BUSITEMA UNIVERSITY

FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER ENGINEERING

ELECTRONIC VOTE CASTING AND COUNTING SYSTEM

BY

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DECLARATION

I BYAMUKAMA OSCAR, BU/UG/2012/60, declare that the work in this project report is my original work except where indicated by special reference in the text and no part of the project has been submitted to any institution for any academic award.

Signature……. Date……

BYAMUKAMA OSCAR

APPROVAL

This is to certify that the project Report under the title **"ELECTRONIC VOTE CASTING AND COUNTING SYSTEM"** has been done under my supervision and is now ready for examination.

Sign: ……. Date: ……..

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DEDICATION

I dedicate this project proposal to my dear sister, karungi Sharon and brother Kiiza baturumayo.

I am very grateful for the support. May the Almighty bless you.

ACKNOWLEDGEMENT

First and fore most I would like to take this opportunity to thank the almighty Lord for providing protection and life to me and everyone around me during the time of my research. For it was through the health and strength I had that I was able to make it to this level

Secondly I would thank my parents and family who have looked after my welfare and finances and assured that I carried on my education successfully may the good Lord award them abundantly.

Furthermore, I extend my sincere gratitude to my supervisor Mr. ALUNYU ANDREW EGWAR, who has tirelessly worked with me to ensure that all the works in this report are up to the recommended standards.

I thank Busitema University Department of Computer Engineering for rendering enough time for us to ensure we learn a lot as computer engineering is concerned and this has made it possible for me to come up with this project.

Lastly but not least I would convey my thanks to all my friends who stood by my side to help me come up with better structures as required for my project research to make it to this level. May the good lord provide for them in their times of need.

Contents

LIST OF FIGURES

ACRONYMS

U.S- United States

USB- Universal Serial Bus

HTTPS- HyperText Transfer Protocol over SSL (Secure Socket Layer)

SPI-Serial Peripheral Interface

EC-Electoral commission

USART- Universal *Synchronous/Asynchronous Receiver Transmitter*

LIN- *Local Interconnect Network*

CAN- Controller Area Network

EUEOM- European Union Election Observation Mission

PHP -Hypertext Preprocessor

MYSQL My Structured Query Language

ABSTRACT

The need to reduce the number of invalid votes caused current vote casting process of ticking against the candidate of voter's choice motivated the development of this system. With more time and mistakes made during counting that needed attention was another motivation for coming up with tis system.

The system comprises of fingerprint scanner used for voter identification, authentication and authorization to increase the security of the system. Using the finger print scanner, the system is able to tell if the voter is registered or not. If not registered it denies access and if registered it grants access only once and a voter casts his/her vote. In case the voter comes back to vote the system is able to identify him as an already voted voter.

Another part of the system of the system is raspberry pi touch screen that is used to display a ballot from where a voter is able to select to select only one candidate of his/her choice out of the candidates listed on the ballot and there after cast her vote. With selection and casting done, the vote of each candidate increments in the database and percentage for each is calculated. Using the finger scanner, the polling assistant's thumb print is identified and is used to display the results on the raspberry pi touch screen after the casting process.

The work is arranged mainly in six chapters, Chapter one includes the introduction of an Electronic Vote Casting and Counting System. Chapter two discusses the literature related to the system, Chapter three illustrates the methodologies used in coming up with the working prototype of the system, Chapter four includes system analysis and design, Chapter five is contains the implementation and testing of the system and chapter six contains the summary of the work, , discussions and recommendations.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter consists of the background of the study, problem statement, objectives of the study, justification, significance of the study, scope and the limitations.

1.1 Background

One basic feature of democracy that cuts across all divides of life is the act of election. Democracy thus encourages individual freedom according to the rule of law, so that people may behave and express themselves as they choose. This not only gives people a chance to choose their leaders, but also to freely express their views on issues. In response to the 1948 Universal Declaration of Human Rights which signifies the necessity of free elections, nations aim at new and improved voting procedures which are of relevance to elections in the 21st century [1]. This is still a failure in some countries all over the world.

In Africa especially Kenya, according to the New York Times [2], Kenya's election commission announced that Uhuru Kenyatta, a son of Kenya's first president, had won 50.07 percent of the vote, narrowly avoiding a runoff and clinching the presidency by a few thousand ballots. But then the Supreme Court released results from a re-tallying of votes from a sampling of polling places. The recount showed that indeed there were some discrepancies in the vote totals from a handful of polling places, and that in some areas there were no official forms backing up the numbers the election commission used.

Currently, Uganda is using manual paper based voting system where voters get a blank ballot and uses a pen or a marker to indicate which candidate to vote for. There after ballots are hand counted for each candidate to determine the winner, and then results are released.

According to a report by the European union Election Observation Mission [3],there were many cases reported and these included:- The voting basins were not effective for ensuring secrecy of votes especially where ballots were at least as long as the basin diameter. In more than half of the cases observed, the numbers of votes cast were not determined by counting the marks in the register and in just under half of cases there was no adequate reconciliation of all used and unused ballots. In just quarter of the polling stations observed, the number of ballots cast did not equal to the number of people who had voted. It was also stated that the definition of a valid vote was determined in a consistent manner but in over a third of polling stations observed, ballots with clear voter's intention were considered invalid due to the use of marks other than tick or thumbprint.

