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# Survey of Person Identification by Using Multibiometrics

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**Abstract-** *Compared to single biometrics, multibiometrics can provide higher identification accuracy and it is more suitable for high standard security. Performance of multibiometrics is higher compared to other standard techniques. It is easy to implement and can obtain better results by combining left and right palmprint images. This framework generates three kinds of scores from palmprint images to obtain matching score fusion level. The result is eiher authenticated person or un-authorised person based on the scores obtained. Compared to previous palmprint identification methods, this proposed fusion scheme allowed perfect identification performance.*

**Keywords:** *Line-Based method, Multibiometrics, Matching score, Palmprint.*

## 1. INTRODUCTION

The most important personal identification technology is PALMPRINT identification. Palmprint contains principle curves, wrinkles, textures and miniscule points [3]. Line based [7] and coding based methods are used in palmprint identification techniques. In addition to that, subspace methods can also well perfored in palmprint identification. In recent years, (2DPCA)-2D Principal Component Analysis, (2DLDA)-2D Linear Discriminant Analysis methods are used for palmprint recognition.

Single biometric technique can't meet all requirements in circumstances [9]. To overcome the drawback of the single biometric techniques, multibiometrics methods are used. Multiple modals of the same trait, which can be fused at four levels such as image (sensor) level, feature level, matching score level and decision level. For the image level fusion, the palmprint images were captured under the illumination of Red, Green, Blue and Infrared and a wavelet based image fusion method which are proposed by Han et al [5] in multispectral palmprint recognition method. For the feature level include the combination of multiple biometric traits and integration of multiple biometric traits. For example, the performance of palmprint based verification by integrating hand geometry features are devloped by Kumar et al. [11]. The face and palmprint were integrated for personal identification. For the fusion at matching score level, various kinds of methods are proposed. For instance, A joint palmprint and palmvein fusion system for personal identification is designed by Zhang et al. [1].Particularly, combination of two kinds of matching scores are obtained by multiple matchers, the SIFT and (OLOF)-orthogonal line ordinal features, For contactless palmprint identification are proposed by Morales. For example, Kumar et al. [8] fused three major palmprint representations at the decision level. The high resolution palmprint verification and identification are proposed because of its weighted sum rule to fuse. The two kind of matching scores are proposed and it is obtained multiple matcher scores.

Different traits are independently treated in Conventional multimodal biometrics methods. However, some special kinds of biometric traits have a similarity, but these methods cannot exploit the similarity of different kinds of traits.



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The left and right palmprint traits are similar. The correlation between the left and right palmprint are do not explore in any attempt. The combining the left with right palmprint are proposed at the matching score level. In the framework, can be contain three types of matching scores, such as the left palmprint matching, right palmprint matching and crossing matching. The cross matching score can contain the left query and right training palmprint, these are fused to make the final result. The framework are also combines the left and right palmprint images for identification purpose. The left and right palmprint are same subject but these also properly exploits.

At first time the left and right palmprint are same subject these are correlated, and it demonstrates the feasibility of exploiting the crossing matching score. In the palmprint identification for improving the accuracy of person identity. At second time, these proposes an elaborated and to integrate the left palmprint, right palmprint, and crossing matching of the left and right palmprint for person identity identification. At Third, to verify the both touch-based and contactless palmprint databases.

## 2. Literature Review

In the principal lines of the palmprint identifications are two methods such as method 1 and method 2. These two methods are widely used in palmprint identification.

### A. Method 1

Method 1 is line based method. In palmprint, lines are the basic feature, and play an important role in palmprint verification and identification. The lines or edge detectors are used to extract the palmprint lines. In generally each palms have three principal lines such as heartline, headline and lifeline, these lines are long and wide im palmprint image. In this line based method is used to provide the stable performance for palmprint verification.

The Gobor filter, Sobel operation, or morphological operation are used to extract the lines in line based method. In this paper, the Modified Finite Radon Transform (MFRAT) method is used to extract the principal line images of the palmprint.

$$S(A,B) = \frac{\sum_{i=0}^{m}\sum_{i=0}^{n} A(i,j)\&B(i,j)}{NA}$$

The pixel-to-area matching strategy is adopted for principal lines matching in (RLOC) - Robust Line Orientation Code method [4], which defines a principal lines matching score.

### B. Method 2

Method 2 is coding method. The most influential palmprint identification method is coding based method. [7] ,competitive code method, ordinal code method, palmcode method and Binary Orientation Co-occurrence Vector (BOCV) method are also used in Representative coding based methods.

