

BUSITEMA UNIVERSITY

FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER ENGINEERING

Bachelor of Computer Engineering

DESIGN AND IMPLEMENTATION OF AN ATM SYSTEM USING DOUBLE AUTHENTICATION

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A final year project report submitted to the Department of Computer Engineering in fulfillment of the requirement for the Award of the Degree of Bachelor of Computer Engineering of Busitema University.

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DECLARATION

This Project report is my original work and has not been presented for a degree in any other University or any other award.

Signature

Date.....

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APPROVAL

I certify that this project report has been drafted under my supervision and is submitted to the board of examiners with my approval.

Signature

Mr. Gilbert.G.Ocen

Date.....

DEDICATION

I dedicate this work to my beloved father Manana Estia and all my siblings. I love you all!

ACKNOWLEDGEMENT

First and foremost, I extend my sincere and inexplicable gratitude to the almighty God who enabled me to contrive through all the challenges up to this time.

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LIST OF ACRONYMS

ATM	Automated Teller Machine
CPU	Central Processing Unit
DMA	Direct Memory Access
GPU	Graphical Processing Unit
LCD	Liquid Crystalline Display
MB	Mega Byte
MHz	Mega Hertz
OS	Out of Service
PCB	Printed Circuit Board
PIN	Personal Identification Number
SC	Serving Customer
SD card	Secure Digital Card
UI	User Interface
UML	Unified Modeling Language
USB	Universal Serial Bus
VG	Video Graphics

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ABSTRACT

An Automated teller machine is a real-time front terminal of automatic teller services with the support of a central bank server and a centralized account database. An electronic banking outlet, which allows customers to complete basic transactions without the aid of a branch representative or teller. However because of several factors like high level of unemployment within the country today, malicious users try to forge away out to survive through the use of all theft means to acquire the PIN and customer credit card so as to withdraw money from users' accounts without their consent. A solution is the use of a double authentication ATM that uses a PIN and fingerprint for validation before any transaction can be performed on an ATM machine. This system in attempt will reduce on fraud as it is not easy to forge a finger print. In gathering the information, consultations and document reviews concerning the existing ATM systems and their corresponding subsystems responsible for detecting and notifying malicious cases were used. It was from the analysis of the gathered information that the developing of an ATM machine using double authentication system kicked-off. I designed the system in Protius ISIS software and wrote a code using sublime text editor which linked the database to the Raspberry pi and this provided me with the basic picture on how the system was to work and be integrated from its constituent subparts. The components of the system were tested prior to system testing. The functionality of the system was under the control of the algorithm/code that was written on the raspberry pi. The system was finally subjected to system testing to validate and verify its working by me and some of my other classmates before presenting to Busitema University.

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CHAPTER ONE

INTRODUCTION

1.1 Background

Many ATM systems are secure only when the ATM card is in the hands, which is not always the case. The procedures you go through before getting a new card and pin like going to the police to get a letter and going to the bank to prove that you are the owner of the account are tiring and inconveniencing. In addition, it too inconveniencing when one needs to access a bank account but cannot because of having no ATM card even though they are the owners of the account so there is need to increase convenience of the ATM system while increasing the security level also. [1]

Davies et al (1984), Automated Teller Machines were first used in 1939. Nowadays, about 1.5 million are installed worldwide. In the consideration of ATM, there are different aspects that should be considered. First, one has to have an idea about the communication within ATMs. Second, the issue of security is of paramount importance because all over the world, there is an increasing use of ATMs and so the risks of hacking turn to be a reality more than ever before. In the past, the function of ATMs was to deliver cash in the form of bank notes and to debit a corresponding bank account. Cards were used to identify the user. As for the withdrawal of money, different methods were used. For instance, punched cards were used. By the use of such cards, only one payment was authorized. Thereby, a user had to get a supply of cards from his/her bank because the punched cards were not returned to the user. Another example was the use of a magnetic card that had a limited life. The use of such cards allowed; for instance, twenty withdrawals of money. From the beginning, personal identification number (PIN) has been of very great importance in the overall operation. The use of it has been done with the aim to decrease the risks that might result from the loss of cards and the misuses that might be connected to that. But the use of biometric authentication provides better security.

According ancient Greek scripts BIOMETRICS means study of life. Biometrics studies commonly include fingerprint, face, iris, voice, signature, and hand geometry recognition and verification. Many other modalities are in various stages of development and

assessment. Among these available biometric traits Finger Print proves to be one of the best traits providing good mismatch ratio and also reliable [2]

Biometric authentication is an automated method whereby an individual's identity is confirmed by examining a unique physiological trait or behavioral characteristic, such as a fingerprint, iris, retina, or signature. Physiological traits are stable physical characteristics, such as fingerprints, palm prints and iris patterns. This type of measurement is essentially unalterable.

Biometric authentication has advantages like No more forgotten passwords, lost cards or stolen pins. You are your own password, Positive Identification-It identifies you and not what you have or what you carry, highest level of security, Offers mobility, Impossible to forge, serves as a “Key” that cannot be transferred or coerced, Non-intrusive, Safe & user friendly.

1.2 Problem statement

Currently a person can steal an ATM card and a pin and the customer may be required to pass through many procedures say go to police and get a letter, go and prove to the bank that he/she is the owner of the account in order to get another ATM card and pin. By the time they go through this the malicious users would have caused serious damage to their accounts. This leads to a high risk of both the bank and its customers losing a lot of money. This system shall introduce biometric authentication using a thumbprint to increase security while increasing convenience. This ATM system with access levels shall have all these features.

1.3 Objectives

1.3.1 Main objective

The main objective of this project was;

- To design and implement an ATM system with double authentication using biometric authentication

1.3.2 Specific objectives

The specific objectives were;

- To find out how to secure a customer's account if his/her ATM **card is lost/ stolen and his pin** maliciously accessed.
- To design a database which store user credentials
- To design an ATM system with double authentication using a pin and biometric
- To test whether the designed system meets the specified objectives

1.4 Justification

ATM systems are more important than ever before. Malicious acts on ATM are on rise in many parts of the country due to high levels of unemployment. Therefore there is need to develop a more secure ATM system to avoid loss of money from banks and reduce on fraud.

1.5 Scope of the project

Financial institutes like banks in Uganda particularly centenary bank shall use this system. This system shall deal with information pertaining finances and their security. In addition, this system shall cater for security and convenience mostly.

This system included use of a fingerprint, a pin, and ATM card. This project started in January 2015 to May 2016.

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