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A TIRE PRESSURE MONITORING AND SPEED
CONTROL SYSTEM

BY

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DECLARATION

I, **Ojiambo Samuel** Reg No BU/UG/2012/230 hereby declare that this project report is my original work except where explicit citation has been made and it has not been presented to any institution of higher learning for any academic award

Sign

Date.....

APPROVAL

This is to certify that the project report under the title “**TIRE PRESSURE MONITORING AND SPEED CONTROL SYSTEM**” has been drafted under my supervision and is submitted to the board for examination

Department of Computer Engineering

Supervisor: Mr Matovu Davis

Sign

Date.....

DEDICATION

I dedicate this report to the family of Mr. Wandera Peter who with their help in many ways have facilitated my project requirements. I also thank my Uncle Bwire Cornelius and Brother Henry Oryang. Thank you all for your guidance.

Lots of thanks to dad, mum, brothers and sisters who have been there in every way for the whole of my life up to this moment.

My friends thank you for the guidance and encouragement. Patience Doreen, Kugonza Kato, Asiimwe Y thank you so much.

I thank my supervisor for his guidance and encouragement for the whole of my project development.

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May the ALMIGHTY GOD bless the works of your hands.

My greatest thank you is to the Almighty God, Who, besides assisting me in many tedious tasks, helped me more than I can say by His Grace, Mercy, Unfailing encouragement and patience. Thank You Lord.

ABSTRACT

The tire pressure monitoring and speed control system is a microcontroller based system that notifies the driver of the amount of tire pressure in the vehicle tires. This system is able to control speed of the vehicle depending on the amount of pressure in the tires. If the tire pressure drops 15% below the recommended then system notifies the driver of this loss with a beeping and then mitigates the car speed to less than 60km/hr. There cases where some drivers inflate car tires to that which is above the threshold tire pressure for a given vehicle, so this system is also able to notify the driver with a beeping sound then controls speed to less than 60km/hr.

The tire pressure monitoring system is placed inside the tire with a cell as the power source then the system is protected with a rubber casing to prevent damage. The speed control system is connected to the engine so as to control speed for cases of low and high pressures. The two modules communicate wirelessly using radio frequency where the transmitter circuit is in the tire and the receiver circuit inside the car system. The user interface is the liquid crystal display where the tire pressure is displayed in real time

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LIST OF ACRONYMS

ABS - Anti-Lock Brake System

BTS- Bureau of Transportation Statistics

CAN – Car Area Network

DFD - Data flow diagrams

DTPMS – Direct Tire Pressure Monitoring System

ITPMS – Indirect Tire Pressure Monitoring System

LCD - Liquid Crystal Display

LED - light emitting diodes

NASS-CDS - National Accident Sampling System - Crashworthiness Data System

NCSA- National Centre for Statistics and Analysis

NHTSA -National Highway Traffic Safety Administration

PSI - Pound per Square Inch

TFT - Thin Film Transistor

TPMS – Tire Pressure Monitoring System

TPMSCS- Tire Pressure Monitoring System and Speed Control System.

TPSS -Tire Pressure Special Study

TREAD- The Transportation Recall Enhancement, Accountability, and Documentation

UNRA – Uganda National Road Authority

CHAPTER ONE

INTRODUCTION

This document proposes to establish a new Federal Motor Vehicle Safety Standard that would require a tire pressure monitoring and speed control system to be installed in a new passenger car. Each vehicle's system would include a Liquid Crystal Display that illuminates to inform the driver the tire pressure at all times and a speed control for cases of his speed when the pressure is several PSI below or above the recommended inflation pressure.

1.0 Background of study

More than 50% of people in Uganda use motor vehicles to move from one place to another [1]. These motor vehicles have tires that enable them move to various places. The management of these tires however mostly lies under the hands of the person driving and the owner of the motor vehicle. In all motor vehicles, drivers only focus on reaching the final destination but as far as the safety of the passengers is concerned it is not a big issue, that is, drivers rarely check for the tire pressures of the motor vehicles which they are going to carry many people. According to research, drivers just jump into their vehicles without taking note of the state of their tire pressure and more so there no devices in Uganda that enable the driver check their tire pressure at all times wherever they might be. Drivers infrequently monitor their tire pressure as it is difficult to visually detect when the pressure is several PSI below the recommended inflation pressure. More so the manual ways of stepping on the tires to see if the pressure is enough in the tire cannot give the actual pressure but just gives an assumption that the pressure is enough or not.

The state of roads in Uganda is alarming. According to the report from UNRA [2] this report clearly shows that the state of roads in Uganda isn't to the standard. This has played a big role in the number of tires having under inflated tires. Motor vehicles tend to balance very well on tarmac roads but when the pressure is not to the standard and a vehicle is moving on an marram road the vehicle will tend to lose balance if the tire pressure is several PSI below recommended and can cause a motor vehicle to topple in case of a high

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