



AN EMBEDDED ATM SECURITY DESIGN USING ARM PROCESSOR WITH FINGERPRINT RECOGNITION AND GSM

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ABSTRACT: One noticeable dividend of the adoption and use of Automated Teller Machine (ATM) by Nigerian banks dating back to the early 1990s is the ease of access to cash by bank customers. However, incidences of ATM frauds has emerged as a limiting factor resulting in a decline adoption for transacting banking businesses. Fraudsters now employ different means to hunt for user's Personal Identification Numbers (PIN) in order to defraud unsuspecting customers. Existing measures adopted by financial institutions require ATM card holders to optionally subscribe to financial transactions message alerts through Short Message Services (SMS) (debit and credit transactions) and the use of posters pasted in banking halls to warn customers on the need to protect PIN numbers from unauthorized users. These measures are purely informative and do not adequately deal with the problems in real time. In this paper, we introduce a Real Time Instructive SMS-Based scheme called MophTem scheme which compels all customers to subscribe to SMS alerts as a basis for initiating transactions on their account. The bank generates a hash code using the customer PIN number and phone number. The generated hash key is then used to decrypt messages requesting for transactions from the customer. The intention is to provide additional security layer and fortify existing PIN access thus safeguarding customer accounts and account information

Keywords: *Microcontroller, Buzzer, Finger Print Module, Gsm*

INTRODUCTION

The advent of the mobile revolution has given birth to a new e-culture characterized by e-Banking, e-Payment, eLearning, e-Passport, e-Immigration, e-Government etc and has brought technology to the doorsteps of many like never before. Digitalization is fast becoming a way of life with the Nigerian people. The protection of data and systems in networks that are connected to the Internet has continued to arbitrary images are made up of a large number of small

pose serious challenges to individuals, firms and governments in recent times as scammers have perfected their game in the battle to fleece people off their hard earned money. Though technology brings growth and development, it also enables fraudulent practices. Information Technology (IT) promotes convenience and it is this very characteristic that is being used to aid and abet crime. Since the introduction and adoption of Automated Teller Machine (ATM) by Nigerian banks dating back to the early 1990s, customers have enjoyed easy access to cash even outside conventional banking hours. However, incidences of ATM fraud have emerged as a limiting factor resulting in a decline in customer confidence and the use of ATM cards as a means of transacting banking businesses.

I. The Hardware System

Micro controller: This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM7TDMI: ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

Liquid-crystal display (LCD) is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that

pixels, while other displays have larger elements.

II. Design of Proposed Hardware System

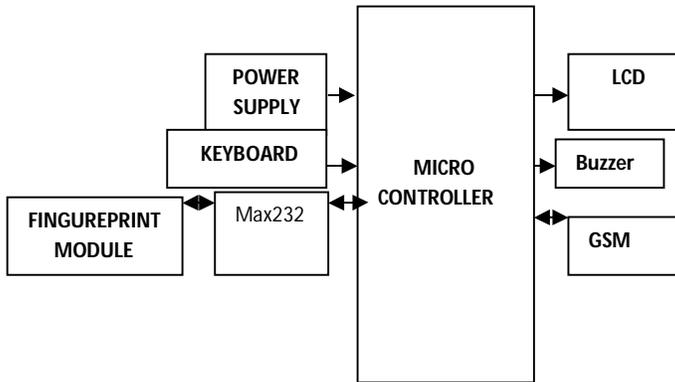


Fig.1. Block Diagram

Nowadays, using the ATM (Automatic Teller Machine) which provide customers with the convenient banknote trading is very common. However, the financial crime case rises repeatedly in recent years; a lot of criminals tamper with the ATM terminal and steal user's credit card and password by illegal means. Once user's bank card is lost and the password is stolen, the criminal will draw all cash in the shortest time, which will bring enormous financial losses to customer. How to carry on the valid identity to the customer becomes the focus in current financial circle. Traditional ATM systems authenticate generally by using the credit card and the password, the method has some defects. Using credit card and password cannot verify the client's identity exactly. In recent years, the algorithm that the fingerprint recognition continuously updated, which has offered new verification means for us, the original password authentication method combined with the biometric identification technology verify the clients' identity better and achieve the purpose that use of ATM machines improve the safety effectively. By using sms in this project we send messages in real time and we can do the secure data which is visibility to the user only. Further the transactions will be in secured

The embedded ATM client authentication system is based on fingerprint recognition which is designed after analyzed existed ATM system. The S3C2440 chip is used as the core of this embedded system which is associated with the technologies of fingerprint recognition and current high speed network communication.

III .Board Hardware Resources Features

BUZZER

The "Piezoelectric sound components" introduced herein operate on an innovative principle utilizing natural

oscillation of piezoelectric ceramics. These buzzers are offered in lightweight compact sizes from the smallest diameter of 12mm to large Piezo electric sounders. Today, piezoelectric sound components are used in many ways such as home appliances, OA equipment, audio equipment telephones, etc. And they are applied widely, for example, in alarms, speakers, telephone ringers, receivers, transmitters, beep sounds, etc.



GSM

An embedded system is a special-purpose system in which the computer is completely encapsulated by or dedicated to the device or system it controls. Unlike a general-purpose computer, such as a personal computer, an embedded system performs one or a few pre-defined tasks, usually with very specific requirements. Since the system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product. Embedded systems are often mass-produced, benefiting from economies of scale. Global System for Mobile Communication (GSM) is a set of ETSI standards specifying the infrastructure for a digital cellular service. The standard is used in approx. 85 countries in the world including such locations as Europe, Japan and Australia¹.

