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Proposed Algorithm for Secured Transaction using 3-Tier Architecture

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***Abstract*—** A Greater demands for fast and accurate user identification and authentication in electronic transaction increases day by day. Continuous development of technology, Security involvements are also increasing. ATM helps in a transaction of money any time & anywhere, faces the threat of attack, fraud, theft, etc., thus to deal with high security which provides safety to consumers, Authentication plays an important role. A new system approach for enhancing security and privacy in biometric applications like face detection, IRIS scan, fingerprint, voice, signature, etc. In this biometric system card-less operation done by biometric technology for operating ATMs. Proposed model provide high security in authentication which protects from illegal transactions. By this user required to authenticate him/her self with biometric identification and personal identification number. This proposed system is designed for illiterate, semi-literate and literate people. System decreases complexity with authentication as "you as Security" with high security. It reduces the problem of an excess number of plastic cards & saves environmental pollution. It saves time, cost, effort compared with a card-based system.

***Keywords*—** Automatic Teller Machine, Biometric, Fingerprint, IRIS, Personal Identification Number, Smartcards

I. INTRODUCTION

ATM stands for Automated Teller Machine which invented by John Shep-phardbaren on June 1967 at Barclays Bank in Enfield, U.K.[21]. It's an electronic telecommunication device which is also called cash machine in which customer perform financial transactions without the need for a cashier. ATM requires user authentication for any transaction. Currently customers use's smartcard for the transaction which can be lost, duplicated, stolen or impersonated with accuracy [16]. Over the last thirty years, people are massive using & have been depended on smartcards for their money transaction. In this proposed system increase the security in ATM machine by integrating the fingerprints & IRIS recognition technique.

Evolution in ATM system over the years has been vast. Authentication, validation, and verification of a user or customer are the ultimate priority and should be deal with care. The first thing that should be kept in mind is the authenticity, confidentiality & security of the customer. In proposed system enhance the security of ATM for the safer transaction in which some authentication test has been passed before carrying out any transaction. The problems faced by customers that ATMs refuse to read or accept the card, misuse of duplicate cards, card stolen etc.

Biometrics plays the main role in ATM system in which electronic transactions increased enormously and customer demand for fast and accurate identification and authentication. The growth of security levels increases from PIN to Biometrics [19, 20]. The proposed system is developed to provide the security in ATM system by using high-level biometrics. In traditional ATM system, customer recognition only based on smartcards, passwords, and some identity verification methods which are not genuine. By unique feature or characteristic biometric system provides automatic authentication for any customer. To solving the problem of the traditional system, using a Biological Technology in ATM system for recognizing the customers, some biometric techniques are-

- Face-recognition
- Fingerprint recognition
- Finger geometry
- IRIS recognition
- Hand geometry
- Vein recognition
- Voice
- Signature
- Thermogram-facial
- Keystroke
- Ear & Finger & Face
- Retina
- DNA
- Palm print

By using biometric verification techniques like face recognition, IRIS recognition, Fingerprint, Voice and other

traits improve the security and authentication for the customer. In smart locking, there are three types of recognition techniques classify-

1. IRIS recognition
2. Face recognition
3. Fingerprint recognition

In above recognition technique, IRIS recognition technique has the highest security than to both and no false matches over two million cross-comparisons. Face recognition has low security and only hundred cross-comparisons can be done. Fingerprint recognition has medium security and in this no false matches over thousand cross-comparison. So for enhancing the security proposed a system in which using IRIS and fingerprint recognition for increasing authentication.

This paper organized as follows, Section I contains the introduction of the Proposed Algorithm for Secured Transaction using 3-Tier Architectures, Section II contain the Methodology for Card less Transaction using Biometrics, Section III contain the Proposed Algorithm for Secured Transaction, Section IV contain the Object Oriented Diagram for Secured Transaction, section V explains the Useful Changes by above Methodology, Section VI concludes research work.

