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**BIOMETRIC SECURITY IN MOBILE BANKING****S. T. BHOSALE****ASST. PROFESSOR****V. P. INSTITUTE OF MANAGEMENT STUDIES & RESEARCH****SANGLI****DR. B. S. SAWANT****DIRECTOR****KARMAVEER BHAURAO PATIL INSTITUTE OF MANAGEMENT STUDIES & RESEARCH****SATARA****ABSTRACT**

Mobile technology is growing very speedily, each person have mobile in its pocket. Banking sector started mobile banking service but insecurity is also growing with the same speed. To overcome this insecurity we are moving for biometrics as secure path to communicate and authentication purpose. Present study deals with new innovative model for Mobile using biometric technology for operating secure mobile banking. Proposed model provides high security in authentication which protects service user from unauthorized access. In this proposed model user required to authenticate himself with biometric identification, middle fingerprint and Personal Identification Number (PIN).

**KEYWORDS**

Authentication, Biometric, Mobile model, Mobile banking, PIN.

**INTRODUCTION****UNAUTHORIZED ACCESS**

A very high-level term that can refer to a number of difficult sorts of attacks is unauthorized access. The goal of those attacks is to access some resource that your machine should not provide the attacker.

**TYPES OF RISKS ASSOCIATED WITH BANKING**

**Operational Risk:** Operational risk, also referred to as transactional risk is the most common form of risk associates with I-banking. It takes the form of inaccurate processing of transactions, non-enforceability of contracts, compromises in data integrity, data privacy and confidentiality, unauthorized access/intrusion to banks systems and transactions etc. Besides, inadequacies in technology, human factors like negligence by customers and employees, fraudulent activity of employees and crackers/hackers etc. can become potential source of operational risk.

**Security Risk:** Security risk arises on account of unauthorized access to a bank's critical information stores like accounting system, risk management system, portfolio management system etc. A breach of security could result in direct financial loss to the bank. For example hackers operating via the internet, could access, retrieve and can use confidential customer information and can also implant virus. This may result in loss of data, theft of or tampering with customer information, disabling of a significant portion of banks internal computer system thus denying service, incurring costs to repair these etc. Other related risks are loss of reputation, infringing customer's privacy and its legal implications etc. Thus, access control is of paramount importance. Controlling access to banks system, has become more complex in the internet environment which is a public domain and attempts at unauthorized access could emanate from any source and from anywhere in the world with or without criminal intent.

Security threats to online transactions are: malicious code, hacking and cyber vandalism, credit card fraud/theft, spoofing, denial of service attacks, sniffing and insider jobs.

**OBJECTIVE**

1. To study various biometric authentication techniques.
2. The application of biometric authentication in mobile device for secure e- banking.
3. To generate logical model that helps for simple operating mobile device for banking services with full proof authentication.

**WHAT IS BIOMETRIC AUTHENTICATION?**

Biometrics is biological authentications, based on some physical characteristics of the human body. The list of biometric authentication technologies is still growing. There are two categories of biometric identifiers include physiological and behavioral characteristics. **Physiological** characteristics are related to the shape of the body, and include but are not limited to: fingerprint, face recognition, DNA, palm print, hand geometry, iris recognition (which has largely replaced retina), and odour /scent. **Behavioral** characteristics are related to the behavior of a person, including but not limited to: typing rhythm, gait, and voice. More traditional means of access control include token-based identification systems, such as driver's license or passport, and knowledge-based identification systems, such as password or Personal Identification Number (PIN).

