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An Efficient Learning Using Iris and Fingerprint Multi-Modal Biometirc Authentication System

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ABSTRACT

Biometrics deals with the technical field for body dimensions and controls. It states various metrics related to characteristics of the human. Biometrics verification is used in processors as a method of access control. It deals with the identification of the individuals in clusters that are under investigation. Biometric are the unique, measurable features used to tag and describe entities. Biometric are often considered as physical versus behavioral features. Physical features are related to the form of the physique. Examples comprises of fingerprint, veins, recognition of face, palm pattern, hand, iris acknowledgement. Behavioral features are related to the shape of a person which are not limited to gait, and voice. Various researchers have invented the term performance metrics to define the latter discussion of biometrics. So this paper deals with the biometric fusion of iris and fingerprint which provides more security for the authentication of authentic individual and the performance will be evaluated in terms of false acceptance rate, false rejection rate and accuracy of the system.

Keywords : Biometrics, Security, Classification, Iris, Fingerprint

I. INTRODUCTION

Biometrics process is used to recognize an individual on the physical features. There are a lot of acknowledgement technologies with fingerprint, iris, hand, and voice acknowledgment. Among those fingerprint acknowledgment is recognized to be the supreme advanced and inexpensive technology, which is extensively used in various safety application zones. Multimodal biometrics authentications are one of the main topics in biometrics expertise. As an alternative of single characteristic, multiple biometric statistics are developed simultaneously and attached to provide additional reliable credentials outcomes. Moreover, subsequently it is much difficult to parody multiple instruments concurrently multimodal biometrics can deliver enhanced strength to spoofing occurrences.

In overall, biometric acknowledgment is skilled by four phases

1. Raw statistics attainment from sensor
2. Feature or characteristics
3. Matching
4. Final decision on the corresponding score.

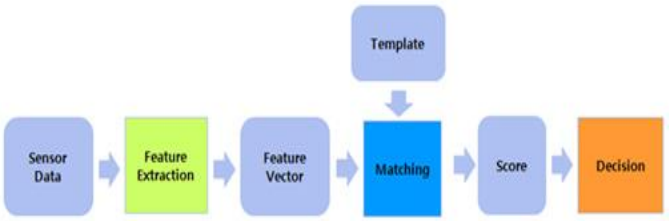

Figure 1. Generalized Block Diagram

Multimodal biometrics methods are categorized into four categories giving to the near of data synthesis. First unique one is sensor level synthesis, by which raw information from multiple devices are merged into new raw information. Second unique one is feature based fusion, in which numerous features developed from feature extraction developments are fused into novel feature direction. Third unique level,

fusion is the score level that performs synthesis of scores gained from each identical process. Fourth level deals with the decision level combination which brings out final decision grounded on the grouping of individual conclusion results. Decision fusion is the supreme simple and extensively used fusion technique. Though, performance development is inadequate due to the obtain ability of limited information. While feature level fusion can operate richer information associated to the difficult level fusion which is difficult to apply due to the unsuitability among dissimilar modalities. Thus, score level synthesis is expected to deliver the most efficient synthesis solution in reality.

