

# Authentication of Multiple Transaction Using Finger Vein

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**ABSTRACT – At present banks are looking beyond the transactions to the full opportunity on how to manage their customers. Accordingly, they are moving beyond managing clients as simple contacts to a whole new level of client relationship management, crafting a superior commercial client experience that gives the bank a competitive advantage and a more loyal, profitable and committed customers. But most of these systems do not focus on how best to manage and keep their customer's data more secured. Here we are developing an application for a Banking sector particularly for a Debit / ATM card section. The use of ATM/Debit cards for each and every account and memorizing the passwords seems to be difficult. In this paper we propose a system in which the user can integrate all his accounts even in different banks. Here user finger vein authentication is recognized for the initial verification part. He can also include his family members' or person-of-his interest accounts details. He can make transactions from their accounts also after successful authentication of the OTP generated. This concept essentially covers the following: Understanding customer needs, secure authentication, good service, and effectively managing system.**

**Keywords – Multiple Accounts, Finger vein Authentication.**

## I. INTRODUCTION

In spite of the evolution of various mobile and internet banking facilities now a days, ATM is still maintaining its central role as a core banking touch point with the customers and have become an integral part of banking sector. At first ATM was made to serve for a particular bank and later ATM are connected to interbank network. This enables people to transfer, withdraw and deposit from ATM machines not belonging to the particular bank. ATM transactions solely rely on the usage of authorized ATM/Debit cards issued by the respective banks. At present every customer maintains accounts in multiple banks and has an ATM card for each and every bank. Memorizing the PIN number for each and every ATM card becomes a difficult task. In this paper to overcome these difficulties we integrate all the bank accounts of the bank account of the customer and access to those accounts are enabled via Finger vein Authentication. This eliminates the difficulty in memorizing the PIN numbers and carrying multiple ATM/Debit cards. Moreover Finger vein authentication is promising as an infallible method of automatic personal identification.

## II. RELATED WORK

The idea of out-of-hours cash distribution had been developed from bankers' needs in Asia (Japan), Europe (Sweden and the United Kingdom) and North America. Later Japanese device called "Computer Loan Machine" supplied cash as a three-month loan at 5% p.a. after inserting a credit card. The device was operational in 1966. In the US patent record, Luther George Simjian has been credited with developing a "prior art device". Specifically his 132nd patent, which was first filed on 30 June 1960. The roll-out of this machine, called Bankograph, was delayed by a couple of years, due in part to Simjian's Reflectone Electronics Inc. being acquired by Universal Match Corporation. An experimental Bankograph was installed in New York City in 1961 by the City Bank of New York, but removed after six months due to the lack of customer acceptance. The Bankograph was an automated envelope deposit machine (accepting coins, cash and cheques) and did not have cash dispensing features.

The ATM machine comprises of enclosures that are made of metal steel. The chest portion often houses currency, deposits and the mechanisms that handle these items. The chest portion also encloses electronic sections that must be protected from tampering. It is provided with an access door that is used to prevent access to the interior by unauthorized personnel. The type of chest used varies with the type of ATM and the location where the machine is installed. Machines which operate in environment where they may be unattended for substantial period of time commonly have higher security chests and enclosures than machines which are installed in lobbies of buildings, stores or other places where guards or other people are usually present. The enclosure also includes less security portion in addition to the chest portion; and they house items such as printers, screen displays, card readers and other items of less value or less susceptibility to tampering. Access to this less security area is controlled through locking mechanisms and only provides quick access to authorized persons for routine maintenance, such as changing paper rolls and printer ribbons.

Kono et al, Japanese medical researcher proposed the finger vein based identity identification, and gave an effective feature extraction method. Yanagawa et al [4] proved the diversity of human finger vein patterns and the usefulness of

finger veins for identity identification on 2, 024 fingers of 506 persons. They showed that the finger vein patterns are identical if and only if they are from the same finger of the same person. These two literatures are the foundation of finger vein recognition, which open the era of finger vein recognition.

