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## Performance Analysis Of Bimodal Biometric Using Face And Fingerprint Recognition

**Punithavathi G**

Dept. Of Electronics And Communication, Reva ITM  
Bengaluru, India

**Nirmalkumar S. Benni**

Assistant Professor, Dept. Of Electronics And Communication, Reva ITM  
Bengaluru, India

### **Abstract:**

*The personal identification based on biometric recognition is essential to create unique identification (uid) card, which can be used for voting in electoral systems, accessing secured areas, identification to avail government and nongovernment facilities. In this paper we propose a bimodal biometric using face and fingerprint recognition system with high computation efficiency and recognition rate and to make the bimodal biometric system practical. We are using 2d-dwt and 2d-fft to get far and frr minimum so that we can improve the tsr.*

### **1.Introduction**

The term “biometrics” is derived from the greek word “bio” (life) and “metrics” (to measure). Automated biometric systems have only become available over the last few decades, due to significant advances in the field of computer processing. Many of these automated techniques, however are based on ideas that were originally conceived hundreds even thousands of years ago. Biometrics are automated methods of recognizing a person based on physiological or behavioral characteristics. Among the features measured are face, fingerprints, hand geometry, hand writing, iris, retinal vein and voice. Biometric technologies are becoming the foundation of an extensive array of highly secure identification and personal verification solutions. As the level of security breaches and transaction fraud increases, the need for highly secure identification and personal verification technologies is becoming apparent. Biometric-based solutions are able to provide for confidential financial transactions and personal data privacy. Biometric characteristics can be divided into two main classifications: Physiological are related to shape of the body. Examples include, but are not limited to fingerprint, face recognition, DNA, hand and palm geometry, iris recognition which has largely replaced retina, and odor or scent. Behavioral are related to the behavior of a person. Examples include, but are not limited to typing rhythm, gait and voice. Some researchers have coined the term behavio-metrics for this class of biometrics. Strictly speaking, voice is also a physiological trait because every person has a different vocal tract, but voice recognition is mainly based on the study of the way a person speaks, commonly classified as behavioral.

### **2.Proposed Method**

#### *2.1.Bimodal Biometric Using Face And Fingerprint*

The fusion model maintains the advantage in recognizing faces with pose variations in the settings of closed-set identification, and substantially suppresses the high FAR for open-set recognition using a special fusion that combines DWT-FFT and Euclidean Distance. The fusion model can reach a right balance between recognition performance, model size, and processing time this model is especially effective in coping with the cases in which the subjects with similar faces and finger may lead to a high FAR, and such cases can be common when the gallery set is large. Its two-fold scheme can be extended to other applications or ways of fusing two or more different classifiers. Many different types of classifiers have been made available in the last decade for research upon pattern recognition and computer vision. The ways of putting them together are yet to investigate, and the researchers believe that this can lead to some different perspectives and potentials of using fusion model. The bimodal biometric using face and fingerprint is as shown in fig1.

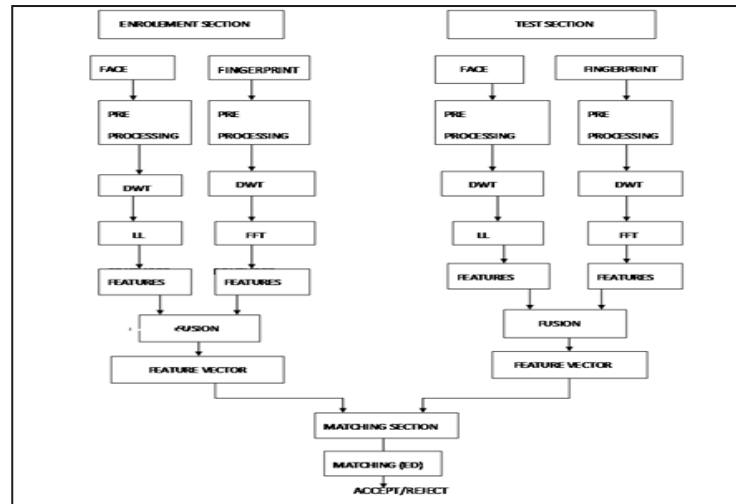


Figure 1: Block Diagram Of Bimodal Biometric

### 2.2. Enrolment Section And Test Section

Database is a library of known faces. The biometric data samples of face are collected from standard database such as NIR, ORL, COMBINED and YALE. The database used in this project is COMBINED. It consists of images of 100 persons inside the database and we create a database of 50 persons IN-DATABASE such that 7 images of one person is considered and 50 OUT-DATABASE where every 8<sup>th</sup> image is the test image .

The biometric data samples of finger are collected from standard database such as DB1\_A, DB2\_A DB3\_A DB4\_A . The database used in this project is DB3\_A. It consists of images of 100 persons inside the database and we create a database of 50 persons IN-DATABASE such that 7 images of one person is considered and 50 OUT-DATABASE where every 8<sup>th</sup> image is the test image .

After loading the databases the features are obtained independently as said in unimodal biometric face and fingerprint systems but here in bimodal biometric the face and fingerprint features are fused by concatenating the features onto a single vector.

### 2.3. Matching Section

After being able to get the final feature vectors from both database and test image, the test image features are compared with the database images using Euclidean distance and is checked for match/mismatch.

