# DESIGN AND IMPLEMENTATION OF BIOMETRIC VOTING SYSTEM FOR STUDENT UNION GOVERNMENT, ENUGU STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY ELECTION.

**BY**

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**(XXXXXXXXXXXXXXX)**

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**(ESUT)**

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**12th October, 2018**

**CERTIFICATION PAGE**

This is to certify that this project research work from the Department of Computer and Information Science, Enugu State University of Science and Technology, Enugu State was solely and entirely carried out by XXXXXXXXXXXXXXXXXXXXXXX with registration number XXXXXXXXXXXXXXXXXX

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**DEDICATION**

I dedicate this work to God Almighty, for his sufficient blessings upon my family and for guiding me through the actualization of this project. And to my family for their support and encouragement**.**

**ACKNOWLEDGEMENT**

I am most grateful to the Almighty God who has been my most gracious guardian and source of strength throughout this thesis.

**ABSTRACT**

This project discusses the development and implementation of a new technology for voting machines. It devises a new modern approach which can replace the traditional mechanical voting system with a biometric one. The main objective is to design a biometric voting machine that uses an individual’s fingerprint as the medium of identification. It aims to remove the traditional use of documents or voter ID at polling booth during elections. The project suggests a more modern system which is biometric in nature, and also less time consuming.

**TABLE OF CONTENTS**

Title page.................................................................................................................i

Certification.............................................................................................................ii

Dedication...............................................................................................................iii

Acknowledgement..................................................................................................iv

Abstract...................................................................................................................v

Table of contents....................................................................................................vi

List of figures………………………………………………………………………………….…………………….x

**CHAPTER ONE: INTRODUCTION**

* 1. Background of study.......................................................................................1
	2. Statement of problem....................................................................................3
	3. Objectives of study.........................................................................................6
	4. Significance of the project..............................................................................6
	5. Project scope..................................................................................................6
	6. Constraints.....................................................................................................9
	7. Project report organization............................................................................9
	8. Definition of terms.......................................................................................10

**CHAPTER TWO: LITERATURE REVIEW**

* 1. Concept of Election......................................................................................13
	2. Paper-Ballot Systems....................................................................................14
		1. Challenges of Paper-ballot Voting Systems..................................................15
	3. Electronic Voting System..........................................................................16
		1. Components of E-Voting System………………………………………………………………18
	4. Fingerprint as means of biometric identification........................................20
	5. Minutiae……………………………………………………................................................22
	6. History of fingerprint identification………………...........................................24

**CHAPTER THREE: SYSTEM ANALYSIS AND INVESTIGATION**

* 1. Research Methodology.............................................................................29
		1. Meaning of Methodology.............................................................................29
		2. Method of Data collection............................................................................29
	2. Analysis of the existing system.....................................................................31
		1. Problems of the existing system...................................................................32
		2. Justification of the new system...................................................................33
	3. Organizational structure...............................................................................36
	4. Information Flow chart................................................................................38
	5. Input analysis................................................................................................39
	6. Process analysis............................................................................................40
	7. Output analysis.............................................................................................40

**CHAPTER FOUR: SYSTEM DESIGN, IMPLEMENTATION AND TESTING**

* 1. Meaning of System design.........................................................................42
	2. Objectives of System design.........................................................................42
	3. The Control center…...................................................................................43
	4. . Program design……………..………………………………………….................................43
	5. Database design.....................................................................................45
	6. System specification.....................................................................................54
		1. Hardware requirement.............................................................................54
		2. Software requirement...............................................................................55
	7. Data flow diagram.......................................................................................56
	8. System Algorithm…………………………………………………………………..…………………60
	9. Choice and justification of tools……………………………………………………………….61

**CHAPTER FIVE: SUMMARY, RECOMMENDATION AND CONCLUSION**

* 1. Summary......................................................................................................68
	2. Recommendation.........................................................................................69
	3. Conclusion and future research...................................................................70

References..............................................................................................................72

Appendix A – SAMPLE FORM AND REPORTS.........................................................76

Appendix B – SOURCE CODE...................................................................................85

**CHAPTER ONE**

**INTRODUCTION**

* 1. **BACKGROUND OF STUDY**

 Free, fair and credible elections are central to electoral democracy and provide vital means of empowering voters to hold their leaders accountable. In a multi-party democracy, it behooves both the elected and appointed government officials at all levels of the political system to render periodic account of their stewardship to the populace. However, accountability of election officials in Nigeria has been undermined by the fact that elections in the country are perennially fraught with irregularities. The democratization of politics has been unsuccessful in arresting electoral frauds perpetrated by different political parties and megalomaniac nominees of a particular election. It has also been unable to address the administrative misconduct of officials of Election.

