

BUSITEMA UNIVERSITY
FACULTY OF ENGINEERING
DEPARTMENT OF COMPUTER
ENGINEERING

MOTORCYCLE RIDING BUSINESS
MONITORING SYSTEM

BY

SSAKA YOSAMU
BU/UG/2012/93

MAY 2016

DECLARATION

I SSAKA YOSAMU REG. No BU/UG/2012/93 do 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.

Signed.....

Date:

APPROVAL

This is to certify that the project report entitled “MOTORCYCLE RIDING BUSINESS MONITORING SYSTEM” has been drafted under my supervision and is submitted to the board of examiners with my approval.

Department of computer engineering.

ALUNYU ANDREW EGWAR

Sign

Date.....

DEDICATION

To my dear brother Muwanguzi Robert.

ACKNOWLEDGMENTS

I thank my supervisor Mr. Alunyu Andrew Egwar and all my lecturers for the great work they done and also the almighty God, even not forgetting my parents

LIST OF ACRYNOYMS

LCD – Liquid Crystal Display

GSM – Global System for Mobile communication

SMS – Soft Messages

SIM – Subscriber's Identification Modem

LIST OF FIGURES

Figure 1: Block diagram of the system.	10
Figure 2: flow chart of diagram	13
Figure 3: Physical diagram of the system	14
Figure 4: Circuit diagram of the system	15
Figure 5: illustration of the Hall Effect sensor.....	16
Figure 6: illustration of GSM modem.....	16
Figure 7: illustration of LCD	17

ABSTRACT

The development of the motorcycle riding industry (Boda industry) has made so many people to join it both the educated and non-educated, the youth and the old, marrieds and non-marrieds since it's a profitable business. The boda industry comprises of passenger carrying and luggage carrying motorcycles.

The industry comprises of motorcycle hiring and also self-owning riders but most riders hirer their motorcycle from private owners at a charge thus profit sharing among motorcycle owners and riders but sometimes riders are unfaithful to motorcycle owners leading to them getting low profits or make losses.

Motorcycle riding business monitoring system addresses the issue of unfaithfulness of most riders by determining the amount of money to be paid to private owners depending on presence of the passenger or luggage and the travelled distance with the passenger on the motorcycle. The money is displayed on the LCD to notify the rider and also inform of a message to the motorcycle owner.

This report discusses the background of motorcycle industry in Uganda, problem faced by the owners as well as problem solving by showing the design and implementation of the above mentioned system.

TABLE OF CONTENTS

DECLARATION	i
APPROVAL	ii
DEDICATION.....	iii
ACKNOWLEDGMENTS	iv
LIST OF ACRONYMS.....	v
ABSTRACT.....	vii
CHAPTER 1: INTRODUCTION	1
1.0. Introduction	1
1.1. Background of study	1
1.2. Problem statement	2
1.3. OBJECTIVES	2
1.3.1. Main Objectives	2
1.3.2. Specific Objectives.....	2
1.4. Justification.....	2
1.5 SCOPE	3
1.5.1 Content Scope	3
1.6. Limitation	3
CHAPTER 2: LITERATURE REVIEW	4
2.0. Introduction	4
2.1. CONCEPTS.....	4
2.1.1. MOTORCYCLES [Boda Boda].....	4
2.1.2. Boda stage	4
2.1.3. Force detectors (Load cell sensors).....	4
2.1.4. Hall Effect sensor	5
2.1.5. Distance.....	5
2.1.6. Shillings per Distance unit	5
2.2. Existing systems.	6
Agreements between motorcycle owner and Hirer	6
Odometers	6
2.3. Motorcycle riding business monitoring system.	6

