IOSR Journal of Computer Engineering (IOSR-JCE)
e-ISSN: 2278-0661,p-ISSN: 2278-8727,
PP 27-32
www.iosrjournals.org

Fingerprint Biometric Based Online Cashless Payment System

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Abstract: *This paper proposes a model Online Cashless Payment Systems which is based on Biometrics in Aadhaar Card. Today's current big issue in e-payment system is providing security to the users banking transaction. Traditional techniques always suffer from a common problem of inability to differentiate between an authorized person and a person who fraudulently acquires the access privilege of the authorized person. Biometric easily identify authorized person and fake person due to human's physiological or behavioral characteristics. This paper focuses on the development of a system that uses fingerprint biometric as password, which is already stored in UID database .for doing secure online cashless payments. So, by using biometrics stored in UID database, an identifying fraudulent person will become easier*.
Keywords: *Aadhaar, Biometrics, Cashless transaction, Fingerprint, Password.*

I. Introduction

A cashless payment is a new way in which all transactions are done through cards or digital means like Mobile wallets, UPI apps, etc. The main advantage of a cashless society is that it records all economic transactions which limit the growth of the black market. It also reduces the chances of tax avoidance. [1] Besides this there are several advantages of a cashless economy such as, cashless societies are generally corruption free. There are lots of benefits for being cashless. The cost of handling cash is high; it is in the favor of economies to go cashless. [2]

After demonetization, Indian government starts to promote cashless transaction for different payments, but there are some problems associated with the implementation of secure cashless payment systems in the country from card thefts, internet fraud, and identity theft etc. [3]

In daily life, people use multiple payment systems i.e. Debit Card, Credit Card, Mobile wallets, UPI apps etc. The payment cards are electronically linked to an account or accounts of the cardholder. However, stored-value cards are cards that store money on the card itself [4] [5]. Mobile wallets are mobile applications that enable financial transactions**.** These apps help customer to pay money for their different transactions [6]. UPI apps are bank apps that provide facility to transfer money or to make a payment at a shop, or to buy something online [7].

All of the systems use passwords/PIN for security but such passwords can be easily hacked; therefore these systems face the common problem of to identify a genuine person and may give chance for accessing your account to a fraudulent person [8].

II. Literature Review

Shweta Gaur, V.A.Shah, Manish Thakker was presented the comparative study on biometric recognition in the paper Biometric Recognition Techniques: A Review. This paper reviewed on different biometrics that is used for human recognition [9]. Sulochana Sonkamble, DR. Ravindra Thool, Balwant Sonkamble have focused on the application of biometrics for human identification.Most of the fields like banking, access control, could become more secure by using biometric as a password.[10]

Aaadhaar Enabled Service Delivery published by UIDAI, Government of India dated on feb2012 was discussed that the different biometrics that is stored in UID database helps for delivering different government services to genuine person [11].The research paper, Discussion Paper on Aadhaar based Financial Inclusion discussed how the aadhaar's database is used for secure online transactions and how the banks provide secure financial services using biometrics stored in aadhaar [12].

Sravya V, Radha Krishna Murthy, Ravindra Babu ,Kallam,Srujana B. gives the benefits of the fingerprint as biometric in their survey paper, A Survey on Fingerprint Biometric System. From this paper, we found that the fingerprint-based systems are economical. These Fingerprint based systems can work in any environment and these system can be easily handled by anyone. Fingerprint based systems are more user-friendly [13]. Anil K. Jain, Patrick Flynn, Arun A. Ross, Handbook of Biometric (Springer Science+ Business Media, LLC,

2008).this book described the various features of the fingerprint which make possible authentication of person[14].

Vishal Vishwas Jadhav, Rahul Ratnakar Patil, Rohit Chandrashekar Jadhav,Adwait Niranjan Magikar, in their paper Proposed E-payment System using Biometrics that UID or Aaadhar database can use for authentication[15].

III. Review on Current Cashless Payment Systems

Following some Cashless Payment systems are currently used by customers for paying money to business correspondents, all of these system faces the problem of hacking of password or fraudulent access due to lack of security.