II. METHODOLOGY FOR CARDLESS TRANSACTION USING BIOMETRICS

The objective of this study is to propose a system, which is used for customer authentication and cardless transaction done by ATM system. Bankers will collect the 10 fingerprints, 2 IRIS scan, mobile number and other details while opening the accounts then the customer can access the ATM system. To address the issue, the system proposed the use of biometric technology fingerprints and IRIS recognition in automatic teller machine. In the proposed system, access will be authorized simply by means of an enrol user giving their fingerprints, PIN and IRIS scan which is attached to automatic teller machine. There are three methods in the implementation of the proposed system;

1. Physiological method
2. Traditional method
3. Geometrical method

1. Physiological method- In the Physiological method the personal identification done by the fingerprints. Fingerprint recognition is one of the most used biometric technologies and its proven technology to authenticate the customer. In this method first we insert fingerprint if the customer is authorized then system proceed otherwise again it starts.

Fingerprint categorized into 6 categories [12];

i. Arch
ii. Tented Arch
iii. Right Loop
iv. Left Loop
v. Whorl
vi. Twin Loop

Applying to acquire images using the minutiae matching approach there are three steps in fingerprint recognition;

i. Image enhancement
ii. Minutiae extraction
iii. Matching

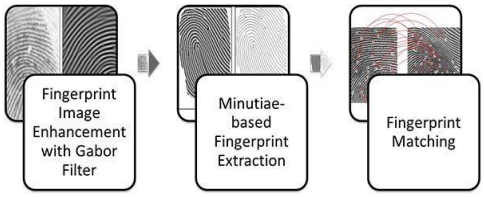

Figure 1- Steps involved in Fingerprint Recognition

2. Traditional method- In Traditional method personal identification number is used for selecting the type of transaction. If the personal identification number is correct then select type of transaction otherwise enter a PIN again in 3 times otherwise end transaction.

3. Geometrical method- In Geometrical method IRIS recognition is used for money transaction. If there is authorized person then transaction done otherwise send the alert message to the account holder and bank.

IRIS pattern is constant throughout the lifetime of a personal and unique to each person [1]. The iris contains a large number of minute details and located between the sclera and pupil boundary that is an annular ring. Multi-scale quadrature wavelets are used to extract the information of the iris [23]. A camera is used to capture the image of iris, that image than passed to localization module that detects the iris portion [2].

The steps involved in IRIS recognition are given below [3];

i. Pupil Detection
ii. Iris Detection
iii. Normalization
iv. Feature Extraction
v. Matching

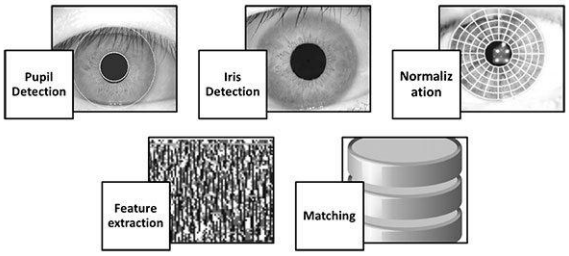

Figure 2- Steps involved in IRIS recognition

III. PROPOSED ALGORITHM FOR SECURED TRANSACTION

In 2009, many biometrics used together to provide security, that biometrics are Face protect, Facial expression, Gender, Signature and Speaker protection [11]. In 2014, Enhancing ATM security using fingerprint and GSM technology in which banker will collect customer's fingerprint and mobile number to authorized customer while transaction [5]. In 2015, Identification number and IRIS recognition are used to avoid usage of so many PIN for a variety of cards for a single person [3]. In 2017, Fingerprint security used with GSM technology in which both types of transaction can be done; it may be with card or without a card [8].

On the basis of above methodology working of the system can be easily defined. In this system Fingerprint recognition, PIN verification and IRIS recognition using for providing highest security for authorized personnel. The proposed system based on the algorithm;

1. Start
2. Scan the Fingerprint
3. Checking Person Authorization then goto step 4 otherwise goto step 2
4. Enter the PIN
5. If correct then goto step 9 otherwise goto step 6
6. You have entered an incorrect PIN
7. More than 3 times PIN entered
8. If yes then Exit otherwise goto step 4
9. Select transaction
10. Enter Amount
11. Scan Iris
12. Checking Person Authorization then goto step 13 otherwise 14
13. Transaction Completed then Exit.
14. Send an alert message to an Account holder then Exit