 The prevalence of electoral irregularities in many transitional democracies, especially in Africa, has accentuated the clamor for and use of voting technologies for uncovering and reducing election frauds. According to Golden, Kramon & Ofosu (2014), “these technological solutions, such as electronic voting machines, polling station webcams and biometric identification equipment, offer the promise of rapid, accurate, and ostensibly tamper-proof innovations that are expected to reduce fraud in the processes of registration, voting or vote count aggregation” (p. 1). Biometric identification machines authenticate the identity of voters using biometric markers, such as fingerprints, that are almost impossible to counterfeit. The technologies are particularly useful in settings where governments have not previously established reliable or complete paper-based identification systems for their populations (Gelb & Decker, 2012).

 One of the real issues about the 2015 General Elections in Nigeria was the use of innovative anti-rigging biometric devices. The administration of the elections witnessed the use of Smart Card Reader (SCR) for the authentication of biometric Permanent Voters‟ Cards (PVCs) and the accreditation of voters. The introduction of these devices was necessitated by the fact that reliable voter register and identification mechanism are some of the preconditions for free, fair and credible elections. However, the legality of the device was questioned. Although Section 52 of the Electoral Act, 2010 (as amended) proscribes electronic voting (e-voting), the SCR is a form of identification, not a means of casting a ballot. The use of the SCR in some quarters experienced glitches in its functionality, thereby leading to manual accreditation of some voters. This attracted negative reactions which consequently fuelled the erroneous conclusion that the Nigerian electoral system is not ripe for the application of such technology. However, it emboldened many disenchanted voters to exercise their franchise because of the assurance and confidence that the new system brought.

* 1. **STATEMENT OF PROBLEM**

At the Enugu State University of Science and Technology, election takes place every year. The Institution can be classified into nine faculties. For the student union election, interested students are required to fill out the aspirant form for the position they wish to apply for. The student is verified by the election officials for eligibility, and after this verification they await election. This electoral procedure involves many processes. The processes involved are listing all eligible aspirants, Voter Registration, Voting, Vote Counting, Collation and Publication of Results.

The Voting is the actual process of casting ballots. An eligible voter goes to the polling station where his name is registered and uses his Student ID card to vote. Firstly, he is issued a ballot paper to cast his vote. In an enclosed space, he selects a candidate of choice on the given ballot paper and thumbprints in a space allotted for that candidate. The voter then carefully folds the ballot paper and deposits it into the ballot box provided. He is then expected to leave the polling center. The processes of Vote counting and publication of results consist of Ballot counting which is done manually and after that the result is published.

The present system of voting whereby the voters go to the voting place to perform their duty and the results are counted and given to students undoubtedly conveys numerous drawbacks given below and which need to be taken into consideration:

* **Counting process is slow**

There are thousands of students at the Institution and assuming that three-quarter of the university population has voted gives rise to a large amount of ballot papers. And counting all of them is a very time consuming process.

* **Errors during the counting process**

It is possible that the counting process contains errors because humans are subjected to errors.

* **High cost**

This type of voting is very expensive as both human and financial resources are involved. ESUT administrative staffs are assigned to look after the proper functioning of the election and it is costly to print ballot papers and counting sheets.

* **Identification Problem**

Corrupt officials tend to use the identity of students that are absent in the voting to cast multiple votes for their favorite candidate.

Therefore, there is a need of an Electronic Biometric Solution providing an effective and efficient voting system, along with an easy document management system and shunning manual system which is quite tedious, time consuming and less efficient and accurate in comparison to the computerized system. There exist no ready-made systems that can meet all the activities involved in the ESUT SUG Voting as requirements are unique and complex which makes use of third party tailored systems difficult to implement.

**Summary of old system problems:**

* Counting process is slow
* Errors during the counting process
* High cost
* Identification Problem
	1. **OBJECTIVES OF STUDY**

The idea of this thesis is to study the processes and activities involved in the Student Union Government Election at Enugu State University of Science and Technology and propose a biometric authentication system as an improved solution to the existing system in order to digitalize their current processes and overcome the current issues faced due to lack of computerized solution.

* 1. **SIGNIFICANCE OF THE PROJECT**

The significant of this project is the designing of a robust and secured application for Windows Based Systems using modern programming language and tools to demonstrate some functionality of a Biometric Voting system like integrity, confidentiality, voter’s identification, reduction of time and stress at the lowest possible cost.