3.1. Credit Card or Debit Card: A credit card is a payment card issued to users to enable the customer to pay money for their purchases, based on the customer's promise to the card issuer to pay them for the amounts so paid plus other agreed charges [4] [5]. A debit card is also referred as a bank card that can be used instead of cash when making purchases. Debit card directly deducts a specific amount from customer's bank account and credited to bank correspondent's bank account [4] [5]. As the use of debit and credit card increases, the fraudulent transaction of money by fake card or stolen card has become a serious issue. Passwords or pin can easily hack; so it cannot provide strong security to the transactions done through the credit card or debit card.

3.2. Mobile payment: Mobile payment is also referred as mobile wallet generally performs the payments via a mobile device. Few examples of mobile wallets are Paytm, PayUmoney, Oxigen, MobiKwik etc [6]. Now a day mostly everyone uses mobile phones and doing payments through mobile phone become the easiest option for online transaction. But due to the vulnerabilities in money transactions via mobile phones is become a limitation in accessing mobile wallets.

3.3. Unified Payments Interface: UPI is a system that powers multiple bank accounts of participating banks, several banking services features like fund transfer, merchant payments in a single mobile app [7].

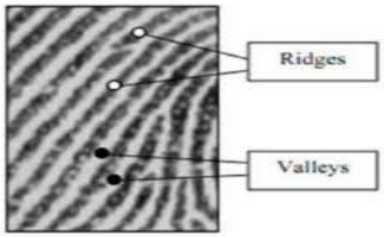
UPI app was developed by National Payment Corporation of India with Reserve Bank of India's vision moving towards the cashless society. A customer who has a bank account with a UPI-partnered bank can download a UPI app on their Smartphone and can use it for different transactions. Currently, in India, some banks such as Axis bank, ICICI bank, HDFC bank, Federal bank provide UPI-based services [7]. These UPI apps currently use MPIN for security but there are many possibilities of misuse of such PIN. All of the systems use password or pin for providing security to the transaction and as the password can be easily hacked, therefore we propose a system that uses fingerprint biometric for a password.

IV. Proposed System

Biometrics is a science for recognizing the person based on his or her physiological and behavioral characters [9]. The identification of a person is becoming highly important in various fields. Biometrics can be used as a secret password and PIN for personal identification [10]. In this paper, we have focused on increasing the security of online cashless payment system by using fingerprint biometric. For which we use biometrics in UID database which is now linked with almost all of the National banks of India and these banks started to take UID numbers of each individual at the time of account opening [11]. In India Unique Identification Authority of India (UIDAI) is now in setting up an online aadhaar authentication system which can be accessed by banks and other service providers to verify individual's details anytime from anywhere. An aadhaar based online authentication would also help to remove chances of fraudulent access and increase in security as it will ensure that the payments, like Government subsidies, pensions, reach to the right individual and cannot be misused by other people. [12]

Aadhaar card stores demographic as well as biometric information. It stores many biometrics like fingerprint, face, iris, and palm. The fingerprint is more reliable biometric than other and it is easy to access, therefore anyone can willingly give it. [13]

A fingerprint is the representation of the epidermis of a finger. In a fingerprint contains the interleaved structure of ridges and valleys, where the ridges are dark and valleys are bright, as shown in Fig4.1 (a). These ridges and valleys may bifurcate and sometimes they may terminate. This termination and bifurcation of valleys and ridges referred as minutiae, as shown in Fig4.1 (b). The fingerprint structure has one or more patterns where the ridge lines form distinctive shapes. These patterns are classified into loop, arch, and whorl, as shown in Fig.4.2[14].



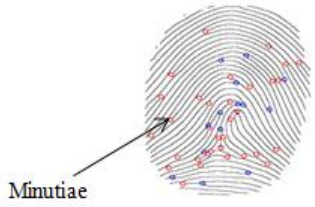


Fig 4.1(a). Fingerprint: Ridges, Valleys **Fig 4.1(b).**Fingerprint: Minutiae

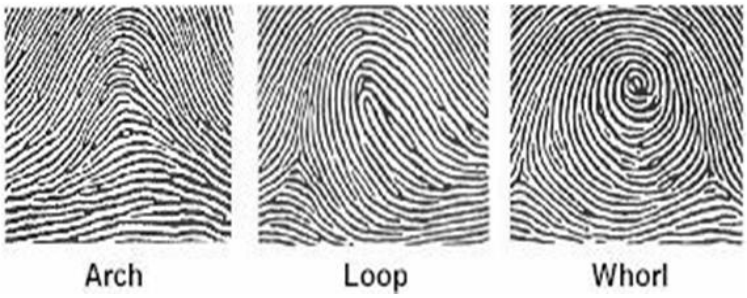


Fig 4.2. Arch, Loop, Whorl of fingerprint

Due to the UID stores fingerprint of each individual and UID database links with the bank, proposed online cashless payment system model use fingerprint biometric in UID database as a password for online transaction [15] [16]. The fingerprint is easy to give and using biometric as a password is more secure than current password scheme, so the customers who pay money to any business correspondent need not worry about hacking. Because giving biometric as password minimizes the chances of hacking.

