Fingerprint Detection System forOnline Transaction Using imagepre-processing technique

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ABSTRACT

This project is based on the authentication scheme for throughout the transaction. Today all the transactions, payments, applications, purchases and so on are performed using the internet only. All the online credentials are based on the credentials like username, password only. Shortly mean this as a text based authentication. This kind of text based authentication is not checking the persons who are doing the transactions in front of the system it is checking only the credentials which the users entering. The proposed system is focusing on the throughout authentication scheme that is from login andlogouttime.This system about the authorized person's fingerprint detection for throughout session (From login time and logout time).The optical fingerprint readerin a tool which helps in detecting the biometric data. Then the pre-processing stage which is used to remove unwanted data and increase the clarity of ridge structure by using image pre-processing enhancement techniqueFeature extraction stage which take the input from the output of the pre-processing stage to extract the fingerprint feature. The matching stage is to compare the acquired feature with the template in the database.Ifmatchdoesn'texist it results as unauthorized user and exit from the current session.

GENERAL TERMS:*Fingerprint recognition, Enhancement, Biometrics, Security, Features Extraction.*

1. INTRODUCTION

The main scope of the work is to design on actual online purchase order system for shopping when we purchase an item from online,itrecognize the captured data if match occur it proceeds with selling. Selling proceeds givesdetails about the products, quantity of the products sold by the user. The admin will view all the checking process made by the user. So there will be a proper authentication.

This online detection helps to provide authorized access in the system while performing important transactions. The verification of authorized access is performed by fingerprint image pre-processing technique.

2.BIOMETRIC AND ITS TYPES

There are two types of biometrics:

1. Behavioral
2. Physical

Behavioral Biometrics:

Mostly used for verification.

- Speaker Recognition
- Signature
- Keystroke

Physical Biometrics:

- Used for either identification or verification.
- Fingerprint
- Facial Recognition
- Hand Geometry
- Iris Recognition

Advantages of using Fingerprint Biometrics:

- Generality-Fingerprint is universally available with every individual. Only some rare people do not finger.
- Unlikeness-Each individual has a unique fingerprint. No two people have same fingerprint patterns.
- It is more secure as it cannot be shared or used by others.
- No need to remember passwords or any PINs.
- Biometrics gives the promise of fast, easy-to-use, accurate, reliable, and less expensive authentication for many applications.

Disadvantage:

Biometric systems must be able to accommodate changes to the biometric over time which may be caused by ageing, illness or injury.

- Using the fingerprint scanner can lead to false rejections.
- Using the fingerprint scanner can lead to false acceptances

3. METHODOLOGY

In the existing system the online transactions are by online using the username and password. After entering the amount the system sends an One timePassword(OTP) on the registered mobile number and then after entering the correct OTP the transaction is proceed successfully. But it is not much secure as the OTP can be stolen or changed by anyone if our mobile is hacked or stolen. Thus, we need a more secure method for making our online transactions. Therefore, we use a fingerprint image pre-processing technique for identification of the user.

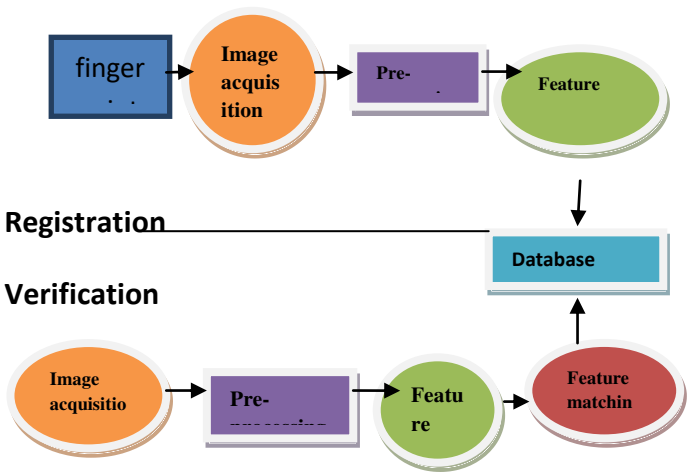

Figure 1 Fingerprint practicesand methods

Some of the steps used in fingerprint method and practices includes,

- Image acquisition
- Image pre-processing
- Image Enhancement
- Image orientation
- Feature extraction stage

4. IMAGE ACQUISITION

In image processing, it is defined as theaction of retrieving an image from somesource,usuallya hardware-based sourceforprocessing. The image that is acquirediscompletely unprocessed.Now the incoming energy is transformedinto a voltage by the combination of input electric power and sensor material that is responsive to a particular type of energy being detected. The output voltage waveform is the response of the sensor(s)and a digital quantity is obtained from each sensor by digitizing its response.

5. IMAGE PRE-PROCESSING :

The pre-processing stage is the process of removing unwanted data in the fingerprintimage such as noise, reflection etc. The fingerprint image pre-processing isused to increase the clarity of ridge structure.