The competitive code method uses number of Gabor filters with number of different direction. In this gabor filter is used to extract orientation features from the number of palmprint. The number of directional filter are convoluted with the palmprint image. The dominant direction is defined as the direction with the greatest response, the index of competitive coding.

$$S(A,B) = \frac{\sum_{i=0}^{m}\sum_{i=0}^{n} A(i,j)\&B(i,j)}{NA}$$

## 3. Proposed Framework

### A. Palmprint Similarity between the Left and Right

In this section the correlation between the left and right palmprints is presented. Palmprint images of four subjects are shown in Fig. 2. four left palmprint images of these four subjects are shown in Fig. 2 (a)-(d).Four right palmprint images of the same four subjects are shown in Fig. 2 (e)-(h). Images in Fig. 2 (i)-(l) are the four reverse right palmprint images of those shown in Fig. 2 (e)-(h) Images. It can be seen that the left and the reverse right palmprint images of the same subject are similar.

Images in Fig. 3 (a)-(d) depict the principal lines images of the left palmprint shown that images in Fig. 2 (a)-(d) . Images in Fig. 3 (e)-(h) are show the reverse right palmprint principal lines images corresponding to Fig. 2 (i)-(l) images. In Fig. 3 (i)-(l) show the principle lines matching images of Fig. 3 (a)-(d) and Fig. 3 (e)-(h), respectively. In Fig. 3 (m)-(p) are the matching images between

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the left and reverse right palmprint principal lines images from different subjects. The four matching images of Fig. 3 (m)-(p) are: principal lines of (a) and (f) matching image, principal lines of (b) and (e) matching image, principal lines of (c) and (h) matching image, and principal lines of (d) and (g) matching image, respectively.

In Fig. 3 (i)-(l) show the left and reverse right palmprint from the same subject have similar position and shape. However, principal lines of the left and right palmprint images from different individual lines have very different position and shape. These lines are shown in Fig. 3 (m)-(p). This domenstrates that the principal lines of the left palmprint and reverse right palmprint can used for palmprint identification.

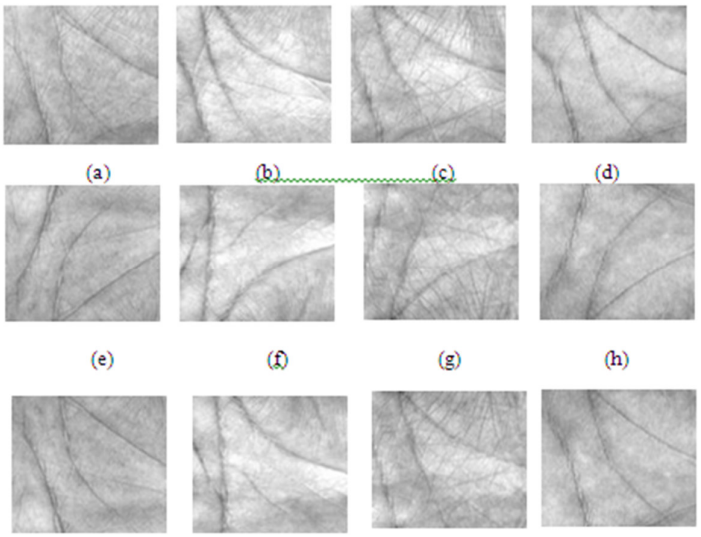


Fig. 2. Palmprint images of four subjects. (a)-(d) are four left palmprint images; (e)-(h) are four right palmprint corresponding to (a)-(d); (i)-(l) are the reverse right palmprint images of (e)-(h).