Working flow of proposed Online Cashless Payment Systems system is as below:

1. The user must be registered to the system by giving unique User ID with an account number. After registration, a user can do the transaction through the system.
2. For doing transactions customer needs to give registered User ID and business correspondent User ID with payee's fingerprint biometric. System will send these details to bank
3. Customer's bank sends an authentication request to UID database.
4. UID database performs authentication by comparing the extracted fingerprint with the stored template of a fingerprint. Based on the comparison, the result is produced, either the customer is genuine or an imposter.
5. UID database sends the result of authentication to customer's bank.
6. If the person is authorized then the amount is debited from customer's bank account and credited to business correspondent's bank account.
7. Acknowledgment sends to business correspondent either the transaction is successful or failed by the business correspondent bank.

After the completion of above steps, the system will be closed or it will be used for next customer's transaction. Architecture of proposed online payment system is shown in Fig4.3

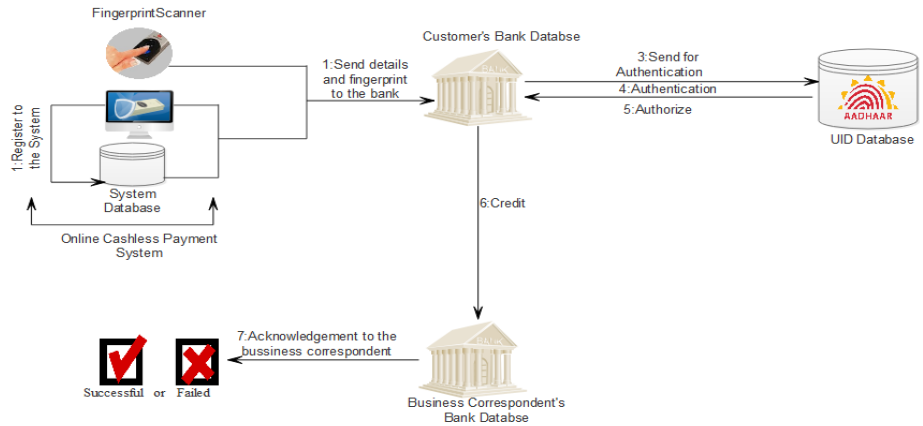


Fig4.3. Architecture for Proposed Online Payment System

V. Experimental Work

The proposed Online Payment System which uses fingerprint biometric as a password. This system will help peoples for doing various transactions such as paying money to the business correspondent, mobile recharge and DTH recharge. The home page of the system is as shown in Fig 5.1.

