



Security Enhancement of ATM System with Fingerprint and DNA Data

B V Prasanthi*, U Padma Jyothi, Sridevi Bonthu, T Vamsi Krishna

Department of CSE, Vishnu Institute of Technology,
Andhra Pradesh, India

Abstract— *As the days passes, wide range of security flaws have been increased and at the same time security concerns in user identification and authentication has also increased and grabbed a prominent role in banking sector. This paper presents a high secure system that increases the ATM security. In this scenario no need to remember the passwords and the reference DNA data will be digitized and converted to barcode by using barcode generator, which is stored back of ATM card. This invention can identify the proper user of the ATM card by collating the measured DNA data and fingerprint captured by fingerprint scanner. We can get rid off many financial losses and illegal attacks.*

Keywords— *ATM , Fingerprint, Authentication, DNA barcode generator*

I. INTRODUCTION

As we all know that over the past 3 decades, customers have been mostly looking on and trust ATM Machine, called ATM machine to handily meet their banking needs. Using an ATM, customers will access their bank accounts so as to create money withdrawals, debit card cash advances, and check their account balances further as purchase post-paid telephone credit and many more. Most ATMs are connected to interbank networks, sanctioning individuals to withdraw and deposit cash from Ernst Machines not belonging to bank wherever they have their accounts or within the countries wherever their account are held. Despite the many benefits of ATM system, ATM fraud has recently become a lot of widespread. Fraud technique like card skimming, shoulders surfing etc has been ascertained recently. So as to extend the amount of security in ATM system, use of biometric technique and DNA barcode [13] helps for easy verification. Biometrics will be outlined as a measurable physiological and behavioural characteristic that may be subsequently compared and captured with another instance at the time of verification. These technologies area unit a secure means of authentication as a result of information of each method are distinctive, cannot be shared, cannot be traced and can't be unnoticed.

DNA is known as DNA profiling [8, 12], or identity testing, in genetics science, method of isolating and identifying variable components within the base-pair sequence of DNA (deoxyribonucleic acid). This method is developed in 1984 by British bio gist Alec Jeffreys, he noticed that certain sequences of highly variable DNA [9] (known as minisatellites), which may not contribute to the functions of genes, are repeated within genes. Jeffreys recognized that every individual encompasses a distinct pattern of minisatellites (the only exceptions being multiple individuals from a single zygote, such as identical twins).The procedure for conducting a DNA identity test consists a sample of cells, such as skin, hair or blood cells, which contain DNA. The DNA is extracted from the cells and purified.DNA bar coding [13] is an exciting new tool for taxonomic research. The DNA barcode is a very short, standardized DNA sequence in a well-known gene. It provides a simplest way to find the species to which a plant, animal or fungus belongs. The Consortium for the Barcode of Life (CBOL) is promoting international partnerships that will make people in all countries to better understand and protect their diversity.Barcoding is generating a worldwide, open access library of reference barcode sequences that allows non-taxonomists to identify specimens. The barcode of an unidentified specimen are often compared with the reference barcodes to find the matching species.Barcoding projects have already generated hundreds of thousands of reference barcodes for tens of thousands of species. These species have been selected because they are of special interest to users who need the ability to identify species of scientific, economic, or social importance. The Consortium for the Barcode of Life is creating partnerships among government agencies, local researchers, and NGOs that design and implement the highest priority bar coding projects. The DNA barcode of an unidentified specimen can be read using standard gene sequencing techniques. DNA bar coding [13] includes three types of methods.

- 1) *Working with organisms*: grouping, distinctive, and protective voucher specimens in secure repositories
- 2) *Laboratory procedures*: Sampling and processing tissue from specimens to obtain DNA barcode gene sequences
- 3) *Managing data*: Sharing the DNA barcode sequence and data regarding its voucher specimen in a public database.

A biometric system can be either an 'identification' system or a 'verification' (authentication) system, which are defined below.

Identification: Biometrics can be used to determine a person's identity even without his awareness or approval.

Verification: Biometrics can also be used to verify a person's identity.

