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Research Paper

# BIOMETRIC ADVANCE OF SCLERA VEIN AND FINGER VEIN FEATURES FUSION RECOGNITION

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Sclera and finger print vein is a new parallel vein recognition method using a two-stage parallel approach for registration and matching. First, we designed a rotation- and scale-invariant Y shape descriptor based feature extraction method to efficiently eliminate most unlikely matches. Second, we developed a weighted polar line sclera descriptor structure to incorporate mask information to reduce GPU memory cost. Third, we designed a coarse-to-fine two-stage matching method. Finally, we developed a mapping scheme to map the subtasks to GPU processing units. The experimental results show that our proposed method can achieve dramatic processing speed improvement without compromising the recognition accuracy. We examine the previously proposed finger-vein identification approaches and develop a new approach that illustrates its superiority over prior published efforts. We develop and investigate two new score-level combinations i.e., holistic and non linear fusion, and comparatively evaluate them With more popular score-level fusion approaches to ascertain their effectiveness in the proposed system. The project is a state-of-the-art advancement of multi biometrics, offering an original viewpoint on features fusion. In greater detail, a frequency-based approach results in an identical biometric vector incorporate sclera vein and fingerprint vein data. Consecutively a hamming-distance-based matching algorithm deals with the combined homogenous biometric vector. The proposed multimodal system achieves interesting results with several commonly used databases.

**Keywords:** Sclera and Finger Vein Recognition, Multi biometric, Two new score level combination

## INTRODUCTION

Biometrics refers to the use of physiological or biological characteristics to measure the identity of an individual. These features are unique to each individual and remain unaltered during a person's lifetime.

These features make biometrics a promising solution to the society. The access to the secured area can be made by the use of ID numbers or password which amounts to knowledge based security. But such information can easily be accessed by intruders and they can breach the

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doors of security. The problem arises in case of monetary transactions and highly restricted to information zone. Thus to overcome the above mentioned issue biometric traits are used. A biometric system is essentially a pattern recognition system which makes a personal identification by determining the authenticity of a specific physiological or behavioral characteristic possessed by the user. Biometric technologies are thus defined as the automated methods of identifying or authenticating the identity of a living person based on a physiological or behavioral characteristic.

The various biometrics traits available are face, fingerprint, iris, palm print, hand geometry, ear etc. Among the available biometric traits some of the traits outperform others. The reliability of several biometrics traits is measured with the help of experimental results. The biometric system is basically divided into two modes i.e., unimodal biometric system and multimodal biometric system. In case of unimodal biometric system the individual trait is used for recognition or identification. The system performs better under certain assumptions but fails when the biometric data available is noisy. The system also fails in case of unavailability of biometric template. Thus in such a situation multimodal biometric systems are used where more than one classifier is used to arrive at a final decision. Both Principal Component Analysis (PCA) and Independent Component Analysis (ICA) are considered in this feature vector fusion context. It is found that the performance has improved significantly.

## EXISTING SYSTEM SCLERA SEGMENTATION ALGORITHM

Sclera image segmentation is the first step in

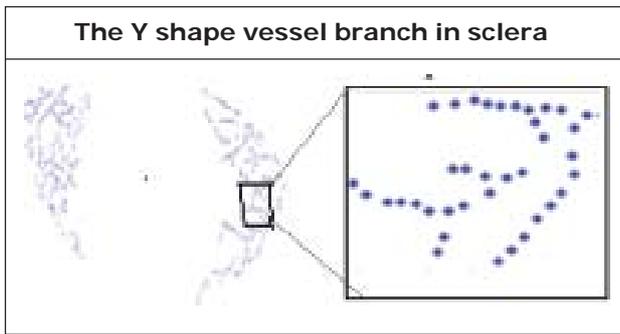
sclera vein Recognition. They used a clustering algorithm to classify the color eye images into three clusters - sclera, iris, and background. A segmentation approach based on a normalized sclera index measure, which includes coarse sclera segmentation, pupil region segmentation, and fine sclera segmentation. A skin tone plus "white color"-based voting method for sclera segmentation in color images and Otsu's threshold based method for grayscale images.