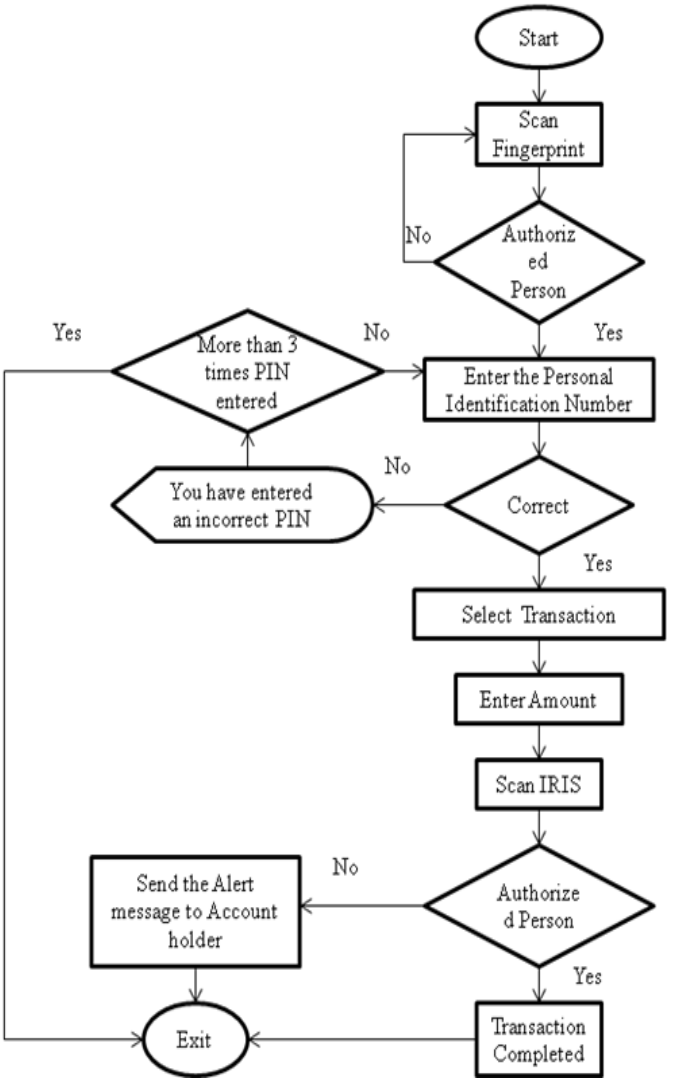

Figure 3- Flowchart of 3-Tier Architecture

IV. OBJECT ORIENTED DIAGRAM FOR SECURED TRANSACTION

Object-oriented design is a software approach in which objects are interacting as a group in a system. In the system, objects represent some entity of interest which being modelled, and it's defined by its class, state, and behaviour. It shows the static structure, dynamic behaviour and run-time deployment of objects of the system. It helps to analyze the functional requirement of the system. Object-oriented analysis define what the system does and Object-oriented design define how the system does it [6].

