

Enhancing ATM Security Using Fusion of Biometric Techniques

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Abstract

Security and authentication of customer's account is of great concern for all the banks all over the world. Frauds are increasing day by day; hackers are using advance techniques for hacking PINs so there is a great need of strengthening the security and authentication system of banks. This paper focuses on the biometrics, its types, how biometric can be of help in the field of banking for authentication and security purpose. It especially focuses on biometric ATMs i.e. an ATM which takes humans physical traits template like fingerprint and iris scan along with OTP as an input instead of entering PIN.

Keywords: Biometrics, ATM, PIN, OTP, Iris, Fingerprints.

I. Biometrics

Biometrics is a science of recognizing the physical and behavioral traits such as fingerprint scan, iris scan, retina scan, hand geometry etc. of a person.

Biometrics is a security system which is based on these traits of a person which can be checked automatically as these traits are indistinguishable from one person to another person.

There are different levels of authentication based on :

1. Something you have like key, token or badge.
2. Something you know like PIN or Password.
3. Something you are like physical or behavioral traits.

Since biometrics security is based on something a person is i.e. his personal biological traits or characteristics it is considered more reliable than any key, PIN or password.

Biometrics can help in each and every field in the scope of security and authentication, and it is one of the safest ways used for security related issues as it reduces the chance of hackings and frauds.

II. Types of Biometrics

There are different types of biometrics like :

- i. Fingerprints: Impression of a person's finger, usually impression of index finger.

- ii. Face detection: scanning a person's face.
- iii. Iris scan: Scanning the iris which is responsible for controlling the size of pupil.
- iv. Retinal Scan: Scanning the blood vessels of eyes.
- v. Voice Recognitions: Recognizing the sound and pitch of a person's voice.
- vi. Hand geometry: Scanning the full shape of palms
- vii. Gait: Walking style of a person
- viii. Vein: scanning the patterns of vein in the palms of a human.
- ix. Signature Recognition: Recognizing a person's signature which actually checks handwriting.

III. Current Implementation of Biometrics

Use of Biometrics is spreading in various fields. For e.g In India, Adhaar Card is an initiative of Indian govt. which is based on Biometrics. Three behavioral traits of a person are used i.e. Face detection, iris scan and fingerprints of all the fingers of both hands, then he/she is given an unique 12 digit number known as Adhaar no. and it serves as an identity proof .

Another implementation is for the attendance of govt. employees. It is use to record the attendance and working hours of an employee.

Not only in government offices, but in many organizations in many fields biometric serve as attendance recording system which helps to eliminate fraud.

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IV. Biometrics and Banking

World of banking is changing. It is a need of time to strengthen the security system of banks as there is increase of hackers, fraudsters, identity theft and data breaches which have become a major issue for banks.

If the customer will have their unique biometrics attached to their bank accounts, it would be difficult for fraudsters and hackers, and through a biometrics authentication platform banks can verify a customer's identity.

Biometrics will support banks to enhance security, user experience and solves the problem of PIN and password management issues and provide secure and simplified experience to user.

Biometrics in banking will optimize customer's interaction, fraud reduction and fraud prevention. Many banks do not feel the need to adopt biometric technology because of its complexity and cost, but recent development in the field of biometrics and customers behavior have helped in changing the views of banking sector. Thus, now banking sectors also feel the need of biometrics authentication in banking.

Customers' today are not only looking for accessing methods which are convenient than memorizing PINs and passwords and security questions but they also demand methods of accessibility which ensures security.

Biometric based security along with OTP satisfy all of these criteria and it is an attractive way than the two step verification system or just OTP (One Time Password) and is more secure than these methods as well, because using only OTPs and security questions are suspect to be hacked or attacked by malwares.

Biometric is a long term investment not an expense as banks can reduce the frequency of frauds affecting their customers and can reduce the number of incidents of customers having their accounts compromised.

V. Need of Biometrics in Banking

1. It is important to make the bank facilities available to all the citizens of any developing country like

India, since there are many people in India who are illiterate or moderately literate. So, biometric ATM will be of great help to the people in rural areas in doing transactions without the need of remembering any PIN or password and with the guidance of audio spoken in local language.

