BUSITEMA UNIVERSITY

FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER ENGINEERING

FINAL YEAR PROJECT REPORT

TOPIC:

VEHICLE OVERLOAD DETECTION AND ALERT SYSTEM

BY

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DECLARATION

I **APIYO JENNIFER ORYEMA (BU/UG/2014/1990)** hereby declare that this work is an output of my effort and has not been submitted to any institution of higher learning for any award.

Signature

…….

Date

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Registration Number

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APPROVAL

This project entitled “Vehicle Overload Detection and Alert System” has been submitted for examination with the approval of the supervisor.

Signature

……..

Date

……

Dr. Semwogerere Twaibu

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DEDICATION

I dedicate this report to my beloved parents Mr. Oryema Marcellino, Mrs. Anyeko Rose and my entire family.

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First and foremost, I thank the almighty God for His grace and unending love that gave me the courage and perfect health to complete this report.

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LIST OF ACRONYMS

AM Amplitude Modulation

ARM Advanced Risc Machine

ECU Engine Control Unit

FM Frequency Modulation

GCM Gross Combination Mass

GND Ground

GVM Gross Vehicle Mass

IDE Integrated Development Environment

LCD Liquid Crystal Display

MPV Multiple Purpose Vehicles

PA Power Amplifier

RF Radio Frequency

ROM Read Only Memory

SVM Support Vector Machine

TX Transmitter

ABSTRACT

Taxis (15 seater) have become an integral part of the transportation system. When these taxis are overloaded with passengers, goods and luggage, it can lead to road accidents and road damages amongst others. Therefore, it requires constant vigilance to reduce the danger. The aim of this project was to design a vehicle overload detection and alert system that could monitor the weight on a vehicle at all times. The design of this system involved the use of a load cell, transmitter-receiver module, LCD, buzzer, LED, and Arduino Uno. The load cell measures the weight being added on the vehicle. When the weight exceeds the preset maximum value, the buzzer sounds a warning alarm and the LED blinks. The RF module is triggered and the transmitter sends a signal to the police hence alerting them. The LCD unit displays the weight on the vehicle hence the driver is always aware of weight onboard. The LCD on the receiver module displays the weight and number plate of a vehicle that has excess load to the police. This system therefore is able to regulate the weight carried by vehicles hence protecting the roads and increasing on the life span.

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CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND

Traffic reports indicate that several passenger service vehicles have always been overloaded. This is brought about by taxi operators who want to make more money and also impatient travelers who insist on being squeezed into the vehicles in order to reach their destinations fast hence exceeding the payload capacity of the taxi. This is a serious safety and cost concern. This is because overloaded vehicles threaten road safety and have resulted into several fatal accidents. Over loading a vehicle causes difficulty in steering, long braking, vehicle instability and delayed acceleration during overtaking of other vehicles. An overloaded vehicle is susceptible to tyre overheating and wear-and-tear which can ultimately result in a tyre blow-out, high maintenance costs due to high fuel consumption, damages on the vehicle's suspension control system causing it to break down[1]. It affects pavement performance life and bridge safety[2]. According to minibus (taxi) survey, large irregularities in tyre inflation pressure and brakes were identified as major mechanical defects causing accidents, with overloading as a key factor contributing to those mechanical defects[3].

Figure 1:1: An overloaded taxi[4]

In almost all countries in Africa, Asia and Latin America, road traffic crashes have become one of the leading causes of death in older children and economically active adults between the ages 30 and 49 years. The leading population of road users that are affected include riders in passenger-ferrying buses, minibuses and trucks. The dominance of bus occupants in traffic fatalities and injuries in the rural areas is likely caused by overloading and non-restrained passengers[5].

According to the Police Annual Crime reports, 3,124 people died from roads accidents in 2012 and 2,937 in 2013. According to the World Health Organization's road safety assessments, Uganda

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