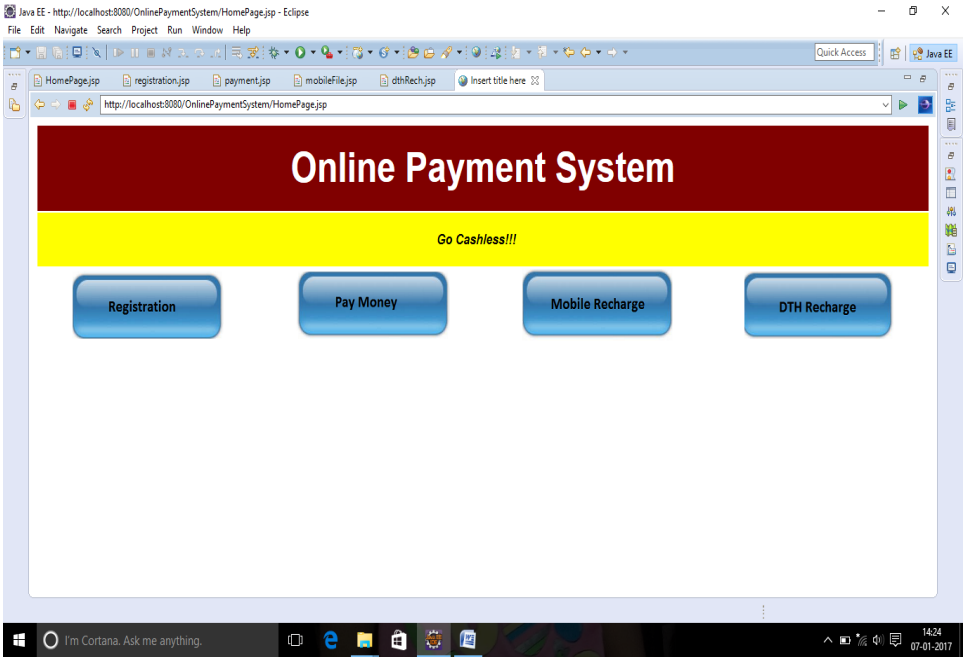


Fig5.1. Home Page

To use this system both customer and business correspondent must have to register to a system and create their own user ID .during registration user's account number is taken and stored in the system database. The registration process is shown in Fig 5.2.

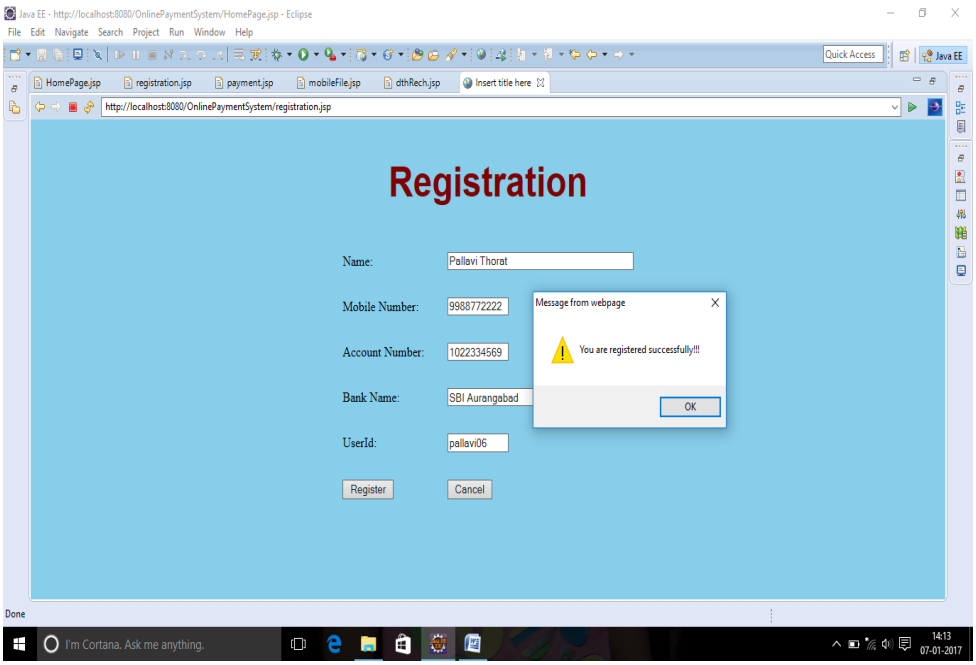


Fig5.2. Registration page

After registration one can pay money to a vendor for his/her purchases. The system takes your registered user Id and fingerprints biometric as a password for doing transactions. These details will send to customer's bank, then the customer's bank will send given biometric for authentication to UID. If the person is

authorized then the amount is debited from customer's bank account and credited to business correspondent's bank account. This payment procedure requires some details, as shown in Fig5.3.