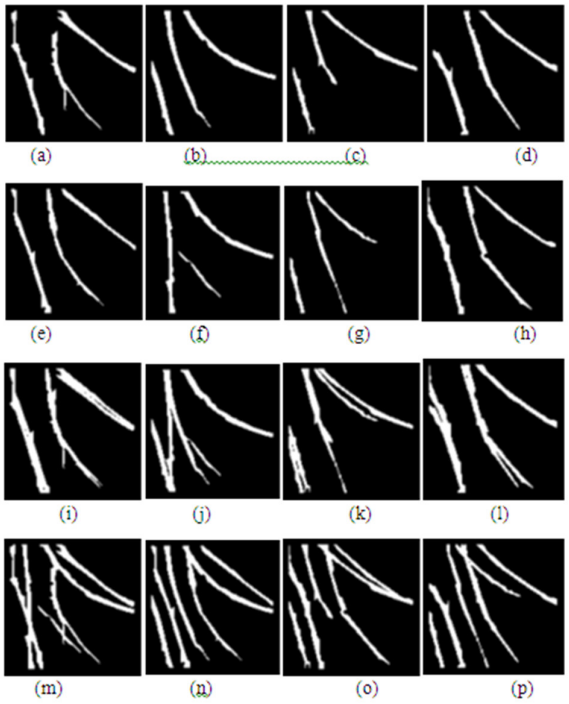


Fig. 3. Principal lines images. (a)-(d) are four left palmprint principal lines images, (e)-(h) are four reverse right palmprint principal lines image, (i)-(l) are principal lines matching images of the same people, and (m)-(p) are principal lines matching images from different people.

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## B. Procedure of the Proposed Framework

The proposed framework main steps are described in this subsection. The framework first applies the palmprint identification method to the left palmprint images and to calculate the scores of the test sample with respect to each class. Then it works for the right palmprint images and uses a palmprint identification method to calculate the score with respect to each class of the test sample.

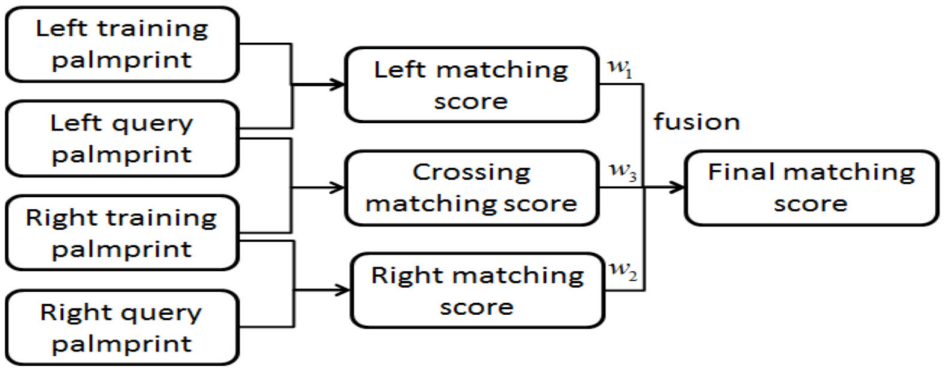


Fig. Fusion at the matching score level of the proposed framework.

After the crossing matching score, the left palmprint image for testing with respect to the right reverse palmprint images is obtained, the proposed framework performs matching score level fusion to integrate these three scores to obtain the identification result.

## C. Computational Time of Identification

| Methods Used In Individual Matcher | Computation time | Error Rate |
|---|---|---|
| RLOC | 1.16s | 5.95% |
| Competitive code | 0.26s | 0.83% |
| Palmcode | 0.54s | 3.77% |
| LDA | 19.70ms | 10.43% |
| TPTTSR | 41.91ms | 1.43% |
| SIFT+OLOF | 15.62s | 0.72% |
| Combined palmprints | 18.95s | 0.65% |

## D. Computational Complexity

As a result, the proposed method needs to perform one more identification than the conventional strategy. Thus, the identification time of the proposed method may be about 1.5 times of that of conventional fusion strategy.

To evaluate the computational cost of the proposed method, algorithms adopted in the proposed method are implemented by using MATLAB 7.10.0 on a PC with double-core Intel(R) i5-3470 (3.2GHz), RAM 8.00GB, and Windows 7.0 operating system. The time taken for the processing the reverse right training palmprint for each class is about 4.24s and 2.91s on both databases.

## 4. Conclusion

This proposed study shows that the left and right palmprint images of the same subject are similar. The performance improvement of palmprint identification for the use of this kind of similarity images has been explored in this paper. The proposed framework method carefully takes the nature of the left and right palmprint images into account and create an algorithm to evaluate the similarity between the left and right palmprint images. Moreover, by employing this similarity, the proposed fusion scheme uses a method to integrate the three kinds of scores generated from the left and right palmprint images. The Experiments demonstrate that the proposed framework obtains very high accuracy and the use of the similarity score between the left and right palmprint

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leads to the improvement in the accuracy. This method is also seems to be helpful in motivating people to explore potential relation between the traits of other bimodal biometrics issues.

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