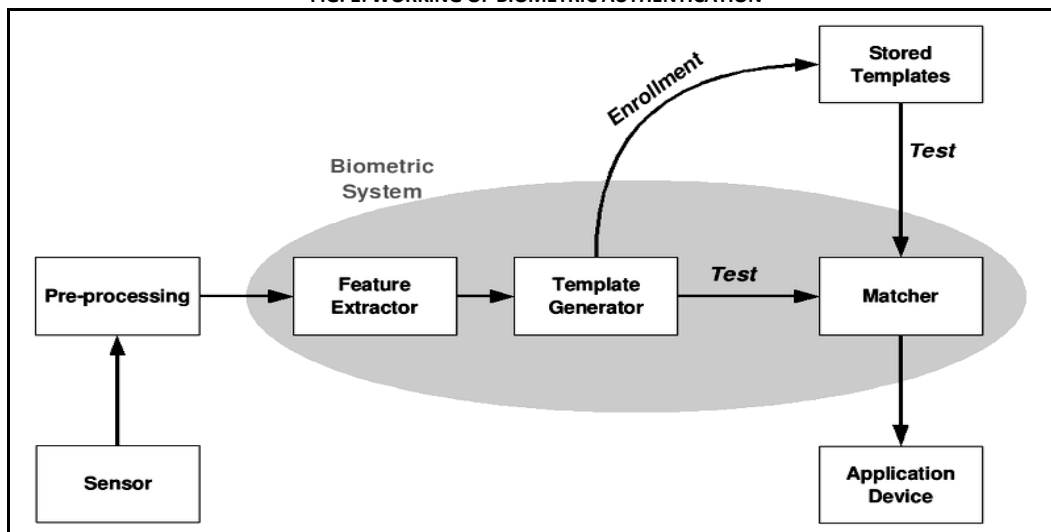
Now there are devices to recognize the following biometrics: fingerprints, hand geometry (shape and size of fingers), retina and iris (part of the eyes), voice, handwriting, blood vessels in the finger, and face. Authentication with biometric has advantages that is it cannot be lost, stolen, forgotten lent or forged and is always available, always at hand, so to speak. If we success in combining this authentication along with password/ PIN then it becomes as easy way to use with full proof authentication.

Biometric authentication mechanism is receiving a lot of public attention. A biometric device is perhaps the ultimate attempt in trying to prove who you are.

**WORKING OF BIOMETRIC AUTHENTICATION**

A biometric device works on the basis of some human characteristics, such as fingerprint, voice or patter of line in the iris of your eye. These devices include handprint detectors, voice recognizers and identification patter in the retina. Authentication with such devices uses unforgivable physical characteristics to authenticate users. The user database contains a sample of users biometric characteristics. During authentication, the user is required to provide another sample of the users biometric characteristics. This is matched with the one in the database, and if the two samples are the same, then the user is considered to be a valid user. Following figure shows the working of biometric authentication process.

FIG. 1: WORKING OF BIOMETRIC AUTHENTICATION



Source: [http://en.wikipedia.org/wiki/File:Biometric\\_system\\_diagram.png](http://en.wikipedia.org/wiki/File:Biometric_system_diagram.png)

**TECHNICAL SPECIFICATION**

During every authentication process there is slight variation in matching biometric characteristic. This is because the physical characteristics of the user may change for a number of reasons. For instance, suppose the fingerprint of the user is captures and used for authentication every time. The sample taken every authentication may not be the same, because of finger can be dirty, can have cuts, other marks or the fingers position on the reader can be different and so on. Therefore, an exact match of the sample need not be required. An approximate match can be acceptable. Therefore using registration process, multiple samples of the user biometric data are created. They are combined and their average stored in the user database, so that the different possibilities of the users samples during the actual authentication can roughly map to this average sample. Using this basic philosophy, any biometric authentication system defines different configurable parameters these are as:

- **False accept rate or false match rate (FAR or FMR):** the probability that the system incorrectly matches the input pattern to a non-matching template in the database. It measures the percent of invalid inputs which are incorrectly accepted.
- **False reject rate or false non-match rate (FRR or FNMR):** the probability that the system fails to detect a match between the input pattern and a matching template in the database. It measures the percent of valid inputs which are incorrectly rejected.
- **Received operating characteristic or relative operating characteristic (ROC):** The ROC plot is a visual characterization of the trade-off between the FAR and the FRR. In general, the matching algorithm performs a decision based on a threshold which determines how close to a template the input needs to be for it to be considered a match. If the threshold is reduced, there will be less false non-matches but more false accepts. Correspondingly, a higher threshold will reduce the FAR but increase the FRR. A common variation is the *Detection error trade-off (DET)*, which is obtained using normal deviate scales on both axes. This more linear graph illuminates the differences for higher performances (rarer errors).
- **Equal error rate or crossover error rate (EER or CER):** the rate at which both accept and reject errors are equal. The value of the EER can be easily obtained from the ROC curve. The EER is a quick way to compare the accuracy of devices with different ROC curves. In general, the device with the lowest EER is most accurate.
- **Failure to enroll rate (FTE or FER):** the rate at which attempts to create a template from an input is unsuccessful. This is most commonly caused by low quality inputs.
- **Failure to capture rate (FTC):** Within automatic systems, the probability that the system fails to detect a biometric input when presented correctly.
- **Template capacity:** the maximum number of sets of data which can be stored in the system.