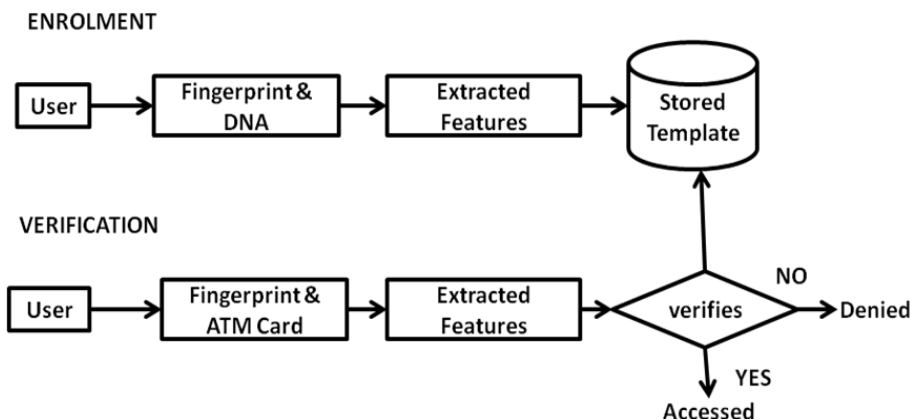


Fig.1 General Biometric System

In the above Fig 1 while during the enrolment the user has give his or her fingerprints along with their DNA samples. Some of the features are extracted and stored as Template which is verified at verification phase.

II. RELATED WORK

As there are problems in identifying the fingerprints of users in accessing ATM System, a new method is proposed in which normal fingerprint scanner add-ons to DNA barcode generator. At very first the users have to give his or her fingerprint impressions generated by fingerprint scanner and DNA samples while opening the account in the bank. Sampling and processing has been done on DNA samples and finally they are converted to barcode by using DNA barcode generator. The obtained barcode is attached on the back of individuals ATM card. While processing with the ATM, the fingerprint scanner has to be attached with the ATM terminal. When the user inserts his or her ATM card, and then places their finger on fingerprint scanner which captures the impression of fingerprint. The DNA barcode which is present on the back of ATM is scanned. The impression of finger and DNA barcode are taken as input and some of the features are extracted and stored as template. This template verifies with the stored database at bank.

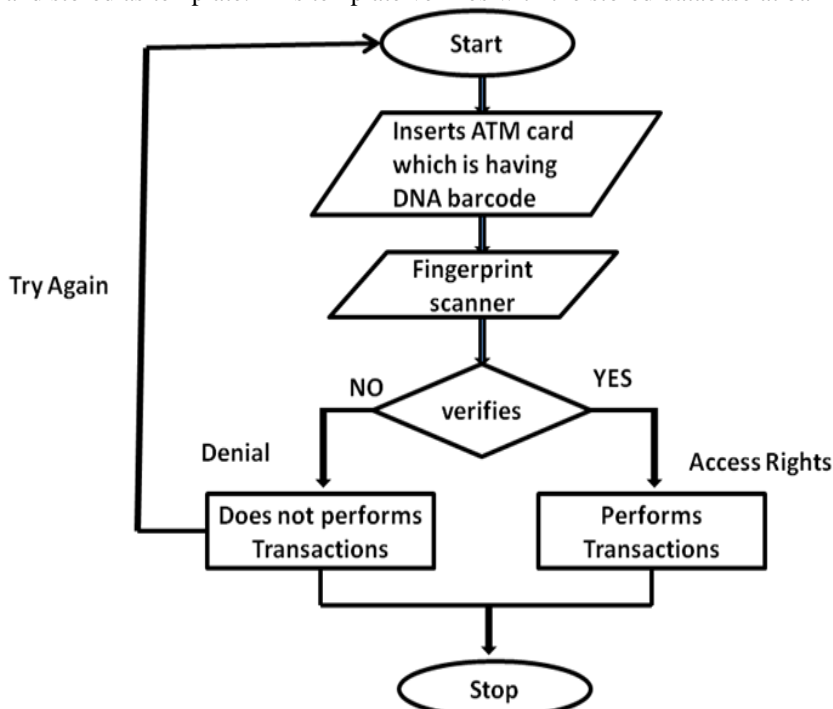


Fig .2 Architecture of Proposed ATM Security

If match occurs, the user has given access rights to perform transactions. If match does not occur, the user has no access rights to perform transactions. The transaction has been denied.

