

Security Method for Human Finger and Palm Images Identification

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Abstract – Sclera vein pattern is used for the recognition purpose which is harmful and may cause some serious side effects to the human being. Finger and palm vein patterns are unique to each individual, even among identical twins. A hybrid approach of using finger and palm vein for the design of biometric system has been proposed. The proposed system approach simultaneously acquires the finger and palm vein databases and combines these two evidences using a hybrid comparison strategy in order to increase the accuracy and sensitivity of the system while reducing the time complexity and harmfulness to human being.

Index Terms – Vein Pattern.

1. INTRODUCTION

1.1. Overview

Authentication is the act of confirming the truth of an attribute of a datum or entity. This might involve confirming the identity of a person, tracing the origins of an artifact, ensuring that a product is what it's packaging and labeling claims to be, or assuring that a computer program is a trusted one. If the Authentication request is approved, then the person becomes authorized to get access.

Database verification involves comparison with only those templates corresponding to the claimed identity. This implies that identification and verification are two problems that should be dealt with separately.

Biometric System: A biometric system is essentially a pattern-recognition system that recognizes a person based on a feature vector derived from a specific physiological or behavioral characteristic that the person possesses. That feature vector is usually stored in a database (or recorded on a smart card given to the individual) after being extracted.

1.2. Minutiae features

The major Minutia features of fingerprint ridges are: ridge ending, bifurcation, and short ridge (or dot) as shown in fig 4.3. The ridge ending is the point at which a ridge terminates. Bifurcations are points at which a single ridge splits into two ridges. Short ridges (or dots) are ridges which are significantly shorter than the average ridge length on the fingerprint. Minutiae and patterns are very important in the analysis of fingerprints since no two fingers have been shown to be identical.

2. SYSTEM IMPLEMENTATION

2.1. WORKING METHODOLOGY

Stage 1: Finger/Palm vein image acquisition

Image acquisition is the first stage of any pattern recognition process. It is the process that involves the sampling of biometric feature and the conversion of these features into the form that can be manipulated by the computer.

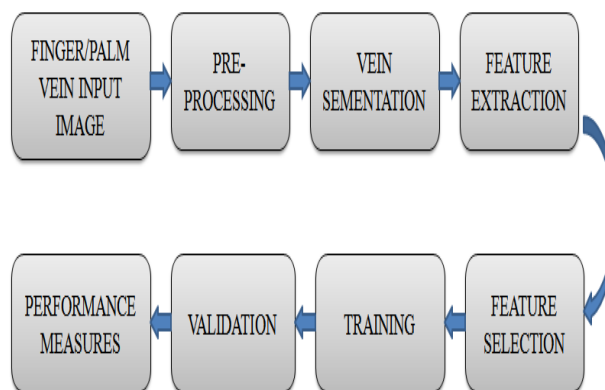


Fig 2.2: Basic block diagram of training phase

Stage 2: Finger/Palm vein preprocessing

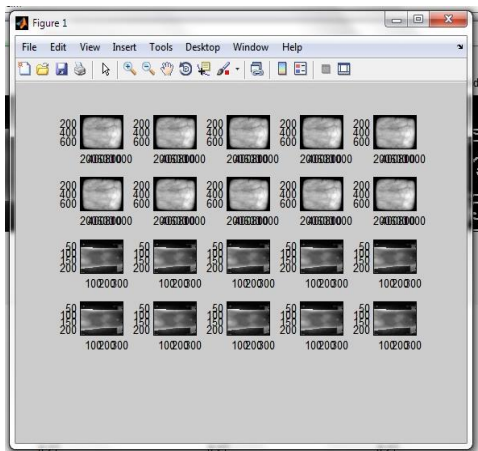
This stage prepares the captured palm vein image for preprocessing. Preprocessing involves the following activities:

- a. Scaling of pictures Finger/Palm vein images were cropped from its original captured sizes and were later resized from the original dimension of 480*640 to 200*200 pixels.
- b. Organizing the captured images into Finger/Palm vein folder.

Cropping the images were cropped to sizes of 10*20, 15*15, 10*20, 15*25, 30*30, 35*35, 40*40, 15*45, 10*50, 55*55 and 450*60 pixels from the center of the image by the program in order to test for the effect of varying resolution on the recognition performance.

- The cropped images in the database were converted into gray scale so as to make it suitable for the Finger/Palm vein recognition system.
- Apply morphological opening operation with a disk shaped structuring element on gray scale image to extract the finger and palm vein regions.
- Binaries the resultant image by thresholding.
- Apply the anisotropic and median filter to remove the noise in present binaries image.

Extracts the finger and palm vein features by using the GLCM.



Stage 3: Training phase of Finger/Palm vein

The training phase involves the extraction of the features and produces a feature set which is then used for training the classifier.

Stage 4: Testing phase of Finger/Palm vein

The testing phase involves the classification process based on the feature set obtained from the acquired test image.