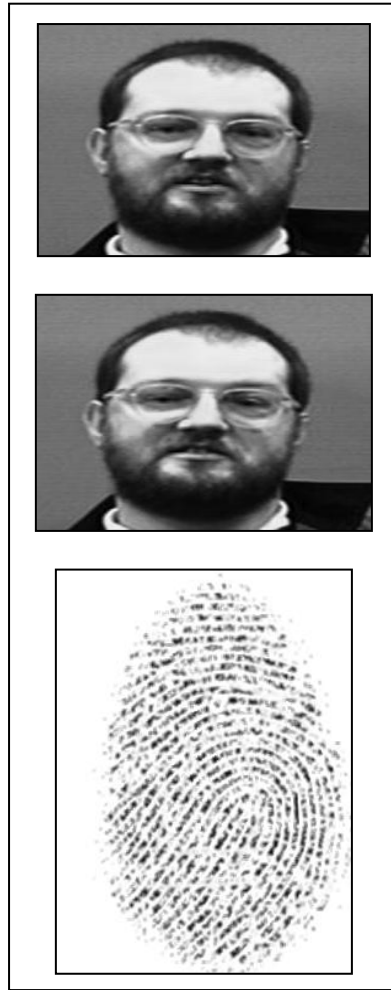
<ul style="list-style-type: none"> <li>• Input: Database Face and fingerprint images and test face and finger images.</li> <li>• Output: person match/non-match</li> </ul> <ol style="list-style-type: none"> <li>1. L-Speck database of face and DB3_A of finger is considered</li> <li>2. Apply 2D-DWT on face Database and 2D-DWT and 2D-FFT on finger database.</li> <li>3. Fuse the features of face database and finger database using concatenation.</li> <li>4. Repeat the steps 1 to 3 on test face and finger images also.</li> <li>5. The Euclidian distance between face data base features and test face features are calculated.</li> <li>6. If the threshold value is greater than the Euclidian distance face image is match else non-match.</li> </ol>
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Table 1: Algorithm

### 3. Algorithm

In today's technology advancement era, where computers are a necessary nutrient to comply with and serve all the activities, the need for secured, reliable, simple and flexible system has advertently become a challenging concern for the organizations. The technology advancement has been a boon for speedy achievements of activity goals but at the same time the security breaches and transaction frauds are on rise. Thus, the Biometric Technology has taken its pace to prevent any security breaches and fraudulent. Table 1 gives the algorithm.

### 4. Results And Performance Analysis

*4.1. Performance Analysis For Face And Fingerprint Recognition**Figure : 2**4.2. Bimodal Biometric Using Face And Fingerprint*

Threshold	FRR	FAR	TSR
0.0200	1.0000	0	0
0.0250	1.0000	0	0
0.0300	1.0000	0	0
0.0350	1.0000	0	0
0.0400	1.0000	0	0

*Table 2: Gives The Variation Of FRR, FAR And TSR For The Bimodal Biometric Using Face And Fingerprint For Different Values Of Thresholds That Are Tabulated*

0.0450	1.0000	0	0
0.0500	1.0000	0	0
0.0550	0.9800	0	2.0000
0.0600	0.7800	0	22.0000
0.0650	0.3800	0	62.0000
0.0700	0.1600	0	84.0000
0.0750	0.0400	0	96.0000
0.0800	0	0.0200	100.0000
0.0850	0	0.0800	100.0000
0.0900	0	0.1800	100.0000
0.0950	0	0.4000	100.0000
0.1000	0	0.7000	100.0000

Table : 3

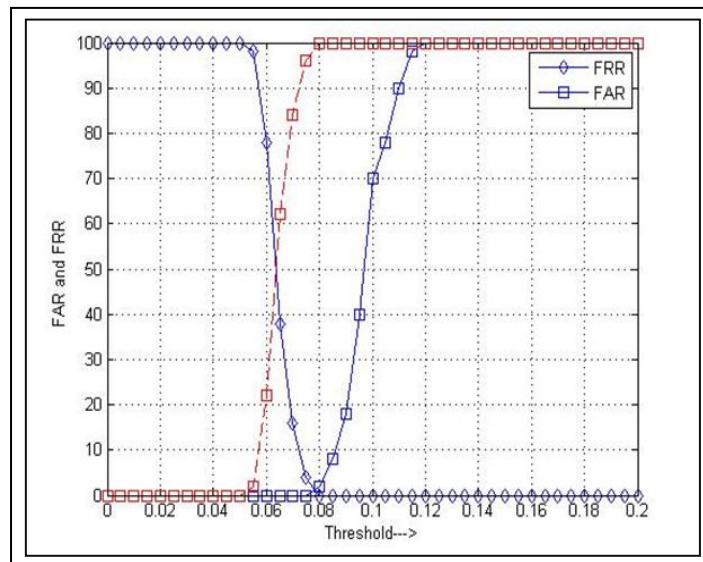


Figure : 3

4.3.Comparative Analysis Of Results

The results of Bimodal biometric using Face and Fingerprint is compared with Unimodal biometric of Face and

	<b>EER</b>	<b>TSR</b>
Unimodal Face	3.333333	96.666667
Unimodal Fingerprint	22.666667	63.333333
Bimodal Face and Fingerprint	1.333333	98.666667

Table : 4

Unimodal biometric of Fingerprint and are presented in the table 3 .It is observed that using fusion method that is Bimodal Biometric using Face and Fingerprint the EER is reduced and TSR is increased compared to the Unimodal of Face and Fingerprint individually.

5.Conclusion

In this project, a novel technique for selecting DWT and FFT coefficients in the area of face and finger print recognition has been presented. Tests have been performed on the Standard Database, showing that recognition rates are increased when the technique is deployed.

6.References

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