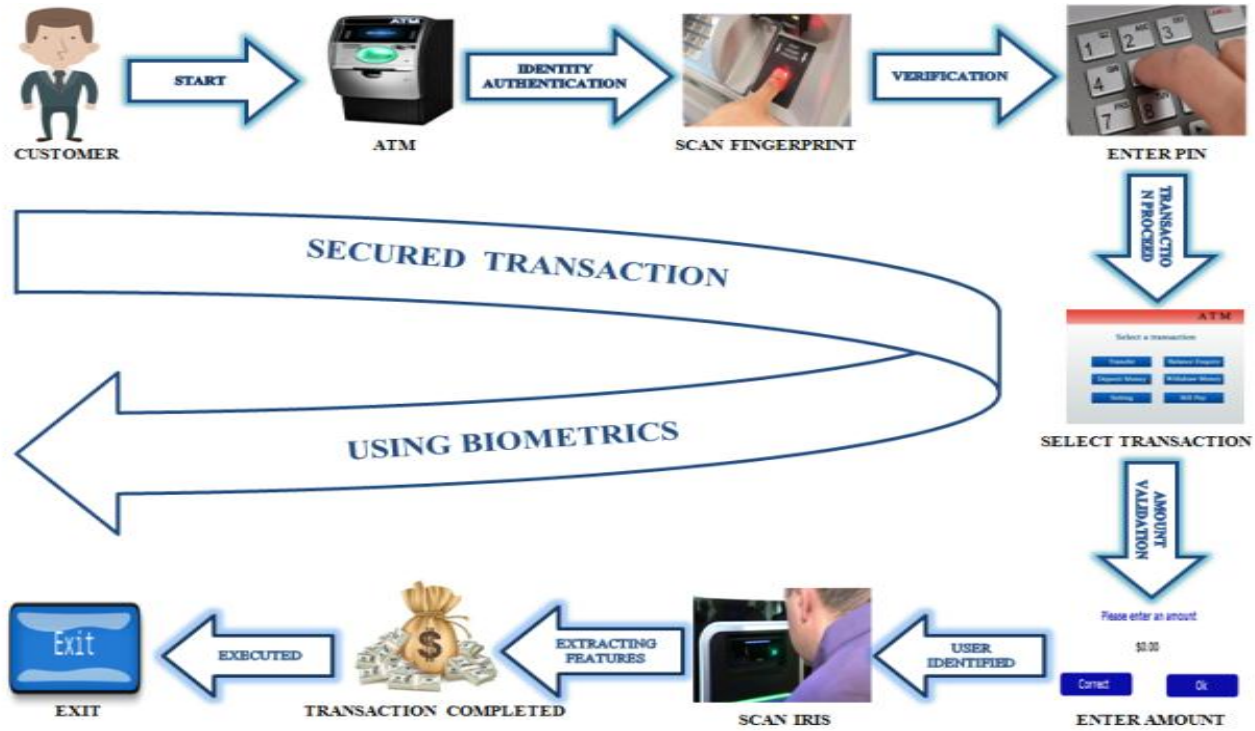

Figure 4- Object Oriented Diagram for Secured Transaction using Biometrics

V. USEFUL CHANGES IN SECURED TRANSACTION BY ABOVE METHODOLOGY

Traditional Automated teller machine systems authorized customer for a transaction by using the credit cards & password, now this system undergoes many changes because this method has some defects. The Traditional system requires only smartcard and password to authenticate the user which can't verify the customer's identity exactly [17, 18].

Since the introduction of ATM, Safety of customer funds in the bank is a most important concern. By smartcard, any person accesses control in ATM and pass an identity test for money transaction. Smartcard is very difficult to prevent another person from attaining and using legitimate person's card, Once this card is lost, stolen, duplicated or impersonated with accuracy and password is traced by illegal means, an Unauthorized person will draw all cash from the bank, so Biometric authentication is used in this system [9].

Increase in biometric features such as fingerprints, face, DNA, IRIS, voice, etc is using for development of ATM system by which fastest access to cash withdrawal, no need of plastic cards, no larger queues in ATM's, and enhance the quality of services [6].

In unimodal biometrics there are many issues like; spoofing, distinctiveness, noise in sensed data, non-universality, lack of individuality, intra-class variations and inter-class variation [10]. To implement face recognition system a large number of the training set is required, so it's complicated. Voice-based access control system is less accurate compared to other biometric systems & misuse of the voice becomes very easy nowadays [3].

In this system biometrics used with PIN number, and fingerprint & IRIS recognition is used for proving security, accuracy, and safety to the customer. Some useful changes are;

- Speedup the process.
- Money transaction easy for the customer.
- Environmentally safe reduce cutting of trees.
- Reduce the misuse of duplicate cards.
- Its highly accurate and comfortable process.
- It increases both privacy and identity security.
- Reduce false matches.
- It handles very large population in high speed.
- It's non-invasive and inherently safe.
- Very low maintenance cost.
- No need to invest on card cost.
- No excuses for card forgetness.
- Safe from a different type of ATM frauds, Physical attack, and software and network attack.
- Increase the reliability and identification quality.

VI. CONCLUSION

Traditional ATM systems based on smartcards by which customer authentication can be done, which is not secure. Millions of transaction happens in a single day through ATM system. Only by smartcard and password customer authentication can't be identified because ATM user's faces my issues related to ATM in day to day life like; chip distortion, card stolen, card misplacement, duplicate cards, card frauds, etc.

There are many frauds that occur in ATM, mainly due to smartcards. SO, this proposed system enhances high security on money transaction & made systems gives us easier access for the less educated person's or illiterate person's. This system not increases the authentication but also help to reduce the complexity to perform money transactions.