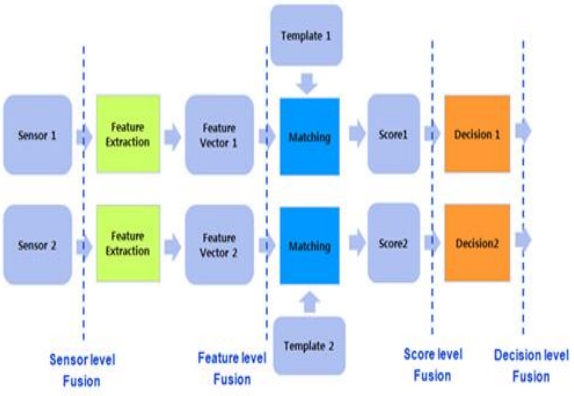

Figure 2. Structural block level diagram for multimodal fusion

II. RELATED WORKS

This section deals with the effectual literature survey which deals with the efficient performance evaluation of the system done by the various researchers. Sheetal Chaudhary, Rajender Nath et al. [1] presented a vigorous multimodal biometric acknowledgment system participating iris, expression and fingerprint based on counterpart score level synthesis using multiple support vector machines. Here, MSVM are realistic in parallel manner to overcome the difficulty of absent biometric traits. It reflects every possible mixture of all the three biometric behaviors individually. They have used support vector machines as their approach and evaluated the recognition rate of 99 percent. Divyakant T. Meva, Dr C. K. Kumbharana et al. [2] presented a biometric system which is getting popular since last years. As per the request of IT industry, this knowledge is satisfying verification and authorization requirements. But Unimodal Biometric schemes have their own limitations. To overcome the limitations of Unimodal Biometric Systems, they have choose the method of Multimodal Biometric Schemes. In this paper, authors have assumed details about Multimodal Biometric system designed and developed to improve success ratio of verification. They have modified fingerprint and face acknowledgment approaches with match score based fusion. They have strained to identify achievement ration under numerous combinations of weights allocated to fingerprint and face counterpart scores. They have found the success rate of 93 percent with failure rates of 6.67 percent. Norsalina Hassan, Dzati Athiar Ramli, and Shahrel Azmin Suandi et al. [3] proposed synthesis of face and fingerprint for vigorous recognition scheme. The addition is performed at the equivalent score level. The corresponding tasks for mutual modalities are approved out by using support vector machines. Trials on face expression and fingerprint record show that the presentations of multimodal biometric scheme provide better acknowledgment associated to unimodal biometric modality. They have used the sum rule and evaluated the error rate of 0.83. Yogesh. H. Dandawate, Sajeeda. R. Inamdar et al. [4] shows seizing of three biometric characters of a person specifically face, pattern and palm vein by designed hardware well ahead these three behaviors preprocessed and fused collectively for cryptography. Palm is selected as a biometric attribute as no two palm veins counterpart unless they are of the similar person also palm has a decent vascular pattern creation as a good identifying issue for a person as likened to other biometric characters. They have used principle component analysis and Gabor filtering and found the accuracy of 97%. Nassima

Kihal, Salim Chitroub and Jean Meunier et al. [5] proposed a multimodal biometric scheme for verification, based on the synthesis of iris and palm print. They have proposed a method for feature abstraction of each modality using wavelet packet corrosion at four levels. This stretches 256 packets which can produce a compact binary cipher.

III. PROPOSED WORK

This section deals with the proposed work implemented for the multimodal biometric authentication system

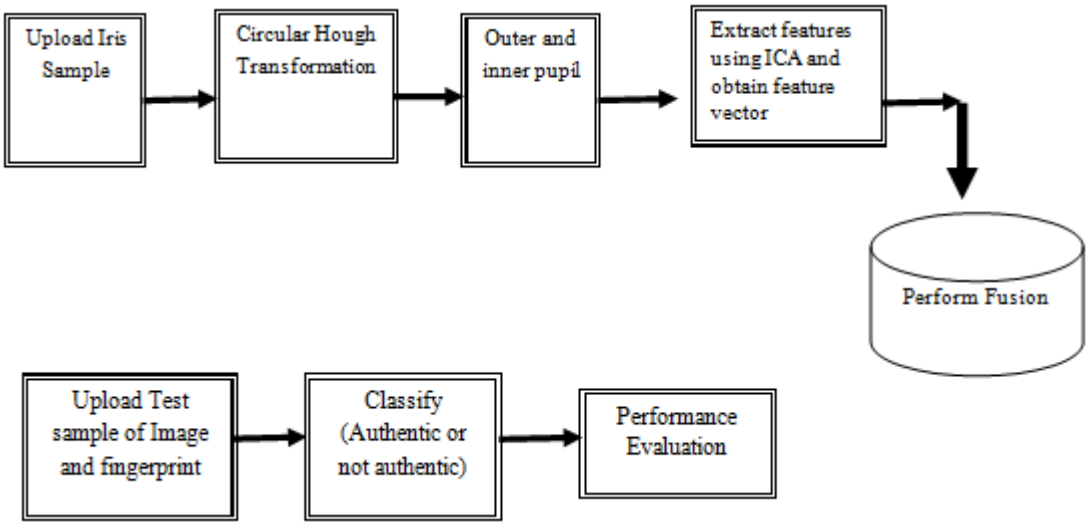

Figure 3. Proposed Flow Diagram

IV. RESULT AND DISUCSSIONS

The below are the results and simulation of the work done till now. The whole simulation is done in MATLAB environment of 2016 version using graphical user interface.

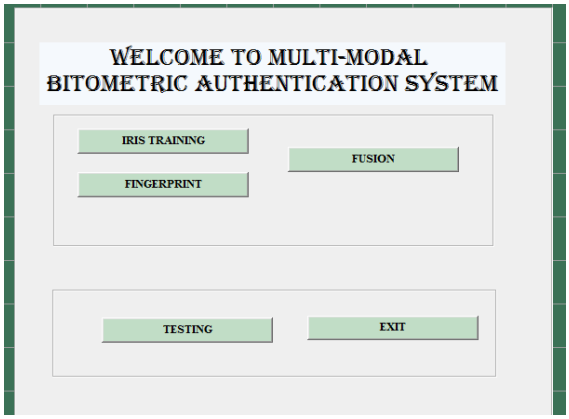

Figure 4. Main panel

The figure 4 shows the iris panel in which the graphical user interface is used using push buttons, edit texts, static texts. The figure shows the upload button in which the image will be uploaded and are used for the processing for the edge detection.