**The line descriptor of the sclera vessel pattern (a) An eye image (b) Vessel patterns in sclera (c) Enhanced sclera vessel patterns (d) Centers of line segments of vessel patterns**



## SCLERA VEIN FEATURE EXTRACTION

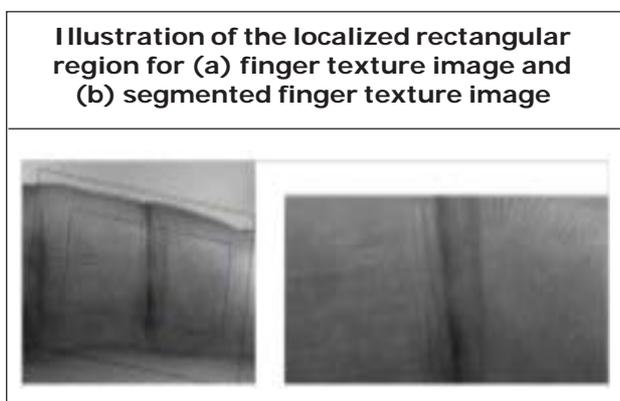
After sclera segmentation, it is necessary to enhance and extract the sclera features since the sclera vein patterns often lack contrast, and are hard to detect. In this module we used a bank of multi-directional Gabor filters for vascular pattern enhancement. We used contrast limited adaptive histogram equalization (CLAHE) to enhance the green color plane of the RGB image, and a multi-scale region growing approach to identify the sclera veins from the image background. When the numbers of branches is more than three, the vessels branches may come from different sclera layers and its pattern will deform with movement of eye. Y shape branches are observed to be a stable feature and can be used as sclera feature descriptor.



To detect the Y shape branches in the original template, we search for the nearest neighbors set of every line segment in a regular distance, classified the angles among these neighbors. If there were two types of angle values in the line segment set, this set may be inferred as a Y shape structure and the line segment angles would be recorded as a new feature of the sclera.

## FINGERPRINT SEGMENTATION

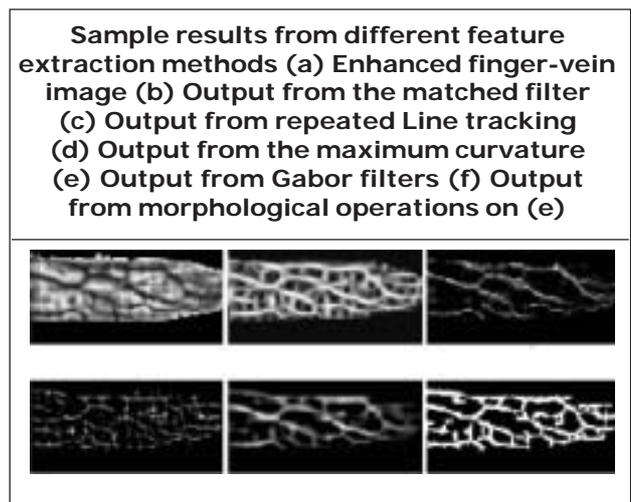
The segmentation from the localized Radon transform (LRT) proposed algorithm is used to segment the original input fingerprint image. This method will segment the fingerprint image without line removal process. This algorithm the background is indicated by the blacked out region. The figure demonstrates clearly that the detected fingerprint regions from the proposed segmentation algorithm are much smaller and more accurate than those of the previous method.



From this figure, the ability of the proposed algorithm to reduce the searchable fingerprint area while improving accuracy can be visualized.

## FINGERPRINT VEIN FEATURE

The repeated line tracking method gives a promising result in finger-vein identification.



Vein identification in fingerprint image using the repeated line tracking algorithm in this module. The idea is to trace the veins in the image by chosen directions according to predefined probability in the horizontal and vertical orientations, and the starting seed is randomly selected; the whole process is repeatedly done for a certain number of times. As its name suggests the maximum curvature method locate the position that possess the maximum curvature from the image profile, and the profile are acquired in different direction; while all points are extracted, they are connected and combined according to the rules.

## DISADVANTAGE

- Single biometric is used for recognition
- Future based detection for single vein

biometric may match with other person 0.01 percentage

- One to one matching.

## PROPOSED SYSTEM

We propose an efficient approach based on multimodal biometrics (Sclera vein and fingerprint vein) for recognition. This proposed system deals with two approaches of extracting feature of veins properties from fingerprint vein and Sclera vein and gives the optimal solution. In particular, we propose a protocol which integrates multi-biometrics, in which information from multiple biometric sources is combined.

Fusion is performed by combining the biometric template extracted from every pair of fingerprints and eye representing a user. The matching score is calculated through the Hamming Distance calculation between two final fused templates. The template obtained in the encoding process will need a corresponding matching metric that provides a measure of the similarity degree between the two templates. The result of the measure is then compared with an experimental threshold to decide whether or not the two representations belong to the same user.

## ADVANTAGE

- Finger print vein and sclera vein multi biometric is used.
- Feature calculation for both veins.
- Parallel approach is used for every vein
- More security

## CONCLUSION

The project is a state-of-the-art advancement of multi biometrics, offering an original viewpoint on features fusion. The paper proposes a biometric

personal authentication system using a novel combination of sclera and fingerprint. . For system deployment the combination is found to be useful as one needs a close up system and other needs contact. One modality is used to overcome the limitations posed by the other. The experimental results show that the accuracy of system would increase on combining the traits.

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