely fixed
- viii. Drunk driving

Statistics of traffic accidents in Uganda shows one of the most common causes of traffic accidents to be the "failure to observe a safe distance behind another vehicle". The three-second rule is recommended where the passenger vehicles during ideal road and weather conditions. Slow down and increase your following distance even more during adverse weather conditions or when visibility is reduced. Also increase your following distance if you are driving a larger vehicle or towing a trailer. There are three safe distances required in car-following front safe distance, rear safe distance, and lateral safe distance, everybody knows that keep safe distance in driving is very important. Considering the three safe distances, the front distance can almost be completely controlled by the driver. Studies have shown that leaving more space between vehicles helps to reduce traffic accidents and allows for smoother traffic. According to Ugandan police, unintended lane departure is the leading cause of serious accidents a fatal collision can occur within a split second causing more extreme damages and injuries. A rule of thumb suggests keeping safe driving distance is "two-three seconds" behind any vehicle that is directly in front of you that would keep you safe.

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