To overcome these problems, this system will eliminate completely the problems associated with smartcard access control in ATM. This procedure reduces the false rate and increases the security of biometric recognition system. It does not help customers to fast accessing but also emphasis self-dependence to uneducated and aged people. This system is more users friendly and open to future advancements.

It's highly recommended that the banking sector make the use of this proposed system in ATM because it enhances security and correct authentication in money transaction. In the beginning, the customer must pass fingerprint recognition as the first method of the system, if authorization is done than enter the PIN otherwise process restart. If the PIN is correct than select transaction otherwise enter the number again that is the second method. After that scan the iris, if authorization did than transaction completed otherwise send the altered message to the account holder this is the third method of the ATM system.

REFERENCES

[1]. Sonakshi Bhagat et al, "*ATM Security using Iris Recognition Technology and RFID*", International Journal of Engineering Science and Computing, Vol.7, No.5, pp.11486-11488, May, 2017

[2]. Mr C Raghavendra et al, "*High protection human IRIS authentication in new ATM terminal design using biometrics mechanism*", Journal of Global Research in Computer Science, Vol-3, No.11, pp.16-20, November, 2012

[3]. P. Nagarajan, Dr. Ramesh S M, "*IRIS Recognition Based Authentication System In ATM*", International journal for trends in engineering & technology, Vol-5, No.1, pp.126-131, May, 2015

[4]. Mr. Mahesh A. Patil et al, "*ATM Transaction Using Biometric Fingerprint Technology*", International Journal of Electronics, Communication & Soft Computing Science and Engineering, Vol-2, No.6, pp.22-27

[5]. Ashish M. Jaiswal, Mahip Bartere, "*Enhancing ATM security using fingerprint and GSM technology*", International Journal of Computer Science and Mobile Computing, Vol-3, No.4, pp.28-32, April, 2014

[6]. Prof. Selina Oko, Jane Oruh, "*Enhanced ATM security system using biometrics*", International Journal of Computer Science Issues, Vol-9, No.5, pp.352-357, September, 2012

[7]. Namit Gupta, Anu Sharma, "*Review of biometric technologies used for ATM security*", International Journal of Engineering and Innovative Technology, Vol-3, No.2, pp.460-465, August, 2013

[8]. R. Maheshwri et al, "*Security ATM With Help Of Biometric Security*", International Journal of Electronics and Communication Engineering, pp.47-51, March, 2017

[9]. Moses Okechukwu Onyesolu, Ignatius majestry ezeani, "*ATM Security Using Fingerprint Biometric Identifer: An Investigative Study*", International Journal of Advanced Computer Science and Applications, Vol-3, No.4, pp.68-72, 2012

[10]. N. Geetanjali, K.Thamaraiselvi, "*Enhancing the Security of Biometrics in ATM*", International Journal of Scientific & Engineering Research, Vol-4, No.4, pp.1192-1198, April, 2013

[11]. Parvinder S. Sandhu et al, "*Biometric Methods and Implementation of Algorithms*", International Journal of Computer and Information Engineering, Vol-3, No.4, pp.1033-1038, 2009

[12]. Ayushi Mathur, Mr. Rupal Gupta, "*Analysis of Algorithms used in Biometric using Fingerprint Authentication for 3D Authentication System*", International Conference on Advanced Computing, pp.398-403, 2016

[13]. Abinandhan Chandrasekaran, Dr.Bhavani Thuraisingham, "*Fingerprint Matching Algorithm Based on Tree Comparison using Ratios of Relational Distances*", International Conference on Availability, Reliability and Security, April, 2007

[14]. I. G. Damousis, S. Argyropoulos, "*Four Machine Learning Algorithms for Biometrics Fusion: A Comparative Study*", Applied Computational Intelligence and Soft Computing, 2011

[15]. Roaya Salhalden A. Abdalrahman et. al., "*A cascaded voice biometric system*", Procedia Computer Science, pp.1223–1228, 2018

[16]. Mithun Dutta et. al., "*ATM Transaction Security Using Fingerprint Recognition*", American Journal of Engineering Research, Vol-6, No.8, pp.41-45, 2017