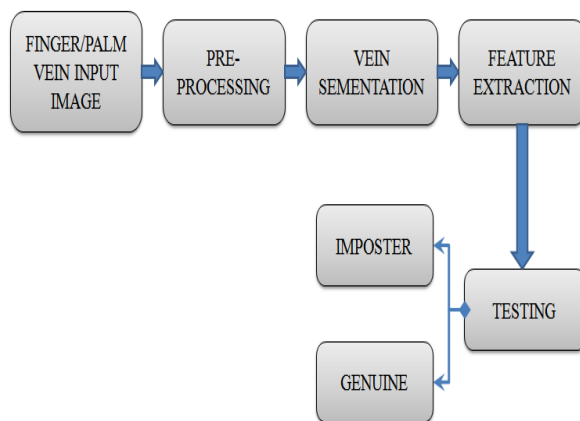


Fig 2.3: Basic Block Diagram of testing phase

A gray scale median filter is applied to the grayscale image to smooth the noisy background. By applying median filter.

3. EXISTING SYSTEM

In practice, simple mechanisms like providing visual feedback about the fingerprint image being captured (in terms of a live display) make a significant difference in the system performance. Security is more less.

Further, prompting the user to place the finger in a desirable position and orientation also improves the false negative performance of the system.

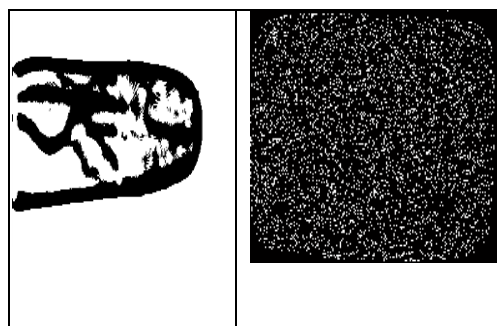
3.1. DRAWBACKS

The finger may be placed at different locations on the glass platen, resulting in a (global) translation of the minutiae from the test representation from those in the reference representation.

The finger may exert a different (average) downward normal pressure on the glass platen, resulting.

4. PROPOSED SYSTEM

The proposed system has two phases namely training and testing phases of the classifier. The overview of the steps to be carried out in the training and testing phases of this paper is as shown.



Both the phases involve the acquisition of the input finger and palm vein images followed by the pre-processing to remove the noise and blurring effect and is localized to extract region of interest. The next stage involves.

- The features extracted from the vein pattern are provided to the FUZZY logic and ANN classifier, which is trained by publicly available databases to provide access to the person. The overview of the proposed system is shown in following. In proposed system two comparative methods are used for testing the finger and palm vein patterns namely Artificial Neural Network (ANN) and FUZZY logic,

4.1. Fuzzy logical operation

In this perspective, fuzzy logic in its slender sense may be a branch of FL. Even in its a lot of slender definition, FL differs each in idea and substance from ancient multivalued logical systems.

There is increasing interest within the use of FL and fuzzy sets, for varied applications. FL makes it attainable to own reminder gray between the reality values of 0(false) and 1(true).

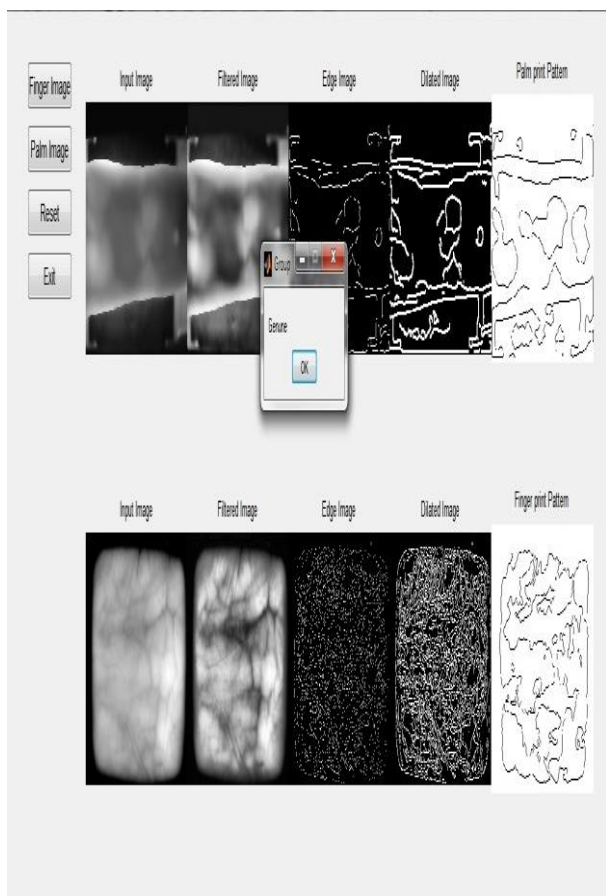


Fig: Simulated behavior using MATLAB

Tamura Features	FINGER PRINT	VEIN	Target
1	1	5.409363	1
2	1	5.320667	1
3	0.98873	0.023825	1
4	1	5.466559	0
5	1	0.023485	0
6	0.91887739	0.022067	0

5. CONCLUSION

The organization wants to protect this information from either internal or external threat. Security plays a very important role in the organization and to make computer system secure, various biometric techniques have been developed. The proposed Finger Vein Biometric Authentication System fits all levels of applications starting from lower end to higher end wherein security is a great issue, the main reason being Liveliness detection. They raw values are executed successfully for their execution.

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