### III. EXISTING SYSTEM

An Automatic Teller Machine or cash machine is an electronic device that allows the customer to make cash withdrawals and check their account balances without the need for a human teller. In modern ATMs, the customer identifies himself or herself by inserting a plastic card with a magnetic strip or a plastic smart card with an IC chip which contains Card Identification Number (CIN) and some information. The main authentication for ATM transactions is Personal Identification Number of four digits that is used by the customer to access the ATM machine to make transactions. If the PIN entered by the customer is incorrect then there would be further proceedings. Though passwords are most prevalent method of authentication in security

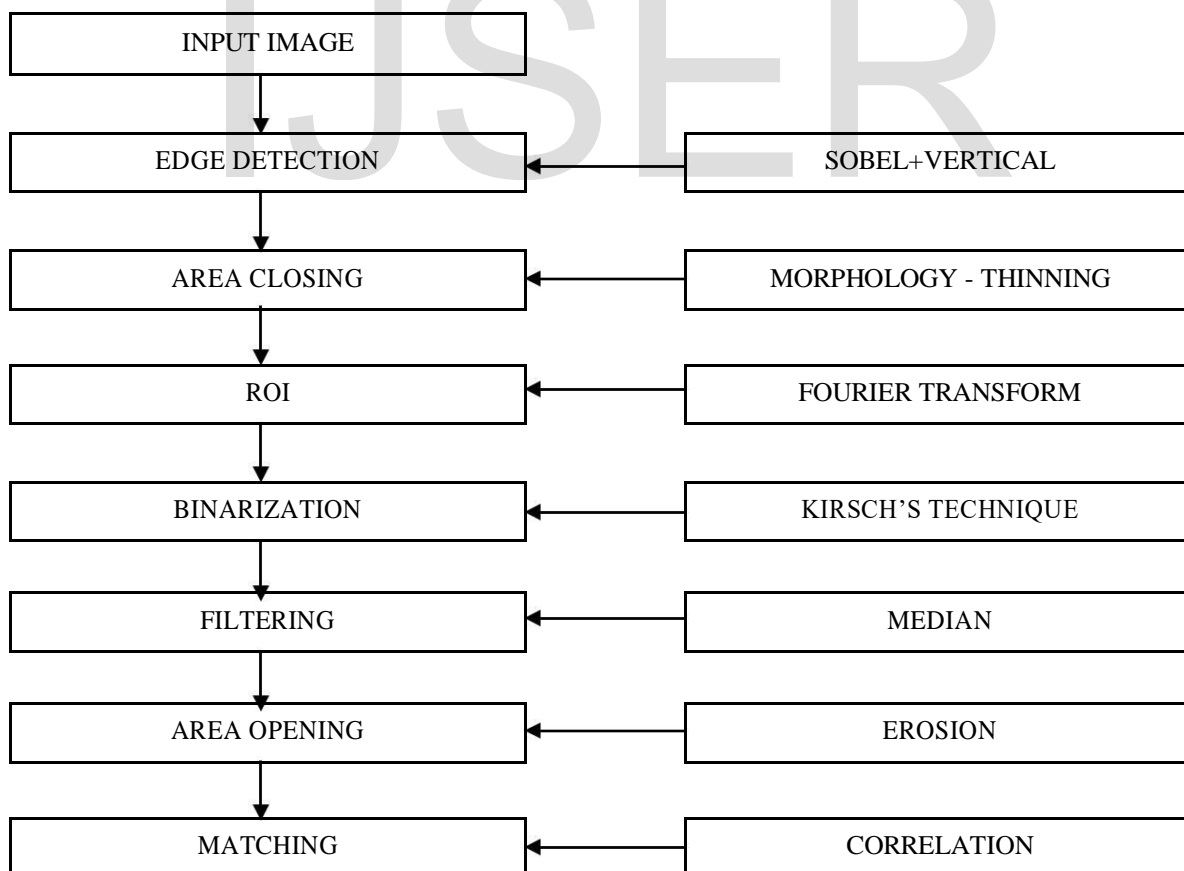
system, they represent weakest link in the security chain. Customers expect high security to maintain privacy.