2. Since case of frauds are increasing due the low level of security and hackers can easily hack the PINs, so biometric will serve as a strong security system and customer's personal data and account details will be secured.
3. Customers today are looking for the transaction methods which are more convenient than memorizing the PINs and the passwords and security questions but they also want the method which ensures security, so biometric is right choice which fulfills these criteria.

VI. Implementation of Biometrics in Bank Branches

In banks, biometrics can be used in bank branches for employees as well as customers. Many banks are already using biometrics for attendance recording,

For customers it can be used in bank branches at the counters of depositing money, withdrawing money, passbook updation and rest of the services provided by the banks. It can be implemented by installing any biometric supporting device at the counters which stores the data of customer containing all the important details of the customer like account no. customers name, his personal details saved with his biological trait used for biometric security system, so that when the customer need to do transaction his biometric template will be scanned and will be matched from the database and he can proceed with the transactions the moment template is matched. This will help people to get rid of filling forms and will save time also.

Adopting a biometric security system can provide banks a convenient and easy way to authorize customers identity accurately and will help in maintaining records of every transaction being processed. This will further prevent frauds as transaction will be processed only when customer's template authenticated at the counter by biometric scanner will match from the database.

VII. Biometric ATM

An ATM (Automated Teller Machine) is an automatic system which is used to do transactions anywhere anytime. We can withdraw money as well as deposit money. For this a person need to insert his ATM card and PIN as an input.

A Biometric ATM is a machine which is used to perform transaction by taking account holders biometric template as an input and if the template is matched then an OTP will be generated and will be send to the customers via sms and then transaction will be proceeded further.

VIII. Process of Fingerprints Recognition

Fingerprint scanner is an electronic device which takes the digital image of patterns of fingers. The image is taken through lights emitted by specialized digital cameras or scanner. Top layer where we put our fingers is the touch surface. Below which there is layer of phosphor which emits the visible light responsible for illuminating the image and pattern of fingers, and then converted into digital form and is compared with the similar type of images stored in database.

IX. Process of Iris Recognition

In the process of iris recognition person keeps his eyes in front of camera maintaining 10-15 cm of distance then the camera takes digital image of the iris with the help of both the ordinary light and invisible infrared. The infrared rays helps in identifying the unique features of eyes then computer keeps image of iris only removing unnecessary details like eyelashes and identify around 240 feature which are unique from person to person and eye to eye and these unique features are converted into 512 digit number which is called as Iris Code which is different eye. Now this iris code is stored in database along with rest of the details of the person. When the person goes for iris scan, the system will check his iris code and the will match from the database.

X. Proposed System for Implementation of Biometrics in ATMs

Biometrics can also work for transaction processed in ATMs. It can be used as best suited technology for

ensuring identity. It provides fast and accurate identification thus, enhancing security for authentication.

A typical ATM have two inputs one is card reader and other is keypads or touch screen display screens. Since ATM takes a magnetic card called ATM or debit card and PIN as input for performing a transaction. We can replace PIN by just putting or installing a biometric device as input device which will take combination of customer's Iris and Finger Print as an input. This fusion of customer's physical traits i.e. Iris and Finger Print will then be matched with the existing template in the database provided by network provider and then an OTP will be generated which will be sent to the customer via sms. After entering the OTP in the system the transaction will be processed.

XI. Advantages

1. *Strong and Robust Authentication:* Since biometric security is based on the physical or behavioral traits which are unique from any person to another. Its combination will provide a strong security system.
2. *Suitable for illiterate or barely literate people:* It is best suited security system for those people who are not literate and for those who have difficulty in remembering PIN.
3. *Accurate and quick Authentication:* Biometric system provides a convenient way for banks to authorize customers accurately and quickly.

XII. Conclusion

ATM is technology which provides financial services in many countries. Biometric is a technology which is already accepted by many for security purpose. Combining Finger Print and Iris and then generating OTP will give a robust security and authentication in ATMs. It will not be helpful only to people living in urban areas but also to the people living in remote areas. It is a complex and expensive method but it helps in reducing frauds and can reduce the no. of incidents of customers having their accounts compromised. Thus, it is an investment not expense.

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