[17]. Nisha Bhanushali et. al., "*Fingerprint based ATM system*", Journal for Research, Vol-2, No.12, pp.31-34, February, 2017

[18]. Sneha Ramrakhyani et. al, "*Fingerprint Based ATM System: Survey*", International Journal of Innovative Research in Science, Engineering and Technology, Vol-6, No.11, pp.21515-21520, November, 2017

[19]. Paschal A. Ochang and Paulinus O. Ofem, "*An Enhanced Automated Teller Machine Security Prototype using Fingerprint Biometric Authentication*", International Journal of Advanced Networking and Applications, Vol-8, No.4, pp-3110-3117, 2017

[20]. Reshma Begum et. al., "*Security of ATM System Using Biometric and OTP*", International Journal of Innovative Research in Computer and Communication Engineering, Vol-5, No.4, pp.72-77, June, 2017

[21]. Aneesh Chandran et. al., "*ATM for Visually Challenged People*", International Research Journal of Engineering and Technology, Vol-4, No.3, pp.370-375, March, 2017

[22]. Ankit Singla and Neetu Jain, "*Fraud Reduction in ATM Machines using Voice Recognition- A Review*", International Journal of Innovative Research in Science, Engineering and Technology, Vol-6, No.5, pp.7525-7530, May, 2017

[23]. Fahreddin Sadikoglu and Selin Uzelaltinbulat, "*Biometric Retina Identification Based on Neural Network*", Procedia Computer Science, Vol-102, pp.26-33, 2016
[24]. Reshmi K.C. et. al., "*A Novel Approach to Brain Biometric User Recognition*", Procedia Technology, pp.240-247, 2016
[25]. Nana Kwame Gyamfi et. al., "*Enhancing the Security Features of Automated Teller Machines (ATMs): A Ghanaian Perspective*", International Journal of Applied Science and Technology, Vol-6, No.1, pp.102-111, February, 2016
[26]. Ceren Tarkmen and Alper Deayerli, "*Transformation of Consumption Perceptions: A Survey on Innovative Trends in Banking*", Procedia - Social and Behavioral Sciences, Vol-195, pp.376-382, July, 2015
[27]. Firas S. Assaad and Gursel Serpen, "*Transformation based Score Fusion Algorithm for Multi-modal Biometric User Authentication through Ensemble Classification*", Procedia Computer Science, Vol-61, pp.410-415, 2015
[28]. Mohsin Karovaliya et. al., "*Enhanced security for ATM machine with OTP and Facial recognition features*", Procedia Computer Science, pp.390-396, 2015
[29]. Michael Mireku Kwakye et. al., "*Adoption of Biometric Fingerprint Identification as an Accessible, Secured form of ATM Transaction Authentication*", International Journal of Advanced Computer Science and Applications, Vol-6, No.10, pp.263-265, 2015
[30]. Rathishala Rajendran et. al., "*ATM Security using Fingerprint Authentication and OTP*", International Journal of Current Engineering and Technology, Vol-5, No.2, pp.1157-1159, April, 2015
[31]. Zameer Afshan, Pawan Kumar Chaurasia, "*A Review on Crypto-Currency*", International Journal Of Computer Science and Mobile Application, Vol-6, pp.95-100, 2018
[32]. V.K. Jain , N. Tripathi, "*Speech Features Analysis and Biometric Person Identification in Multilingual Environment*", International Journal of Scientific Research in Network Security and Communication, Vol-6 , No.1 , pp.7-11, Feb, 2018
[33]. Namrata Ghuse et. al., "*An Improved Approch For Fraud Detection In Health Insurance Using Data Mining Techniques*", International Journal of Scientific Research in Network Security and Communication, Vol-5, No.5, pp.28-32, June, 2017
[34]. Savitha G. et. al., "*Selective Small Reconstruction Error Based LDRC Multimodal Biometric Authentication*", International Journal of Scientific Research in Computer Science and Engineering, Vol-6, No.1, pp.1-10, Feb, 2018
[35]. Oluwabunmi Ayankemi ONI, "*A Framework for Verifying the Authenticity of Banknote on the Automated Teller Machine (ATM) Using Possibilistic C-Means Algorithm*", International Journal of Scientific Research in Computer Science and Engineering, Vol-6, No.2, pp.57-63, April, 2018

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