For the banking and finance sector there is high security requirement for financial transaction through various electronic devices. Recently various electronic devices are used for financial transactions like- Computer, Mobile, ATMs, Point of Sale (POS) Machines, Laptop's etc. Perhaps the best security solution is to combine the password/PIN with biometrics characteristics. It covers all the key aspects related to authentication:

- Who are you? = Personal Identification Number (PIN)
- What you know? = Biometric authentication (middle fingerprint)

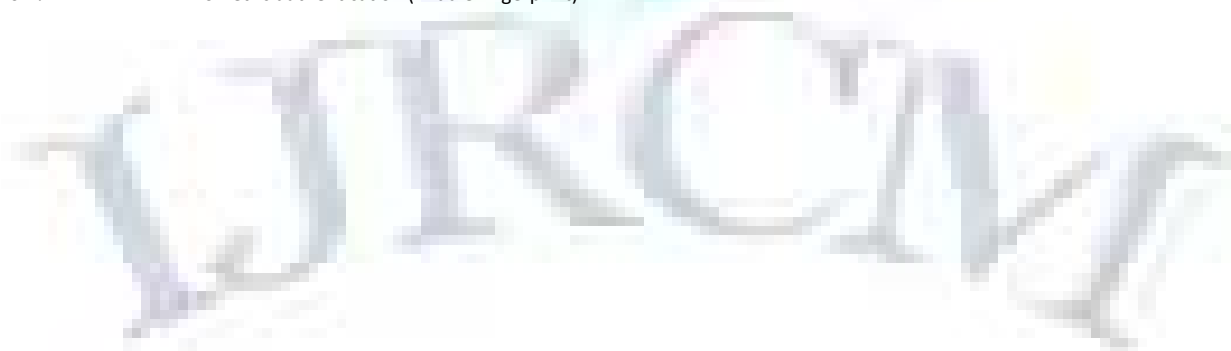
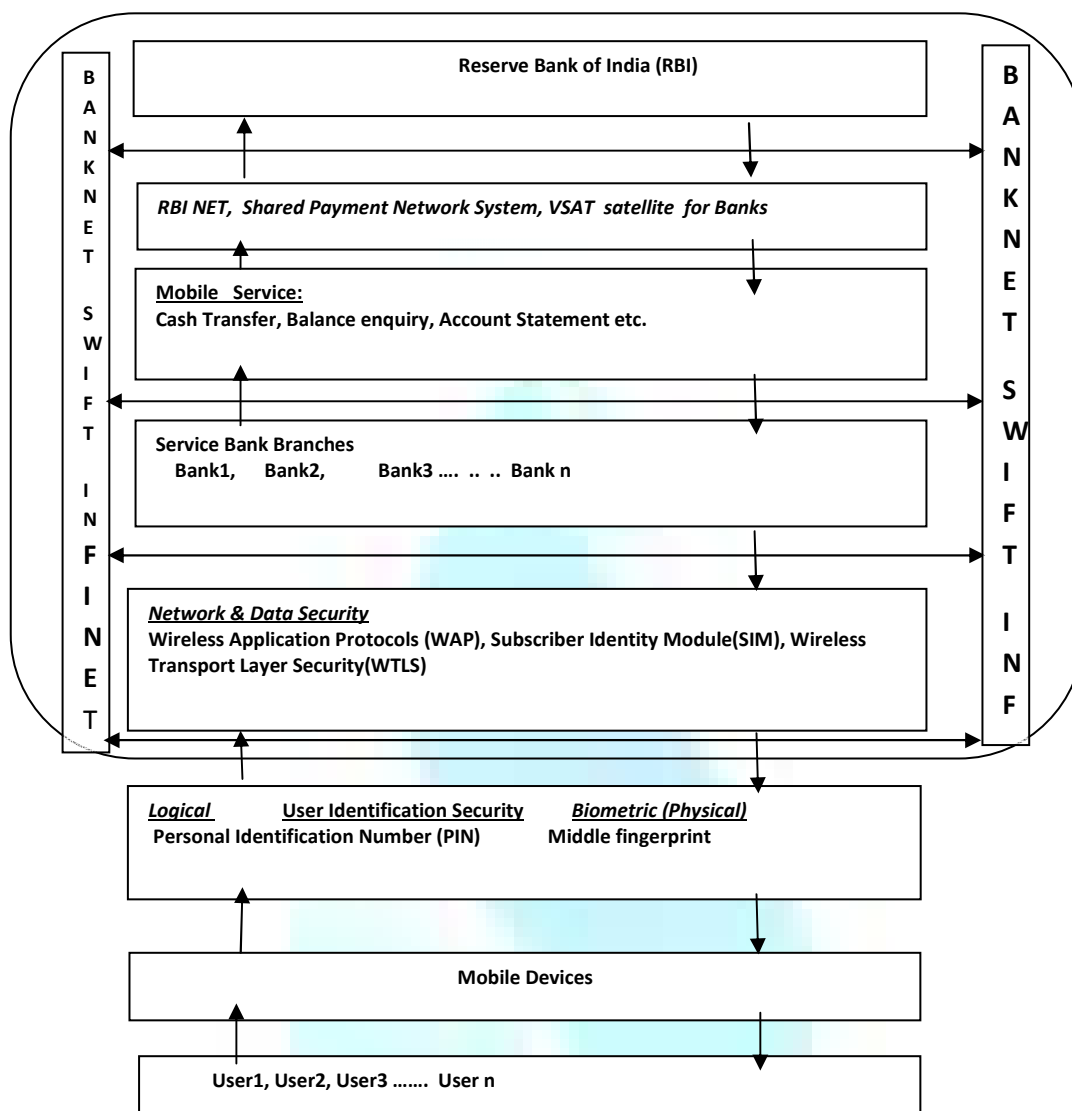




