Survey on Finger vein

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Abstract- **Biometric is used in computer science as a form of identification and access control. Out of all techniques of biometric finger vein extraction is most effective method. The paper describes the various researches done on finger vein till date. We are using a unique combination of the curvature points and mathematical curve analysis along with the minutiae point extraction methods for veins biometric. The minutiae point extraction method is used to extract the finger vein skeleton, which is followed by the joining points of the skeleton lines. The deep curve analysis will give the curvature intersections, curvature points and the information about the angles, curve length and other curve properties in order to extract the perfect features from the finger vein image.**

I. INTRODUCTION

User authentication is extremely important for computer and network system security. Some of the commonly used biometric traits are face, sclera, fingerprint, iris, finger vein etc., The vein based authentication system is a promising biometric pattern for personal identification in terms of its security and convenience. It is difficult to steal since the vein is hidden inside the body and is mostly invisible to human eyes. The vein patterns can only be taken from a live body. Hence it is a natural and convincing proof that the subject whose veins are successfully captured is alive. Finger vein authentication is a new biometric method utilizing the vein patterns inside one's fingers for personal identity verification Biometric systems based on fingerprints can be fooled with a dummy finger fitted with a copied fingerprint; voice and facial characteristic based systems can be fooled by recordings and high resolution images. The finger vein ID system is much harder to fool because it can only authenticate the finger of a living person.

II. LITERATURE SURVEY

1. M. S. M. Asaari, S. A. Suandi, B. A. Rosdi *"Fusion of band limited phase only Correlation and width centroid contour distance for finger based Biometrics", 2014.*

In this paper A new finger vein recognition algorithm based on Band Limited Phase Only Correlation. Finger width and Centroid Contour Distance for finger geometry recognition. The fusion of vein and geometry for a finger based bimodal biometrics system. A new infrared finger image database is made publicly available on the web. In this paper, a new approach of multimodal finger biometrics based on the fusion of finger vein and finger geometry recognition is presented. In the proposed method, Band Limited Phase Only Correlation (BLPOC) is utilized to measure the similarity of finger vein images

2. *J. Yang, Y. Shi, "Towards finger-vein image restoration and enhancement for Finger-vein recognition", Jun. 2014*

In this paper, Biometric recognition based on human finger-vein patterns is an emerging technique and has been receiving increasing attention. Due to light attenuation in biological tissue, the collected finger-vein images are often seriously degraded. This makes finger-vein feature representation unreliable, and inevitably impairs the accuracy of finger-vein recognition. Exploring suitable ways of finger-vein image restoration and enhancement is indispensable for finger-vein based personal identification. In this paper, we first analyze the intrinsic factors causing the degradation of finger-vein images, and propose a simple but effective scattering removal method to improve the visibility of finger-vein images. Moreover, to handle venous region enhancement problem effectively, a directional filtering method based on a family of Gabor filters is proposed. Finally, a Phase-Only-Correlation strategy is used to measure the similarity of the enhanced finger-vein

images. Experiments performed on a large finger-vein image database show that the proposed method is effective and reliable in finger-vein image restoration and enhancement

SYSTEM MODEL

In this Method we will acquired finger vein minutia images, the redundant points are eliminated. The elimination of redundant points will enhance the matching reliability and reduce computational complexity. Neighborhood elimination technique is employed for the purpose of removing the redundant information while keeping the effective source information for subsequent processing. This technique is applied on the normalized point-set of finger vein. For each point of finger vein, those points that lie within the neighborhood of a certain radius are removed. In order to determine the neighbors of each specific point, the spatial information is used.

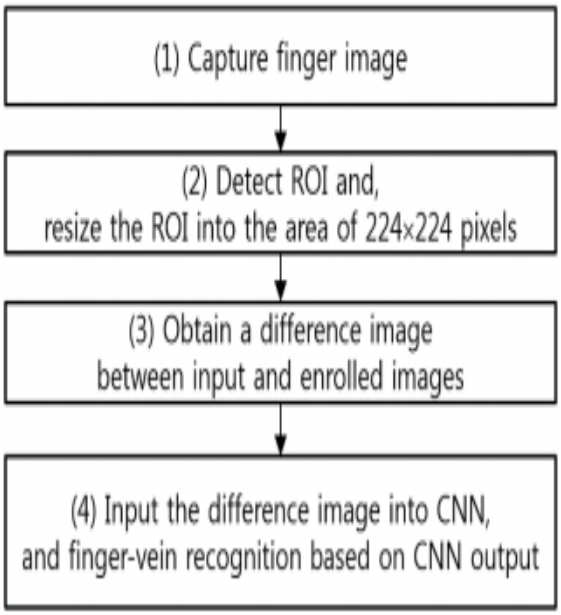

Figure 1. Flowchart of the proposed method.

