BUSITEMA UNIVERSITY

FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER ENGINEERING

Design of a Vehicle Verification System for Parking lots

By

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Declaration

I, MUDEBO SULAIMAN, registration number BU/UP/2012/326 do hereby declare this Project entitled "Design of a Vehicle Verification system for Parking Lots" as my original work except where explicit citations has been made and that it has never been submitted to any Institution of higher learning for academic award.

 Signed: .... Date: ....

DEDICATION

I dedicate this report to my Parents for their love and moral support. I also dedicate this report to my Siblings for their affectionate encouragement most especially our Young sister Nambozo Shakilla, May she live to achieve what she cherishes

Approval

This is to certify that the Project Report entitled **"Design of a Vehicle Verification System for parking lots"** has been done under my supervision and is hereby being submitted for examination with my recommendation.

Signed:... Date:...

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ACKNOWLEDGEMENT

Thanks to the Almighty for all he provides. I extend my Regards to my Supervisor for the Time and advice he availed during the development process. I am Highly Appreciative to Busitema University Staff most Especially the Computer Engineering Department. On a Special note, I stand Indebted to my Parents to their Moral and Financial Support towards my Academic Path to date.

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LIST OF ACRONYMS

GPS-   Global Positioning System

GSM-   Global System for Mobile Communication

HES   Hall Effect Sensor

IDE   Integrated Development Environment

MODEM-   Modulate Demodulate

RF-   Radio Frequency

RFID-   Radio Frequency Identification

SIM-   Subscriber Identity Module

VIN-   vehicle Identification Number

ABSTRACT

The Vehicle verification System seeks address the Security dilemma associated to the Vehicle parking lots basing its emphasis on a verification mechanism. The system looks at situations like when one has bypassed all your physical antitheft mechanisms like alarms, steering wheel lock, wood locks and is finally set to get away the parking premise with the vehicle. Here the parking lot has to come to your rescue, of course they will run to police and notify all traffic officials, which is quite tiresome and time demanding. This system does it better!! Of course it will not directly catch the thief, the system finds out who is exiting with which vehicle. First, you need to have an identification chip within your vehicle given to you by the owners of the parking facility. At the entrance the details of your car are captured and you are allocated an exit code that you produce during exit. This information is stored by the system. For demonstration, I used a transmitter circuit as my model car. The gate herein illustrated by the motor driven by the H-Bridge circuit depicts acceptance or denial to and from the parking there by opening or closing respectively. The hole effect sensors the reed switches, and the R-f setup are vital in identification of the vehicle there by triggering the corresponding action. The communications within the system are basically coordinated by the GSM shield. These include requisition of the exit code by the system, reply to the system requisition, and also notification of concerned in case of detected illegalities. This it does through the Power of AT-commands (attention commands). A Modell has been provided to depict a parking lot environment. The microcontroller is the brain of this system. It does the thinking and initiates an action depending on how it interprets your input. For this Project I used the At mega 328 microcontroller programed in Arduino 6.1.8 IDE reasons for which shall further be explained herein.

CHAPTER ONE:

INTRODUCTION

1.1: BACK GROUND

By 1962, Uganda had about 12,000 cars, this is much smaller than the 21000 cars bought by Ugandans every year today. Uganda revenue authority estimates that the number of vehicles have increased from 300000 in 2001 to over 800,000, more than 100% 1ncrease. In the fortune of Increasing number of Vehicles, Car security is becoming a major issue in Urban and semi-Urban areas of Uganda. These thefts are masterminded by sophisticated gangs who by pass anti-theft devices and illegally drive away cars [1].

Less effort has been established to address this issue especially in parking areas. In Most parking lots, custody of the vehicle is at the owner's expense. The parking entrances and exits do not have effective counter theft mechanism given their manual and rudimentary verification mechanisms.

The car Park managerial bodies do not have reliable systems to monitor vehicle security within the Car Parks especially during exit of the cars from the parking areas. Vehicle owners have resorted to anti-theft mechanisms like Vehicle Identification Numbers, Kill switches, and hood locks steering wheel locks all of which have their associated draw backs.

Uganda is in expectation of the construction of the first multistory car Park lot with a capital Investment requirement of about $2, 865,000 which is about 8.6 billion shillings. In this Proposal they state that the business risk associated with this idea is the theft of the vehicle if Security is not well monitored as gangs illegally exit with parked vehicles [2].

1.2: PROBLEM STATEMENT

In the light of increasing number of vehicles in Uganda, the key issue in question is security associated to Parking lots. The available Parking lots are not reliably secure since Illegal exit is not checked and parking is at owner's risk. The ineffective verification at the parking areas renders them theft prone. Hence the need for an improved verification system.

1.3: OBJECTIVES

1.3.1: MAIN OBJECTIVE

To Design a Vehicle verification system for parking lots

1.3.2: SPECIFIC OBJECTIVES

❖ To design and develop the Identification module which shall sense and provide the vehicle Identity.

❖ To develop the communication module that shall coordinate requisitions and replies made

❖ To design and develop the gate status module to depict denial or acceptance to the parking lot.

❖ To integrate the modules into a vehicle verification system.

❖ To test and validate the vehicle verification system for the parking lots.

1.4: JUSTIFICATION

Vehicle parking lots are among the major Car theft prone areas in the country. In 2013 alone the number of motor vehicles either stolen or robed were 670.In the first six months of 2014, the number of stolen cars increased to 792. Though there was a short improvement in 2015, Cases of vehicle theft are still high (ANDREW BAGALA 2015) [3]. According to the 2013 Uganda Police force annual report, 103 stolen Motor vehicles were recovered from suspects [4].This result is highly attributed to the ineffective anti-theft Procedures at the Parking areas like Parks, washing bays ware houses and garages. Thus the need to try out an efficient and cost effective system to address unauthorized car entrance and exit in such amenities. This System does it through Verification of cars to restrict illegal entrance and exit of cars from such amenities there by relieving the car owners of security burdens and time taken to recover the vehicles.

1.5: SCOPE

1.5.1: CONTENT SCOPE

The vehicle verification system demonstrates a system that automatically gets the details of the vehicle at the entrance and allocates it an exit code which is used for verification at the exit. Exit of the parking Premise is guaranteed upon a correct exit code. A requisition of the exit code is sent by the system to the user's mobile device by the use of AT commands upon which he or she shall reply with the exit code allocated during entrance to the parking facility.

1.5.2: GEOGRAPHICAL SCOPE

The System has been developed to serve the Parking areas of Uganda and any other Places that have similar Parking lot Problems.

1.6: LIMITATIONS

1.6.1: CONTENT LIMITATION

The vehicle verification system does not directly catch the thief but focuses on the authoritative right of the person driving. It is not in any way concerned with licensing and other such violations as defined by the state. All it does is to verify entrance and exit rights of the vehicle at the Parking lot there by deny or guarantee success. This system is not concerned with transactions made at the parking areas.

1.6.2: DEPLOYMENT LIMITATION

This system shall be most applicable in parking areas with predefined entrance and exit Points It may not cut across unenclosed areas like street Parking areas, Open fields, and any such other places.

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