### IV. PROPOSED SYSTEM

For account transaction instead of ATM/Debit card we are using **finger Vein Authentication**. User can integrate all his accounts in other banks can be integrated in this single account with unique double digits PIN numbers. User finger vein authentication is used for the verification part. For this purpose Mat-lab software is used. User behavior is monitored through HMM (Hidden Markov Model) Model. User can include all his family member's accounts details also in the same account. For account transaction, first verification is by using the finger vein. If it detects the authorized person he can enter the double digits PIN number through Keypad. If the entered PIN number is correct, the list of integrated account details is displayed on the screen. User has the choice of accessing any account belongs to him. If any variation is detected during transaction, it will ask to enter security number/formula, which is set by the user at the time of registration.

### IV. FINGER VEIN AUTHENTICATION

#### BLOCK DIAGRAM OF FINGER VEIN RECOGNITION SYSTEM

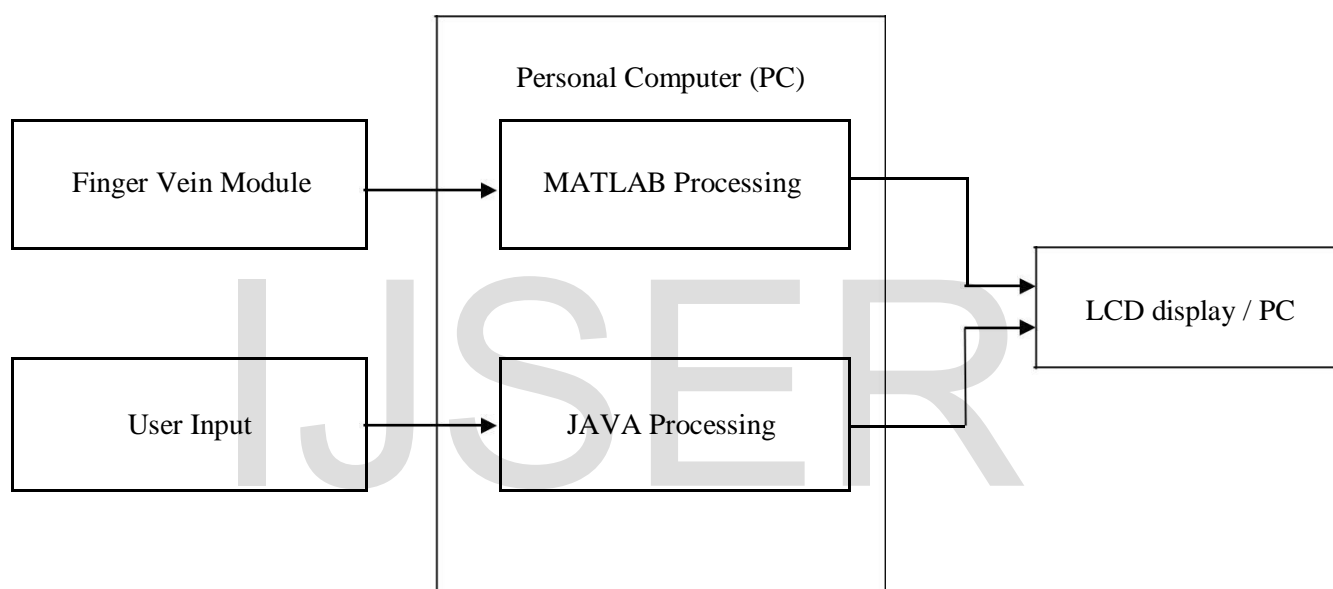


With the help of finger vein module, image is captured and stored in the database. Database is to be created at the time of initiation of the account. It is followed by edge detection process. Here we use Sobel, vertical algorithm which divides image in the for of pixels and finds the average of magnitude and gradient values of the pixel along vertical Y-co ordinate alone (the image is now converted into black and white image).This process is continued by area closing, which uses morphology thinning process, which dialates the bigger sized vein in order to view the underlying vein region.