Due to the voting irregularities, many people have been left uncontended with results and have always complained, thus better voting system is required, the system which is free from ballot box stuffing, quick at counting and free from invalid votes.

1.2 Problem statement

Despite attempts by voters to vote candidates of their choice, the current vote casting process of ticking against the candidate of your choice is susceptible to errors hence a voter invalidates his/her vote. This problem is also compounded when the polling officers make mistakes and waste time during the manual vote counting process.

Therefore this calls for a system that enables a voter to electronically cast his/her vote after which the vote is automatically counted. This does away with the invalid votes and mistakes during the manual counting process.

1.3 Objectives

1.3.1 Main objective

To design and implement a system that enables a voter cast the vote electronically and in turn the vote is automatically added to candidate the voter voted for.

1.3.2 Specific objective

i. To review and study the relevant literature in order to analyze requirements required for the design of the electronic vote casting and counting system.

ii. To design a module that detects if voters are registered or not before casting their vote.
iii. To design a module that is used casting and counting of votes.
iv. To integrate the modules so as to achieve the desired functionality.
v. To test and validate the integrated module to ensure that it works as required.

1.4 Justification

With many issues with the current voting system in Uganda especially, counting errors and invalidity of votes, a system that automatically counts votes as they are electronically cast in a faster way was developed. A system, that is less or completely not susceptible to errors in casting and counting of votes.

1.5 Scope

1.5.1 Content scope

This study was limited to creating a system that helps people to cast their votes electronically, and count them as they are cast and display the results after the election vote casting process.

The system focused only on people with no disabilities.

The system is not intended to provide vote tallying process at the main center.

1.5.2 Geographical scope

The system is to be used in towns for the start because of the network in Uganda is still poor, later be implemented in all parts of Uganda

References

[1] salomonsen, " Voting for Online Democracy," 2005. [Online]. Available: http://www.physorg.com/news 4011. [Accessed 21 october 2015].

[2] J. Gentleman, "Voting Irregularities in Kenya Election Are Confirmed, Adding Fuel to Dispute," The Newyork Times, 29 March 2013. [Online]. Available: http://www.nytimes.com. [Accessed 5 November 2015].

[3] European Union Election Observation Mission ,
"Final Report on the Uganda General Elections 2011," kampala, 20 march,2011.

[4] Australian Electoral Commission , "Australian Electoral Commission," 4 april 2014. [Online]. Available: http://www.aec.gov.au/Voting/ways_to_vote/. [Accessed 20th tuesday october 2015].

[5] L. Jain, "Intelligent Biometric Techniques in Fingerprint and face recognition," *Boca Raton,* 1999.

[6] J. Thornton, " Latent Fingerprints, Setting Standards In The Comparison and Identification," in *84th Annual Training Conference of the California State Division of IAI*, califonia, 2000.

[7] E. kiggundu, "Voter Education on the Voting Process," uganda Electoral commision, kampala, 2006.

[8] A. partner, "ACE Electoral Knowledge Network," IDEA, IFES and UNDESA., 1998. [Online]. Available: https://aceproject.org/about-en. [Accessed 27th wednesday october 2015].

[9] S. Nanvati, "Biometric: identity Verification in a networked world," in *Biometric: identity Verification in a networked world*, Newyork, Wiley and son, Inc, 2002, p. 52.

[10] S. Nanvati, "Biometeric: identify Verification in a Networked world," in *Biometeric: identify Verification in a Networked world*, Newyork:, Wiley and sons, Inc, 2002, p. 48.

[11] S. Nanvati, "Biometric: identity Verification in a networked world," in *Biometric: identity Verification in a networked world*, Newyork, Wiley and Sons, Inc, 2002, p. 51.

[12] Z. marchant, "Biometric: fingerprint Authentication," SANS reading Room, [Online]. Available: http://rr.sans.org/authentic/fingerprint.php.

[13] S. Nanvati, "Biometric: identity Verification in a networked world," in *Biometric: identity Verification in a networked world*, Newyork, Wiley and sons, Inc, 2002, p. 51.

[14] S. Nanvati, "Biometric: identity Verification in a networked world," in *Biometric: identity Verification in a networked world*, Newyork, wiley and sons, Inc, 2002, p. 53.

[15] J. Ashbourn, "Biometric: advanced Identity Verification," in *Biometric: advanced Identity Verification*, London: springer-verlag, 2002, p. 48.

[16] S. Nanvati, "Biometric:identity Verification in a networked world," in *iometric: Identty Verification in a Networked world*, Newyork, Wiley and Sons, Inc, 2002, p. 51.

[17] P. G. S. a. S. k. Roger Jamieson, "Fingerprint Identification: An Aid to the Authentication Process," Informaton systemsAudit and control Association, Austria, 2005.

[18] O. cit, "Face vs. Fingerprint Identification," Java Card Special Interest Group; White, R., 1999. [Online]. Available: www.zdnet.co.za/pccomp/stories/reviews/0,5672,396764,00.html.

[19] R. p. foundation, "FAQ," Raspberry pi foundation, 2015. [Online]. Available: https://www.raspberrypi.org/help/faqs/. [Accessed 24 20 2015].