* 1. **PROJECT SCOPE**

This project is purposely designed for the Student Union Government election in Enugu State University of Science and Technology to overcome the problem of illegal activities during election, by making sure only eligible voters have access to the system, immediately outputting the results of the election, and ensuring that voters have trust in the process of election. However, this system can be extended to other electoral system with little or no modifications. The system must also meet the below listed requirements:

* It must be easy for an individual to register to vote.
* An individual must identify themselves, in some way, in order to register.
* Prior to voting a voter may check his registration status.
* A voter may register to vote on the day of the election.
* The voter must identify themselves, in some way, in order to vote.
* The process of casting a ballot should accommodate disabled voters.
* Record the selection of individual vote choices for each contest.
* Indicate that a selection has been made or canceled.
* Notify the voter when the voting is completed.
* Before the ballot is cast, the voter is allowed to review his choices and, if he desires, to delete or change his choices before the ballot is cast.
* Prevent the voter from over-voting.
* Notify the voter after the vote has been stored successfully that the ballot has been cast.
* Tallying the Ballots
* An individual not registered to vote must not be able to cast a ballot.
* A voter must not be able to vote more than once.
* The privacy of the vote has to be guaranteed during the casting, transfer, reception, collection, and tabulation of votes.
* No voter should be able to prove that they voted in a certain way.
* None of the participants involved in the voting process (organizers, election officials, trusted third parties, voters, etc.) should be able to link a vote to an identifiable voter.
* Each vote is recorded precisely as the voter intended.
* Each voter is ensured a "clean slate" of the system to ensure equality, confidence, and minimize system tampering.
* The outcome of the voting process must correspond to the votes cast.
* It should be infeasible to exclude a valid vote from the tabulation, and to validate a non-valid one.
* System and voter operations are logged and audited.
* The system cannot be re-configured during operation.
* Access to voted ballots is prohibited until after the close of the polls.
* Additional ballots cannot be cast once the polling place has closed.
* The system must be open to independent inspection and auditing.
* The system is protected against accidental and malicious denial of service attacks.
	1. **CONSTRAINTS**

Despite all the significance of this project, it is also subjected to some limitations, which includes the fact that it’s a desktop application, it cannot be used by the citizens at their convenience but has to come to the pull for the election, and only a fingerprint reader from Digital persona Inc. can be used for the enrollment and verification of user to the system.

* 1. **PROJECT REPORT ORGANIZATION**

This project thesis on “Design and Implementation of a Biometric Voting System” is organized from chapter one to chapter five.

Chapter one is the introduction which covers Background of study, Statement of Problem, Objectives of Study, Significant of the project, Project scope, Constraint, Project report organization, and Definition of terms.

Chapter two reviewed the literature emphasizing on the concept of Biometric Voting system.

Chapter three analyzed the system explaining in details the definition of the problems, methods of data collection, interviewing, Observation, Evaluation of forms, program structure.

In chapter four, the system implementation, Justification of programming Language, system control, System Requirement, Software requirement and file conversion was discussed.

 Finally, chapter five summarized the system achievement, concluded the entire work and made necessary recommendations for further improvement on the system.

* 1. **DEFINITION OF TERMS**

**Computer:** An electronic device which is capable of receiving information (data) and performing a sequence of logical operations in accordance with a predetermined but variable set of procedural instructions (program) to produce a result in the form of information or signals.

**System:** A set of things working together as a mechanism or interconnecting network.

**Biometric:** The application of statistical analysis to biological data.

**Management:** The process of managing

**Database:** A structured set of data held in a computer.

**Data:** The quantities, characters, or symbols on which operations are performed by a computer.

**Network:** A group or system of interconnected people or things.

**Password:** A secret word or phrase used to gain admission or access to something.

**Design**: The purpose or planning that exists behind an action or object.

**Integration:** The action or process of integrating.

**Entity:** A thing with a distinct and independent existence.

**Application:** A program or piece of software designed to fulfill a particular purpose.

**Student:** A person studying at a university or other place of education.

**Institution:** A large organization founded for a particular purpose, such as a college, bank, etc.

**University:** A high-level educational institution in which students study for degrees and academic research is done.

**Fingerprint:** A mark made on a surface by a person's fingertip, able to be used for identification from the unique pattern of lines.

 **Election:** A formal procedure whereby a person is elected, especially to a political office.

**Aspirant:** A person who has aspirations to succeed in something.

**Vote:** A formal indication of a choice between two or more candidates or courses of action, expressed typically through a ballot or a show of hands

**Ballot:** A procedure by which people vote secretly on an issue.