FIG. 2: LOGICAL MODEL FOR MOBILE BANKING SUPPORTING KNOWLEDGE AND BIOMETRIC BASED SECURITY



Source: Self generated Logical Model

**WORKING**

Bank will create user’s biometric sample e.g. middle fingerprint and personal identification number (PIN) and stored in the user database of that bank. During the actual authentication, the user is required to provide a sample of the same nature i.e. finger print with its Personal Identification Number (PIN) then system will generate code called virtual account identification (V-ID). This is usually sent across an encrypted session (e.g. using SSL) to the server. On the server side, the user’s current sample is decrypted and compared with the stored in the database. If the two samples match to the expected degree on the particular values, the users is considered as authenticate user and proceed further for transactions, otherwise user is considered as invalid user and then terminates session.

**REQUIREMENT AND WORKING PROCEDURE**

1. Service user registers their mobile for mobile banking transaction in respective bank.
2. Mobile should have scanners for accessing biometric authentication and have PIN for operating bank services.
3. Authentication is required for every transaction.
4. If users fail more than 4 times to identify himself then block that user for that day.
5. If such blocks more than 4 (within 3 months) then block the user account and ask to regenerate new authentication.

**ADVANTAGES**

1. Provides strong authentication.
2. Ideal for Indian rural masses.
3. Flexible account access allows service users to access their accounts at their convenience.
4. Due to biometric authentication no one is able to access others account.
5. In case user may change their PIN code for security purpose.
6. Biometric technology presents a step forward in reducing cases of identity fraud.

**LIMITATIONS**

1. This method is costly requires mobile as per prescription of bank.
2. Due to biometric only owner can access account.
3. If service user is unable to input correct identification within 4 chances then his account will be blocked and if such block is more than 4 in 3 month his account is blocked and he/she has to re-identify himself in respective bank.
4. At initial stage and in blocked account case banks has to do take more efforts to re-generate identity.

**SUGGESTIONS**

1. Separate efficient, talent and technical staff should be available in bank for that process
2. Banks should have one DEMO Room in bank for demonstrating new technologies to service users, bank staff, video conferencing
3. Bank should promote their service users for operating mobile banking services.
4. Banks should always support to their service users regarding any problems while using mobile banking services.

**PROBLEMS WITH BIOMETRIC**

1. Biometric are relatively new, and some people find their use intrusive. Hand geometry, fingerprint and face recognition (which can be done from a camera across the room) are not quite enveloping, but people have real concerns about peering (hard to watch) into a laser beam or strictly a finger into a slot.
2. Biometric recognition devices are costly, although as the devices become more popular, their cost goes down.
3. All biometric readers use sampling and establish a threshold for when a match is close enough to accept. The device has to sample the biometric, measure often hundreds of key point, and compare that set of measurements with a template. There is normal variability.
4. Although equipments are improving, there are still false reading / recognition.
5. The speed at which recognition must be done limits accuracy. We might ideally like to take several readings and merge the results or evaluate the closet fit. But authentication is done to allow a user to do something. Authentication is not the end goal but a gate keeping the user from the goal. The user understandably wants to get past the gate and becomes frustrated and irritated if authentication takes too long.

**CONCLUSION**

Proposed module is designed for mobile banking users which performs various operation on their mobile like balance enquiry, transfer of funds, service request etc. This system requires biometric authentication (Middle Fingerprint) which is always with you and PIN then system creates virtual account which are helpful for authenticating service user. Due to simple method of operating mobile for banking services with high security reflects more usage of banking services in future.

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