This is followed by detecting the region of interest which

employs Fourier transformation. The region of interest corresponds to the region where the diversity of vein is maximum. The region of interest is cropped and enlarged. This is followed by binarization process in which we use Kirsch's technique to extract the diagonal values of the image. Diagonal values contains the important features of the image. This process is followed by filtering which uses medium filter to remove any noise if present. Then the image is subjected to area opening where erosion operation is performed to bring the smaller sized vein back to its original form. The final step involves matching, where we use correlation which compares the vein in the database.

### BLOCK DIAGRAM OF THE MAIN MODULE



The setup for authentication of multiple transactions using finger vein consists of a PIC microcontroller, Power supply, Personal computer with MATLAB software, Keypad, Finger vein Detection module and an LCD display.

### V. ACCESSING PROCESS

Initially, the power is given to the personal computer and finger vein module through their respective adapters and starts their respective process. The process starts up with the finger vein module to access the accounts. The user has two ways to access the account for the transaction or any withdrawal of amount and it will be carried on by the authentication process .

#### AUTHENTICATION PROCESS:

##### (1)ACCESSING HIS/HER OWN ACCOUNTS

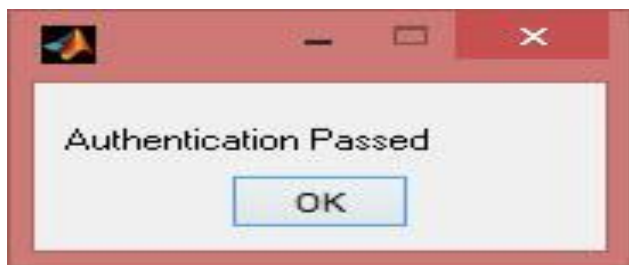
When the module is powered up and it will be ready to capture the image of the finger vein, which is captured by the camera and the IR detector inside the module will clearly

shows the vein of the respected finger of the person who enters inside the device for accessing.



After entering the vein, it will be processed and a

message box will be displayed, which will intimate that the authentication is passed.



Then the finger vein will be compared with the matching unit for authentication and recognition of the user for further accessing process. The matching process is done by comparing it with the finger vein which is already stored in the database during the time of account initiation. If it matches, the user is identified as a AUTHORIZED USER.



(a) Image of the Vein Stored in database

(b) Image of the Vein when entered during accessing

Then the user is allowed to access his/her multiple account by entering the two digit pin number using the keypad. Otherwise, message box with a UNAUTHORIZED USER will be displayed, if the user's vein is not matched.

## (2) ACCESSING FAMILY MEMBER'S ACCOUNTS

If the user wants the transactions to be accessed by his/her family member accounts, a one-time password(OTP) will be generated to the respective user so that the user has to share the OTP to the one who wants to access the account of the corresponding member. Each time a unique OTP will be generated so that the accessing of other member's account within the group cannot be facilitated without their own concern. Each user will be provided with a unique identification number at the time of registration in order to distinguish each and every user.

## VI. CONCLUSION

Finally, this system provides a new venture into the banking sector which enables the customers to have a secured and authenticated transaction. This system provides the customers with the ease in memorizing the passwords and avoids carrying ATM cards with them. In the future, this system can be enhanced in such a way of merging one's own accounts in multiple banks and calculating his/her actual cash-in-hand in the bank accounts. This total sum can help the government to find whether the account holder has paid his/her payable amount of tax or not. This can prevent the accumulation of black -money by depositing it in different accounts. Hence this system is expected to bring a major change in the future banking sector.

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