2.3.1. Strength of implemented system/method.....	7
2.4. Technologies used.....	7
2.4.1. Global system for Mobile communication (GSM).....	7
2.4.2. Microcontroller technology.....	7
CHAPTER 3: METHODOLOGY.....	9
3.1. Introduction.....	9
3.2. Requirement Elicitation.....	9
3.2.1. Research work (literature review).....	9
3.2.2. Observation.....	9
3.2.3. Questionnaires.....	9
3.3. System Analysis.....	9
3.4.1. Block diagram.....	10
3.5. System implementation.....	10
3.5.1. Hardware implementation.....	10
3.5.2. Tools.....	11
3.6. Testing and validation.....	11
3.6.1. Unit testing.....	11
3.6.2. Integration testing.....	11
3.6.3. System testing.....	11
3.7. Validation.....	11
CHAPTER 4: SYSTEM ANALYSIS AND DESIGN.....	12
4.0 Introduction.....	12
4.1 Functional analysis.....	12
4.2 Requirement analysis.....	12
4.2.1 Functional requirements.....	12
4.2.2 Non- Functional requirements.....	12
4.3. System design.....	13
4.3.1 Data flow model for the all system.....	13
4.3.2. Hardware (Physical Design).....	14
4.3.3. Circuit diagram of the System.....	15
4.4. COMPONENTS USED IN HARDWARE DESIGN.....	15

HALL EFFECT SENSOR	15
GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM)	16
LIQUID CRYSTAL DISPLAY (LCD)	17
CHAPTER FIVE: IMPLEMENTATION AND TESTING	18
5.0 INTRODUCTION	18
5.1 DEVELOPMENT PLATFORMS	18
5.1.1 ARDUINO IDE.....	18
5.2 CODE DESIGNS.....	18
5.2.1. GSM module code.....	18
5.3 TESTING.....	22
5.3.2 Integration testing.....	23
5.3.3 System Testing	23
5.4 System Verification and Validation	23
5.5. System evaluation	23
CHAPTER SIX: DISCUSSION AND RECOMMENDATIONS.....	24
6.0 Introduction	24
6.1 Summary of work done.....	24
6.2 Critical analysis /appraisal of the work.....	24
6.3. Conclusion.....	25
6.4. Recommendations	25
References	26
APPENDIX 1.....	28
APPENDIX 2.....	32

CHAPTER 1: INTRODUCTION

1.0. Introduction

This gives a brief background of the use of motorcycles in Uganda and the economy dependency on them as well as the introduction to the study of motorcycle riding business monitoring system.

1.1. Background of study

The motorcycle riding (Boda) industry has an estimated national fleet of 50,000 to 800,000 motorcycles (boda bodas) in Uganda with approximately over 200,000 riders and 5,000 stages in Kampala [1]. Over 1.6 million, or 7% of the population, depend for part of their livelihood on this industry and the livelihoods of a further 100,000 are supported from the repair and sustenance services the industry needs. There are clear differences in the ownership patterns of motorcycles; 34% of motorcycles are operated by the owner, compared to a further 10% of motorcycles belong to the family or close relative. Correspondingly, hiring of motorcycles for operation comprises about 56% of the total [2]. This suggests that motorcycle hire is a profitable business that is entered into by people who are already engaged in other economic activities. It is not obvious why there is a greater propensity to hire out motorcycles. Unfortunately the data on operating costs and earnings are not sufficiently robust to establish if they provide a better return on investment. However, other explanations are plausible. The scale of the industry and its rapid expansion offers a counter indication that individuals find it profitable.

Median of motorcycle operators travel furthest distance of 9 km, with 37% exceeding 10 km, and 10% more than 30 km. The furthest trip is 80 km [2]. However, pricing for longer trips appears to be opportunistic as there is no tapering of fares per km with distance. This is true even within their main range of operations up to 10 km, where fares per km tend.

Most riders in Kampala can take home at least Shs15,000 per day and Shs450,000 per month in profit, while ambitious, hard-working, and lucky drivers can earn even more. At the very minimum, Kibikwamu says, riders in the Boda 2010 Association earn at least Shs300, 000 per month [3]. Lucky riders that find passengers who pay more than they should can earn up to Shs100, 000 per day. On average, drivers spend at least Shs8, 000 per day on fuel and Shs50, 000 per month maintaining their bikes. Around half of the riders in Kampala rent their motorcycles at a rate of Shs60, 000 per week [2] [3], but even those who rent their bikes are able to earn a profit. Because the wages in the motorcycle riding business greatly exceed those for other low-skilled jobs in

sectors like construction, security, and retail, many young men flock to the motorcycle riding (boda industry) from other professions.