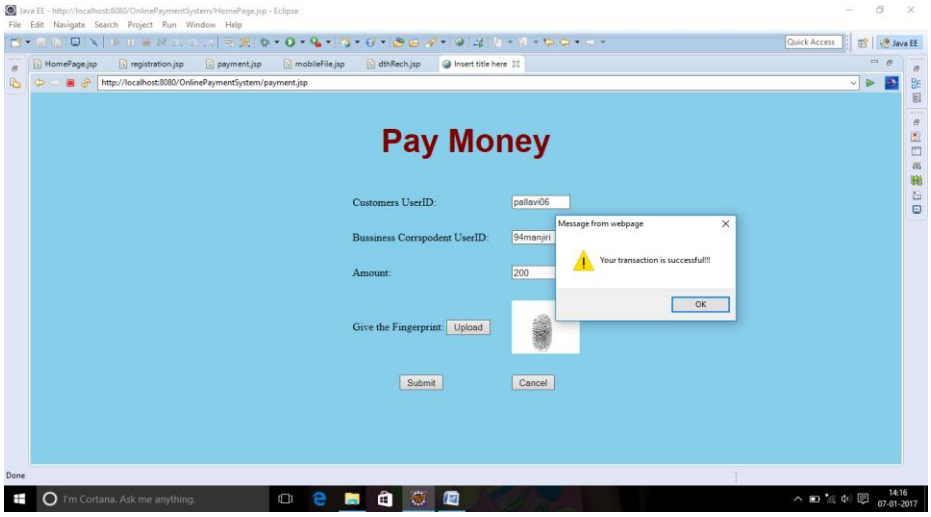


Fig5.3. Pay Money page

The proposed system also provides the way for online mobile recharge as shown in Fig5.4.

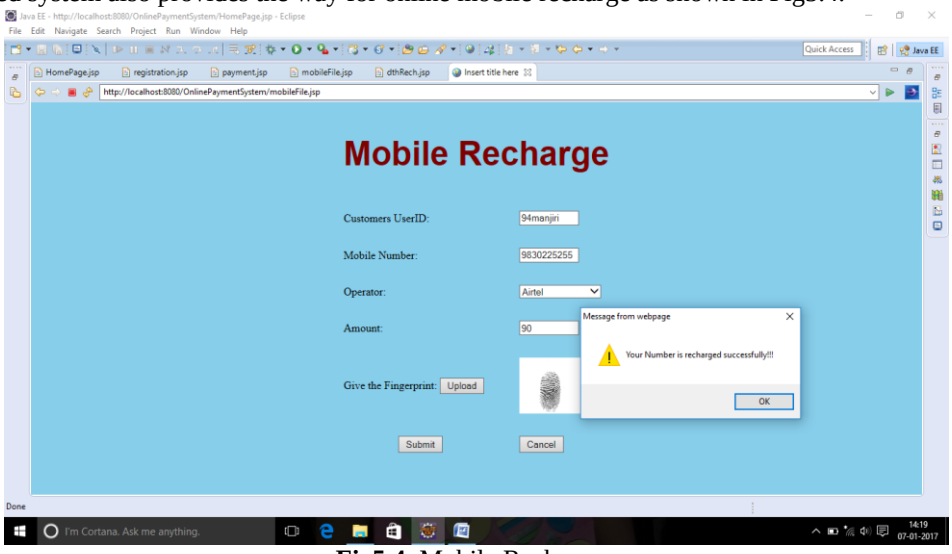


Fig5.4. Mobile Recharge page

This system also has the ability for doing DTH recharge online, as shown in Fig5.5.