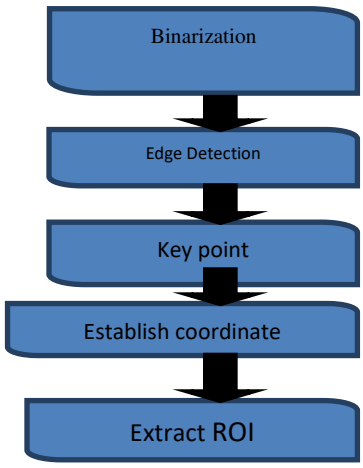

Figure 2-General steps of pre-processing

There are many steps for doingthis process shown in fig.2, such as Imagesegmentation, Binarization, Elimination ofnoise, smoothing and thinning which areused to enhance the fingerprint image.

6.IMAGE ENHANCEMENT

The Region of Interest is fingerprint Image enhancement. This is mainly done improving the image quality and to make it clearer for further operations. Hence image enhancement is necessary and a major challenge in all fingerprint techniques to improve the accuracy of matching. It increase the contrast between ridges and furrows and connects the some of the false broken points

of ridges due to insufficient amount of link or poor quality of sensor input.

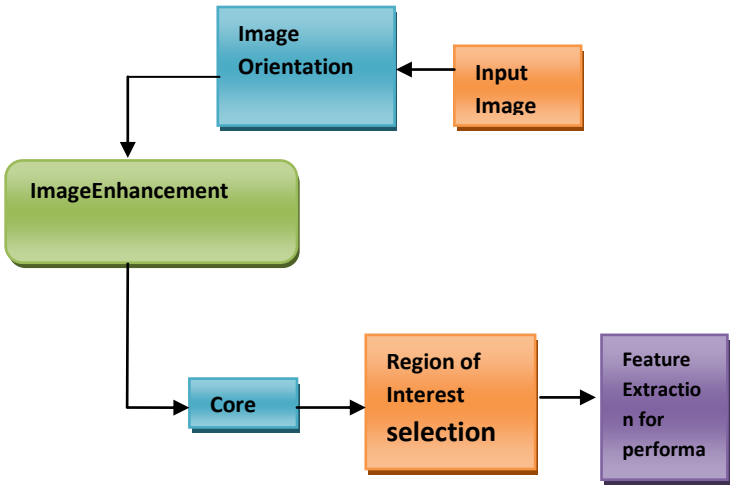

Figure 3-Image Enhancement

7.IMAGE SEGMENTATION

For doing any further processing on the image only a specific Region of Interest(ROI) of fingerprint image is considered. For doing this, fingerprint segmentation is used toeliminate the undesired noisy background in the image and reduce the size of The image area which is without ridges and furrows is first discarded since it only contains the background information. Then the remaining effective area i.e. ROI is sketched out. To extract this ROI, following two- step method is used. The first step is block direction computation while the second is intrigued from some morphologicalmethods.

7.1 BLOCK DIRECTION

Here the fingerprint image is divided into blocks of size 16*16 pixel(W*W) afterwhich the block direction of each block is calculated according to algorithm.Calculate the gradient values along x-direction (gx) and y-direction (gy) for each pixel of the block.

7.2 ROI EXTRACTION BY MORPHOLOGICAL OPERATIONS

ROI extraction is done using two morphological operations called OPEN and CLOSE. The OPEN operation can expand images and remove peaks introduce d by background noise. The close operation can shink images and eliminate small cavities.

8.FEATUREEXTRACTION

For the purpose of automation, a suitable representation for feature extraction of fingerprint is essential. This representation should have the following properties:

- Retention of discriminating power of each fingerprint at several levels of resolution
- Easy computability
- Stable and invariant to noise and distortions

The famous method is minutiae extraction algorithm which is find the minutiae points and map their relative placement on the fingerprint. There are two points ridge ending and ridge bifurcation.

Several feature extraction methods have been proposed and implemented successfully.

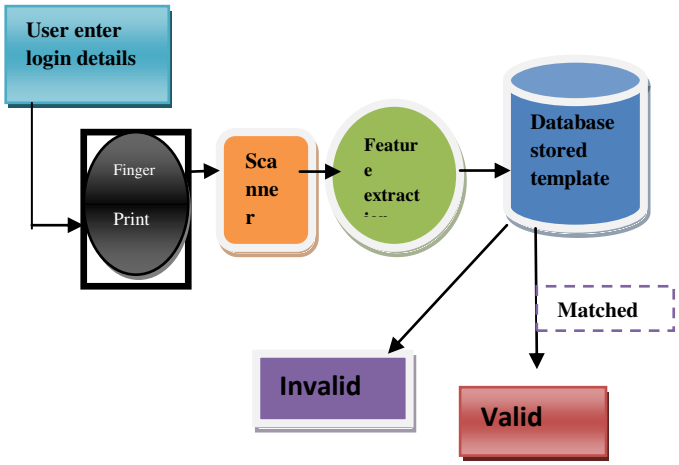

Figure 4- Feature extraction

9.FUTURE WORK

Determine the alteration type automatically. So that appropriate counter-measures can be taken. Reconstruct altered fingerprint. For some types of altered fingerprints where the ridge patterns are damaged locally or the ridge structure is still present on the finger but possibly at a different location, reconstruction is indeed possible.

10.CONCLUSION:

The system implemented will be moresecure, accurate and fast to get into onlinetransaction services. All the transactionswho do not have internet services can usethis system for starting such service. Eventhose transactions who have existinginternetservices can use this system formore secure and accurate userauthentication. Hence, the proposed systemwill be compatible with All types ofcurrently existing systems and that too withminimumoverhead.

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