Advanced ATM System

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***Abstract*— Biometric authentication has been proven to be of high accuracy in user identification. To achieve more accurate identification it is better to use which characterizes an individual. The various biometric features that may be used for authentication includes fingerprint, palm print, handprint, face recognition, speech recognition & eye biometrics out of which fingerprint has higher accuracy as compared to others mentioned. A fingerprint is a combined formation of ridges and valleys. This system recognizes fingerprint to access bank accounts of only those individuals whose fingerprint have been registered. In case of battery drain or a mishap like complete power failure, stored fingerprints are retained. A prototype of ATM system based on a microcontroller using fingerprint sensor module is implemented. The programming platforms that can be used are MySQL and Visual Studio. This can be implemented as a hardware project as well as desktop application.**

Keywords*— *ATM, Biometrics, Fingerprint, Authentication., Security.

I. INTRODUCTION

Based on a physiological or behavioral characteristic it is possible to recognize an individual using Biometric techniques. It can be implemented to improve the security of financial transactions and for personal uses. Utilizing biometric sciences, we can identify/verify distinctive features of an individual. The various features used are face, fingerprints, hand geometry, handwriting, iris, retina, vein and voice. Amongst the various biometric techniques trending, finger-scan is the most efficient and feasible technology therefore the commonly used one as well. The transactions of money play an important role in the present society. ATMs, Debit cards and Credit cards are mainly used for transactions. Authentication in ATM system is done using ATM cards and Personal Identification Number(PIN). Nowadays ATM cards can be cloned easily by intruders, therefore authentication provided by conventional methods are not highly secure. The fingerprints of customers can be used instead of traditional ATM card to overcome this disadvantage, as fingerprint of every individual is unique and unchangeable.

II. LITERATURE SURVEY

The primary aim of this project is to convolve security and biometric technology to produce the secure system.The "Handbook of Fingerprint Recognition" helps us to understand the science of automatically identifying individuals based on their physiological or behavior characteristics [2] The Biometrics: "Advanced Identity Verification" helps us to understand fingerprint matching techniques. [4] The "Biometrics: Identity Verification in a Networked World" helps us to understand the benefits over traditional authentication approaches [3] The journal "Introduction to Biometrics" helps us to understand use of fingerprint scanners to authentic computer users [1]

III. IMAGE ENHANCEMENT

A. Contrast Stretching

Contrast stretching (often called normalization) is a simple image enhancement technique that attempts to improve the contrast in an image by `stretching' the range of intensity values it contains to span the desired range of values, *e.g.* the full range of pixel values that the image type concerned allows. It differs from the more sophisticated histogram equalization in that it can only apply a *linear* scaling function to the image pixel values. As a result, the `enhancement' is less harsh. Most implementations accept a gray level image as input and produce another gray level image as output.

B. Histogram Equalization

This method is basically incorporated to increase the global contrast of many images, whenever the usable data of the image is represented by similar contrast values. Due to this adjustment, the intensities can be better distributed on the histogram. This also allows for areas of lesser local contrast to gain a considerably higher contrast. This can be accomplished by effectively spreading out the most frequent intensity values.

IV. WORKING

Steps involved are as follows:

- User will login to the system using his fingerprint.
- The user has to scan the finger and add a pin in order to do transactions.
- Withdrawal of cash is to be done by entering the amount user wants to withdraw.
- The user can transfer cash to other accounts by entering the account number he wants to transfer.
- Balance, as well as last five transactions, can be viewed which is available in his/her respective account.

V. FINGER SCAN TECHNOLOGY

Stages involved for fingerprint enhancement are as follows:

- There are five stages involved in finger-scan verification and identification. Fingerprint (FP) image acquisition, image processing, and location of distinctive characteristics, template creation and template matching.

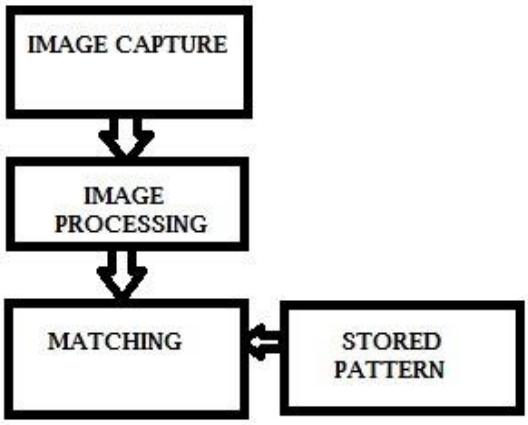

Fig 1: Block diagram for the fingerscan process.

- A scanner takes a mathematical snapshot of a user's unique biological traits. This snapshot is saved in a fingerprint database as a minutiae file. The first challenge facing a finger-scanning system is to acquire a high-quality image of a fingerprint. The standard for forensic-quality fingerprinting is images of 500 dots per inch (DPI).
- Image acquisition can be a major challenge for finger-scan developers since the quality of print differs from person to person and from finger to finger. Some populations are more likely than others to have faint or difficult-to-acquire fingerprints, whether due to wear or tear or physiological traits. Taking an image in the cold weather also can have an effect.
- Oils in the finger help produce a better print. In cold weather, these oils naturally dry up. Pressing harder on the platen (the surface on which the finger is placed, also known as a scanner) can help in this case. Image processing is the process of converting the finger image into a usable format. This results in a series of thick black ridges (the raised part of the fingerprint) contrasted to white valleys.
- At this stage, image features are detected and enhanced for verification against the stored minutia file.
- Image enhancement is used to reduce any distortion of the fingerprint caused by dirt, cuts, scars, sweat and dry skin.

VI. ADVANTAGES AND LIMITATIONS

The size of the memory required to store the biometric template is fairly small. Fingerprint based ATM System is more secure than ATM card. The user can make a transaction using his fingerprint anywhere and at any time he need not have to carry ATM card, but There is a fraction of the population that is unable to be enrolled. There are certain ethnic groups that have lower quality fingerprints than the general populations. Testing has shown that elderly populations, manual laborers, and some Asian populations are more difficult to be enrolled in some finger-scanning systems. If the User finger pattern has some cut or got damaged the system might not recognize the user.

VII. APPLICATIONS

It can be used in Banking & Finance, Membership Verification ATM, Transaction / Check Deposit ATM and Self Service ATM.

VIII. CONCLUSION

Finger-scan technology is proven and capable of high levels of accuracy. Identical matches are nearly impossible since fingerprints contain a large amount of information making it unlikely that two fingerprints would be identical. The design of fingerprint image enhancement Fingerprint recognition module is an extremely important part of the system, the high-quality images was the major factors of influencing the performance of the system.

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