III. BENEFITS OF THE PROPOSED WORK

The combination of finger print and DNA data gives more accurate and precise results than existing methods as ATM access with fingerprint and GSM [6], ATM access with multi modal biometrics [4], etc. It is used for fast and accurate authentication. It is used as evidence in many applications in computer forensics. It cannot be copied or forged. DNA evidence is key to the conviction or exoneration of suspects of various types of crime. Even this method can be used in performing E-transactions and identification of users in many applications.

IV. CONCLUSIONS AND FUTURE WORK

The growth in the electronic transaction has resulted in greater demand for accurate and fast user identification and authentication. Biometrics refers to the automatic recognition of a person based on physiological and behavioural characteristics. The main reason for introducing biometrics system is to increase overall security. It offers greater security and convenience than traditional methods. The combination of DNA barcode and fingerprint biometric authentication method is very effective in protecting information and it can be a resource in a large area of applications. Security issues related to previous methods can be solved using this technique.

In this paper DNA identifying test is time taking process, but it is a unique identification test that no one can forge it or copy it. The authentication method provided to ATM system will be extended in future to minimize the time consumed than the proposed one.

REFERENCES

- [1] Das SS, and Jhunu D (2011) *Designing a Biometric Strategy (Fingerprint) Measure for Enhancing ATM Security in Indian E-Banking System*. International Journal of Information and Communication Technology Research 197-203.
- [2] Santhi B, and Kumar RK (2012) *Novel Hybrid Technology in ATM Security Using Biometrics*. *Journal of Theoretical and Applied Information Technology* 37: 217-223
- [3] Ibiyemi T. S, Obaje S. E, and Badejo J (2012) *Development of Iris and Fingerprint Biometric Authenticated Smart ATM Device & Card*. 24th National Conference of the Nigeria Computer Society (NCS).
- [4] Mali P, Salunke S, Mane R, and Khatavkar P (2012) *Multilevel ATM Security Based On Two Factor Biometrics*. *IJERT* 1: 8.
- [5] Abayomi-Alli A., Omidiora E. O., Olabiyisi E.O., and Ojo J. A. (2012) *Enhanced E-Banking System with Match-On-Card Fingerprint Authentication and Multi-Account ATM Card*. The Journal of Computer Science and Its Applications, An International Journal of the Computer Society of Nigeria (NCS), Vol. 19, No. 2 December, 2012
- [6] Pennam Krishnamurthy & M. Maddhusudhan Reddy, "Implementation of ATM Security by Using Fingerprint recognition and GSM" International Journal of Electronics Communication and Computer Engineering Volume 3, Issue (1) NCRCTCST, ISSN 2249-071X, 2012.
- [7] Mr. John Mashurano & Mr. Wang liqiang "ATM Systems Authentication Based On Fingerprint Using ARM Cortex-M3" International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181 Vol.2 Issue 3, March – 2013.
- [8] J.M. Butler, *Forensic DNA Typing. Biology, Technology and Genetics of STR Markers*, 2nd ed., Elsevier Academic Press, Burlington, 2005.
- [9] A.J. Jeffreys, V. Wilson, S.L. Thein, *Individual-specific 'fingerprints' of human DNA*, *Nature* 316 (1985) 76-79.
- [10] M.A. Jobling, P. Gill, *Encoded evidence: DNA in forensic analysis*, *Nat. Rev. Genet.* 5(2004) 739-751.
- [11] N. Morling, *Forensic genetics*, *Lancet* 364 (Suppl. 1) (2004) s10-s11.
- [12] M. Lynch, *God's signature: DNA profiling, the new gold standard in forensic science*, *Endeavour* 27 (2003) 93-97.
- [13] DNA barcoding- URL: <http://www.dnabarcoding101.org/bioinformatics.html>