III. RESEARCH METHODOLOGY

The orientation encoded method is applied to palm-prints and palm-veins and has shown high performance. Therefore, we attempt to preserve the orientation features of finger-vein by the following encoding method:

Determination of Orientation

As the finger-vein extends along the finger, the finger-vein has a clear orientation field. To estimate the orientation, we divide the ridge direction of a pixel (x, y) into eight directions, which is shown in Figure 1. Then the eight directions are divided into four groups and the two directions in each group are perpendicular to each other. Let $G_j = \{j, j + 4\}$ be jth group.

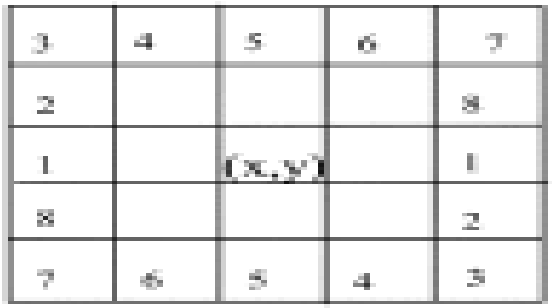

Figure 1: Eight directions of a pixel.

Computation of Difference Curvature

The curvatures in two directions G_j can be computed using Equation(1), respectively. The difference values of the curvatures in each group are calculated as:

$$\Delta Kj = \begin{cases} Kj[z] - Kj+4\ [z] & \text{if } j \leq 4 \\ Kj[z] - Kj-4\ [z] & \text{if } j > 4 \end{cases} \qquad (j=1, 2, \ldots, 8)$$

Research Methodology/Planning of Work

In this project have investigated a novel finger-vein identification scheme utilizing the SIFT, finger-vein shape and orientation features. Firstly, two feature extraction approaches are proposed to obtain finger-vein shape and orientation features. Then we proposed a sub-region matching method to overcome the local and global changes between two vein images. Finally, a combination scheme is employed to improve the performance of finger-vein recognition system. Rigorous experimental results on two different databases have shown that the proposed vein extraction method outperforms previous approaches and a significant improvement in the performance can be achieved by combining SIFT features, finger-vein shape and orientation features.

The finger-vein shape and orientation features based on weighted SUM and SVM fusion rules. For each experiment, half of imposter and genuine scores are randomly selected for training and remaining scores

are used for testing. This partitioning of the scores was repeated 20 times, and then we compute the mean of GAR (at certain FAR) and EER on the 20 testing sets to evaluate the performance of finger-vein recognition system. These parameters of z-score normalization were estimated based on training data and three kinds of normalized scores are used as the input of two fusion rules. For the weighted SUM fusion rule, the weights are selected experimentally. For the SVM-based fusion rule, the highest classification accuracy among various kernels such as dot, neural, radial, polynomial and analysis of variance kernels was obtained by a radial-based kernel.

The new approach for Human Identification combining Repeated Line Tracking and Gabor filter results in improving performance and reliability and at the same time is highly effective and robust. The proposed technique is based on series of steps involving image acquisition, preprocessing, pattern extraction and matching combining Repeated Line Tracking and Even Gabor methods. This makes Pattern Extraction and matching robust. Repeated Line Tracking is implemented first for extraction of finger-vein features from the unclear image by using line tracking that starts from various positions. Although noise may also be tracked, emphasized to a smaller degree than the dark lines, yet the pattern extracted gives promising results. Multiorientation Gabor filter is applied later on to the extracted pattern from Repeated Line Tracking in order to make the pattern extraction robust. Finally matching is done by implementing Template matching technique. In the matching process, the extracted pattern is converted into matching data, and these data are compared with recorded data for human identification. It is observed that the proposed technique comes up with good GAR values that give promising results and an improvement over the earlier individual methods.

IV. CONCLUSION

Finger vein is an important biometric technique for personal identification and authentication. The finger vein is a blood vassal network under the finger skin. The network pattern is distinct for each individual, unaffected by aging and it is internal. i.e, inside human skin which can always guarantee more security authentication. In this proposing study to an analysis of different techniques for Finger vein feature extraction. The basic and important principle, different feature extraction techniques and performance measuring are briefly analyzed. Most of the existing work is functionally described and compared in three parts, i.e. Finger vein image acquisition, pre-processing and feature extraction Although Finger-vein Biometrics is one of the latest biometric technologies, it has already established both technical and statistical feasibility, in the very near future the combination of Finger-Vein Biometric with other Biometric technologies will result in a multimodal system with very high accuracy especially for security concerns in sensitive areas.

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