1.2. Problem statement

56% of the motorcycle riders hire motorcycles from private owners in the motorcycle industry [2] thus there is sharing of profits among the owners and hirers. In this industry there is always a business loss or minimum profits to motorcycle owners due to untrustworthy customers. Hire charges are always paid on daily basis, weekly or monthly depending on owner's choice [3].

1.3. OBJECTIVES

1.3.1. Main Objectives

To design and implement motorcycle riding business monitoring system that calculates the motorcycle hiring charge.

1.3.2. Specific Objectives

- i. To study and investigate the current systems/methods used by different motorcycle riders and owners to determine hiring charge.
- ii. To gather and analyze the requirements for motorcycle riding business monitoring system.
- iii. To design a motorcycle riding business monitoring system so as determine money paid to the owner.
- iv. To implement a motorcycle riding business monitoring system that conforms to the design specification.
- v. To test and validate the system.

1.4. Justification

Since over 2millions live hoods depend on motorcycle riding (boda boda) industry [2], either directly or indirectly, a loss in this industry both on the side of the owner and hirers affects the welfare of these live hoods thus this system will fight this loss and provides a simple way of determining the hirer charge in the motorcycle riding industry.

1.5 SCOPE

1.5.1 Content Scope

The system has been designed to determine the distance travelled by the motorcycle when carrying a passenger or luggage, calculate the appropriate sum of money and send the sum as a message to the boda owner every after a given period of time.

1.6. Limitation

The system is limited to only cyclists carrying passengers and luggage.

References

- [1] B. Klosterboer, "Daily Monitor," Monday February 25 2013. [Online]. Available: <http://www.monitor.co.ug/artsculture/Reviews/Kampala-s-Boda-Bodas--Profit-overrides-competition/-/691232/1703394/-/12ack3j/-/index.html>.. [Accessed Thursday January 28 2016].
- [2] A. D. John Howe, "Boda Boda-Uganda's Rural and Urban low-capacity transport services," AA Balkema, Rotterdam, Netherlands, 2002.
- [3] R. Nasasira, "Daily Monitor," Tuesday september 15 2015. [Online]. Available: <http://www.monitor.co.ug/Business/Prosper/boda-boda-economy-defining-streets-Kampala/-/688616/2869756/-/82s1jd/-/index.html>. [Accessed Friday January 29 2016].
- [4] G. N. OKEBIRO, "Motorcycle[Boda Boda] As Emerging Business for the Poor In transport Industry And sustainable development In Kenya," 2014.
- [5] B. Rayner, "Informal Transportation in Uganda: A cas study of Uganda," 2014.independent Study Project(ISP). [Online]. Available: http://digitalcollections.sit.edu/isp_collection/1923 .
- [6] Amalgamated Instrument CO PTY LTD, "Load cell system fault finding guide(Application Note: Number AN1) ACN: 001 589," Amalgamated Instrument CO PTY LTD, leighton place Hornsby ,Australia, 2015.
- [7] Interface.co, "LOAD CELLS, A Primer on the design and Use of strain Gage force sensors," Butherus Drive scottsdale, 2008.
- [8] VPG Transducers, "Load cells and Weigh modules," 14 January 2015. [Online]. Available: www.vpgtransducers.com. [Accessed 30 january 2016].
- [9] WELLS Manufacturing corp., "UNDERSTANDING HALL EFFECT SENSORS," *WELLS POINT COUNTER*, vol. 3, no. 1, pp. 1-2, 1999.

- [10] R. Kern, " Scientific instruments in their time . Vol. 2: From the Compendium for single instrument," Cologne, 2010.
- [11] WAGO, "Sending/recieving Messages using a GSM modem," WAGO Kontakttechnik GmbH & Co.KG, Hansastrabe 27 minden 32423, 2003.
- [12] Campus component PVT .LTD, "GSM INTERFACING BOARD," pune india, 2011.
- [13] International Engineering consortium, "Global System for Mobile communication," 2010.