Finger Vein Network Enhancement with SVM

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ABSTRACT: This paper presents the work which simultaneously acquires the finger-vein and low-resolution finger images and that combines these two techniques which using a better score-level combination strategy. Here, analyzing the previous proposed finger-vein identification approaches and develop a new approach that describes it superiority over prior published efforts. In this thesis here develop and analyze the three new score-level combinations which are repeated line tracking, support vector machine and maximum curvature comparatively evaluate them with more popular score-level fusion approaches to ascertain their effectiveness in the proposed system.

KEYWORDS: Finger vein, Image enhancement, Biometrics, SVM

I. INTRODUCTION

Finger vein recognition is defined as the method of biometric authentication which is using the pattern recognition techniques that based on human finger vein images patterns below the skin surface. It having many forms of biometrics which used to identify individuals and find out their identity. For the finger vein here the technologies presently in use and the development for large variety of applications which including the authentication of credit card, automobile security, employee time, computer & network authentication and automated teller machines. Biometrics authentication is a method of recognizing a person based on his physiological or behavioural characteristic such as fingerprint, finger-vein, face and signature.

Vein recognition technology however offers a promising solution to these challenges due the following features.

(1) Its universality and uniqueness just as individuals have unique fingerprints so also they have unique finger vein image and most people remain unchanged despite ageing.

(2) Detection methods for hand and finger vein do not have any known negative effects on body health.

(3) Epidermis condition has no effect on vein detection result.

A. *SVM*

SVM stands for support vector machines it also known as support vector networks which are manage the learning models with associated learning algorithms that analyse the data and recognize patterns which are used for classification and regression analysis.

There are properties of SVM:

1. Flexibility in choosing a similarity function.

2. Sparseness of solution when dealing with large data sets only support vectors are used to specify the separating hyper plane.

3. Ability to handle large feature spaces complexity does not depend on the dimensionality of the feature space.

4. Over fitting can be controlled by soft margin approach.

5. A simple convex optimization problem which is guaranteed to converge to a single global solution

6. Feature Selection.

B. *Applications of SVM*

- Image noising and de-noising
- Text categorization
- Image classification
- Bioinformatics(Protein classification, Cancer classification)
- Hand written character recognition

II. LITERATURE REVIEW

Presents a number of researches based on appearance based and model-based approaches for vein recognition. A concise description of those recent significant researches is presented below:

L. Rondney Long proposed in their paper the basics about identification using finger they suggested the features of a finger and their reorganization methods.
Digital Image Processing by Fafael C. Gonzalez, Richard E. Woods Addison westly publishing company proposed the use of identification. Also discussed the current status and future directions and discussed the image features as colour, texture, and shape in details. Also gives a summary of all the features with examples. For e.g.fortexture the reare textur eco-occurrence, Fourier power spectrum, Gabor features and Tamura features. It discussed various similarity measures classifier-based, elastic deformation and graph matching.

Here, introduction to finger print Recognition by U. Halici, Turkey, L.C. Jain, Australia & A. Erol, Turkey proposed the image segmentation using k-means algorithm for texture features. It suggested thetexture features and their mathematical formula in detail that has used k-means for clustering as it is the simplest algorithm.

Chih-Yi Chiu proposed the texture analysis and description in linguistic terms where proposed a fuzzy clustering algorithm for converting low level features into high level concepts and described the tamura features and linguistic terms in detail.
Ying-lui proposed
a content-based image retrieval with high level semantics where discussed about high level features, low-level features and semantic gap it suggested the ways to reduce these mantic gap.

Marchori, A. suggested that by predicted the disease class of the image identification which is able to customize to retrieve similar images with the same diagnosis.

III. PROPOSED ALGORITHM

Finger vein pattern is hard to replicate since it is an internal feature in additionally quality of the captured vein pattern is not easily influenced by skin conditions as compared with palm vein based verification system the size of the device can be made much smaller. It does not require contact between the finger and sensor which is desirable for a hygienic viewpoint. Where the segmentation errors occur during the feature extraction process due to the low qualities of finger vein images when the networks are not segmented properly and the recognition accuracy may be degraded.
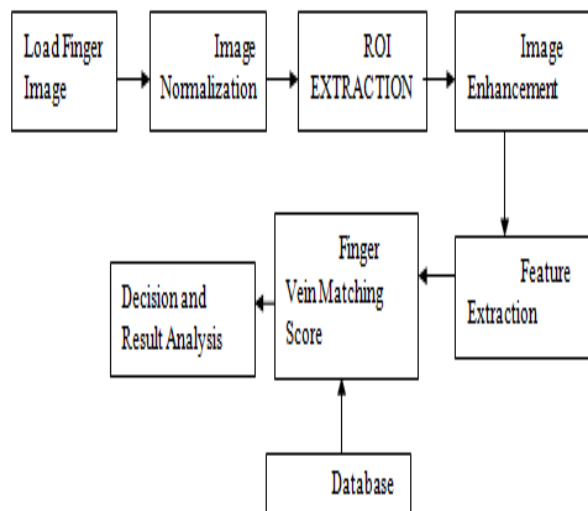

Figure1: The block diagram of the proposed system

It consists of four main stages: image acquisition, pre processing, feature extraction by Surf Feature Extraction and the calculation of matching scores by Hamming distance.
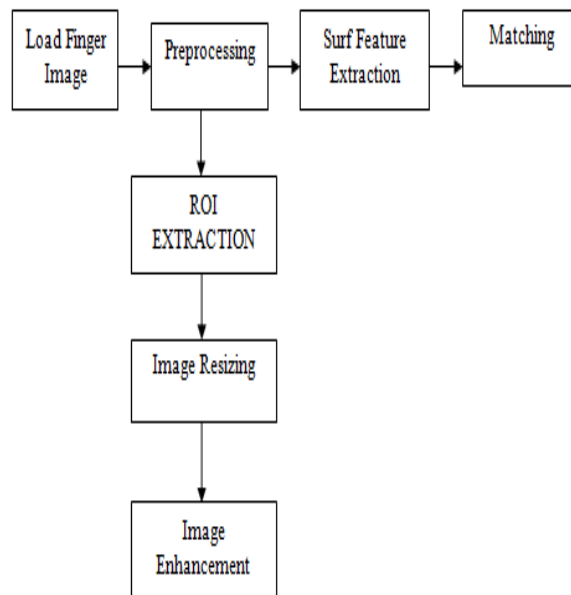

Figure 2: Block Diagram for image enhancement

Personal verification based on biometric technology has been used in many kinds of applications such as door access control, transactions on ATM and border crossing controls where the biometric is the technology of verifying people using human physiological or behavioural features such as fingerprint, iris, face and voice. Due to the fact that a hand contains lots of information and the information is easy to be retrieved, hand based biometrics such as fingerprint and palm print are the most popular biometric technologies.

IV. CONCLUSION

Here enhancing the human identification algorithm where using finger vein which is based on repeated line tracking, support vector machine and maximum curvature. The existing human identification using the finger vein recognition which does not considered the important parameters and it is poor in quality and uses repeated line which is less accurate and more time consuming.

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