When a mobile subscriber roams into a new location area (new VLR), the VLR automatically determines that it must update the HLR with the new location information, which it does using an SS7 Location Update Request Message. The Location Update Message is routed to the HLR through the SS7 network, based on the global title translation of the IMSI that is stored within the SCCP Called Party Address portion of the message. The HLR responds with a message that informs the VLR whether the subscriber should be provided service in the new location.

FINER PRINT MODULE



A fingerprint in its narrow sense is an impression left by the friction ridges of a human [finger](#). In a wider use of the term, fingerprints are the traces of an impression from the friction ridges of any part of a human or other [primate hand](#). A print from the [foot](#) can also leave an impression of friction ridges. A friction ridge is a raised portion of the [epidermis](#) on the fingers and [toes](#) (digits), the palm of the hand or the [sole](#) of the foot, consisting of one or more connected ridge units of friction ridge skin. These are sometimes known as "epidermal ridges" which are caused by the underlying interface between the dermal [papillae](#) of the dermis and the interpapillary (rete) pegs of the epidermis. These epidermal ridges serve to amplify [vibrations](#) triggered, for example, when fingertips brush across an uneven surface, better transmitting the signals to [sensory nerves](#) involved in fine texture perception. These ridges also assist in gripping rough surfaces, as well as smooth wet surfaces.

Impressions of fingerprints may be left behind on a surface by the natural secretions of sweat from the [eccrine glands](#) that are present in friction ridge skin, or they may be made by ink or other substances transferred from the peaks of friction ridges on the skin to a relatively smooth surface such as a fingerprint card. Fingerprint records normally contain impressions from the pad on the last joint of fingers and thumbs, although fingerprint cards also typically record portions of lower joint areas of the fingers.

CONCLUSION

The health of our financial industry is vital to the economy of Nigeria. The economy of any country rotates around its financial management and welfare. The Nigerian Government, financial institutions and CBN ought to be more proactive about the financial management of Nigeria by investing in modern technology and human resources to implement 21st century financial tools in Nigeria and not when the technology has become obsolete in Europe, America and parts of Asia. This will help in minimizing ATM fraud in Nigeria. Through the use of MophTem scheme an additional layer means that the scammer needs to have sent an initial text using mobile phone which is unique to user. This scheme will become more secure as the federal government is moving in the direction of registering every SIM card with the biometric features of the user. Moreover, as an industry, Nigeria is moving towards a more secure 'Chip and PIN'. The 'Chip and PIN' stores data on the chip of the card rather than the magnetic strip of the card. This chip is similar to the Chip used for mobile SIM card and is more

difficult to 'clone'. This is the standard that the entire financial industry is moving towards. We believe that by providing a wide range of services at the ATM which has MophTem scheme, depositors and customers can conveniently carry out banking transactions round the clock confidence. Certainly, a winning business case based on return on investment (ROI) can be made by investing in using MophTem scheme to secure ATM transactions. We think with customers' confidence in ATM transaction ROI will certainly soar upwards.

REFERENCES

- [1] E. Nkanga, "Combating Cyber Crime Menace in Nigeria", 16 April 2008, THIS DAY Newspaper in Nigeria.
- [2] I. Oguntoye, "Bolstering Scammers", The News magazine, October 20, 2008, pp. 62-63.
- [3] M. S. Odapu, "Cyber Crime - Time to Stop County's Dominance", 6 September 2008, Daily Trust newspaper in Nigeria.
- [4] E. Aginam, "Cybercrime Can Wipe Out Development Gains of a Nation – Experts", 4 March 2009, Vanguard newspaper in Nigeria.
- [5] Y. Ishola, "ATM fraud: What safeguard for bank customers?" <http://sunday.dailytrust.com/>
- [6] T. Ogunseye, "N10m ATM fraud lands female banks in court. Sunday Punch 10/01/2010, p. 2.
- [7] B. Olaleye, "HEARTACHES OF ATM" Daily Sun, Tuesday 2/3/2010, pp. 45.
- [8] G. Oni-Orisan, "Nigerian ATM Card Holders And Their Bankers" <http://www.nigeriavillagesquare.com>, Thursday 24 June 2010.
- [9] F. Ayodele, "Automated Theft Machine: Crook intensity their fleece of bank account holders through the Automated Teller Machine" the News magazine. Vol. 34, no. 3, 2010, pp. 39-40.
- [10] F. Balogun, "Automated Problems", The News February 18, 2008, vol. 30 no. 06, pp. 46-48.



[11] <http://www.matasano.com/> ATM Backdoor why is no one talking about this.

[12] <http://www.mydigitallife.info> (2006). ATM Hacking and Cracking to Steal Money with ATM Backdoor Default Master Password

[13] N. A. Azeez, A.R. Ajetola, B.A. Sulaimon, and F.A. Atanda, "Framework from Computer Aided Investigation of ATM Fraud in Nigeria". Pacific Journal of Science and Technology. Vol. 11 no: 1, 2010, pp.356-361.

[14] R. Simutis, D. Dilionas and L. Bastina, "Enhanced Supervision of Automatic Teller Machines via Auto associative Neural Networks", The 8TH International Conference on "Applied Stochastic Models and Data Analysis" (ASMDA-2009), pp. 450-454.

[15] M. Lounce, "All you need to know to ensure Safe and Secure ATM Transactions" Africa's Global Bank, www.ubagroup.com, pp. 1-3.

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