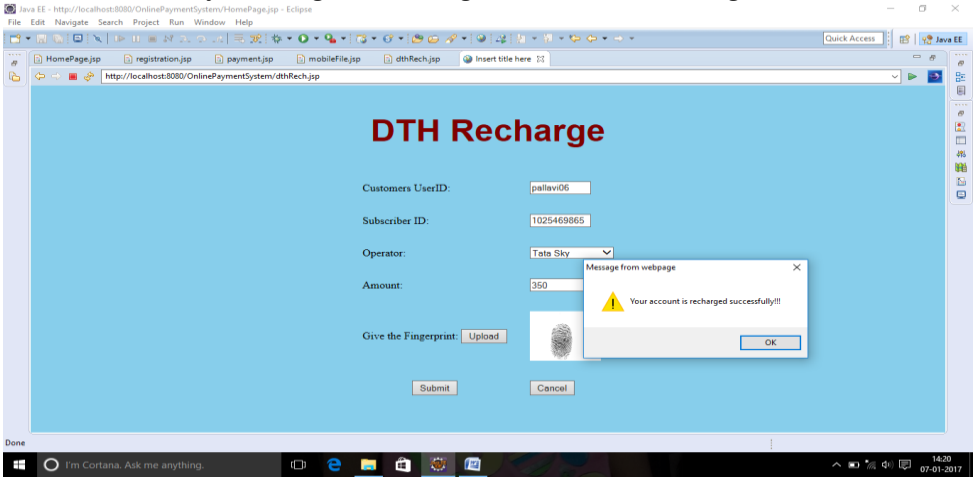


Fig5.5. DTH Recharge page

VI. Conclusion

Today India moving towards the cashless payments but there are threats of hacking because currently used cashless payment systems like Debit Card, Credit Card, mobile wallets, UPI apps etc., do not have the ability to provide strong security for the transactions. The present system is using the username and password security mechanism which can easily reach by guess work and password can be hacked. Therefore many people hesitate to pay money using these systems.

Hence in this paper, we try to propose cashless payment system that may remove all issues that generally arise in traditional cashless payment Systems. We propose to use biometric as a password instead of using a general password. For this purpose, we use fingerprint biometrics stored in UID database. As the customer can easily give the fingerprint and in banks, there is no need to give biometric specially, as the UID database linked with banks. This model will help to achieve security, reliability, easy to use.

Reference

[1]. Cashless Society, http://www.civilsdaily.com/story/cashless-society

[2]. What are the benefits of a cashless economy? Are there any disadvantages too? , by RanjanDubey, Economics Student Written on nov 29/2016, Retrieved From,https://www.quora.com/What-are-the-benefits-of-a-cashless-economy-Are-there-any-disadvantages-too.

[3]. A Cashless Future Is The Real Goal Of India's Demonetization Move ,by Wade Shepard , written on DEC 14, 2016 @ 01:37 PM, Retrieved From, http://www.forbes.com/sites/wadeshepard/2016/12/14/inside-indias-cashless revolution/#6ff276af18c7.

[4]. Debit card, Retrieved from,https://en.wikipedia.org/wiki/Debit_card

[5]. Credit card, Retrieved from,https://en.wikipedia.org/wiki/Credti_card

[6]. Mobile payment,retrieved from, https://en.wikipedia.org/wiki/Mobile_payment

[7]. How UPI Works - the Apps, Charges, and Everything Else You Should Know, by GopalSathe, written on 01 September 2016, Retrieved from,http://gadgets.ndtv.com/apps/features/what-is-upi-the-apps-charges-and-everything-else-you-should-know-1452664

[8]. Oginni Simon Oyewole, El-Maude, Jibreel Gambo, Mohammed Abba, Michael Ezekiel Onuh, Electronic Payment System and Economic Growth: Review of Transition to Cashless Economy in Nigeria, International Journal of Scientific Engineering and Technology Volume No.2, Issue No.9, pp : 913-918 1 Sept. 2013, (ISSN : 2277-1581).

[9]. Shweta Gaur, V.A.Shah, Manish Thakkar, Biometric Recognition Techniques: A Review, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 1, Issue 4, October 2012.

[10]. Sulochana Sonkamble, Dr. Ravindra Thool, Balwant Sonkamble, Survey Of Biometric Recognition Systems And Their Applications, Journal Of Theoretical And Applied Information Technology © 2005 - 2010 Jait.

[11]. Aadhaar Enabled Service Delivery published by UIDAI, Government of India dated on feb2012.

[12]. Discussion Paper on Aadhaar based Financial Inclusion published by UIDAI, Government of India dated 18 oct 2010.

[13]. Sravya V, Radha Krishna Murthy, Ravindra Babu Kallam,Srujana B., A Survey on Fingerprint Biometric System, International Journal of Advanced Research in Computer Science and Software Engineering , Volume 2, Issue 4, April 2012 ISSN: 2277 128X.

[14]. Anil K. Jain, Patrick Flynn, Arun A. Ross, Handbook of Biometric (Springer Science+ Business Media, LLC, 2008).

[15]. Vishal Vishwas Jadhav,Rahul Ratnakar Patil,Rohit Chandrashekar Jadhav,Adwait Niranjan Magikar,Proposed E-payment System Using Biometrics, International Journal of Computer Science and Information technologies,Vol.6(6),2015,4957-4960,ISSN:0975-9646.

[16]. Adegboye Adegboyeg,, Secure on-Line Transaction through Augmented Biometrics System, Global Journal of Computer Science and Technology: G Interdisciplinary Volume 15 Issue 2 Version 1.0 Year 2015, ISSN: 0975-4350