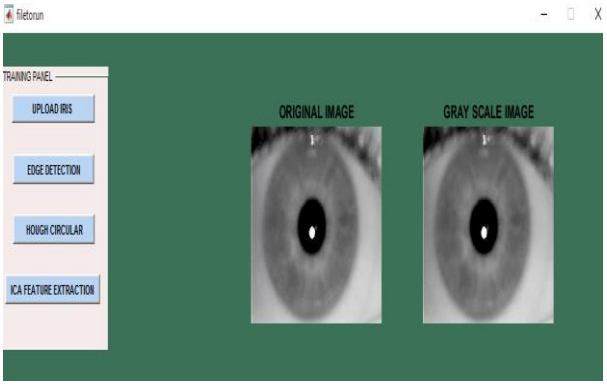

Figure 5. Iris Panel

The figure 5 shows the original and grey scale of the uploaded sample which is done by clicking on the upload button and then the edges are detected using edge detection

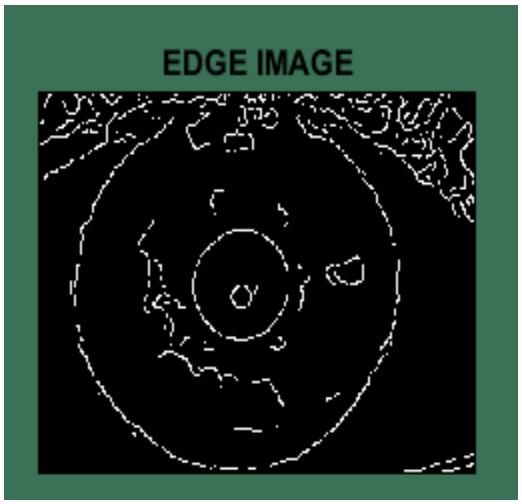

Figure 6. Edge Sample

The figure 6 shows the edges of the uploaded sample. The edge detection is done using canny edge detector which obtain the appropriate edges of the image samples

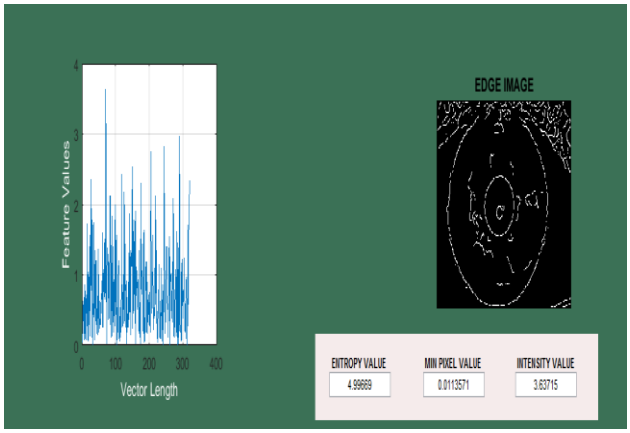

Figure 7. Feature Extraction

The figure 7 shows the feature extraction approach which deals with the extraction of the feature vector using independent component analysis and shows the extracted feature values in the figure in terms of feature vectors

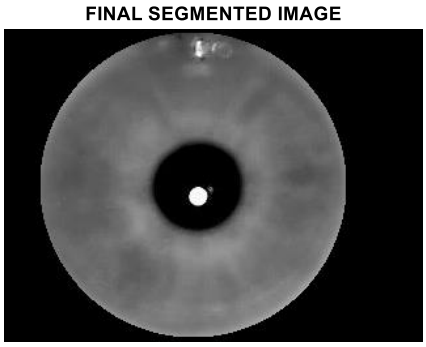

Figure 8. Final Segmented

The figure 8 shows the final segmented image of the pupil on which the scanning is done in the real time. This will expel the unnecessary outer boundaries of the iris sample and will obtain the necessary part of the iris pupil on the basis of which the authentication is done

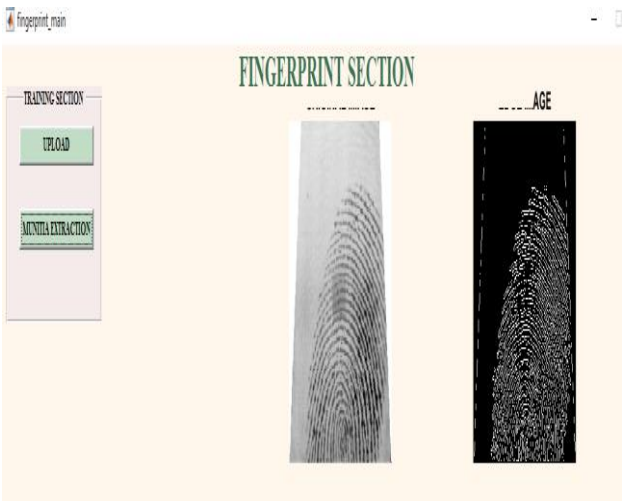

Figure 9. Fingerprint Panel

The figure 9 shows the GUI panel for the fingerprint category which is made using GUI interface using MATLAB user interface controls and shows the uploading and extraction pushbuttons

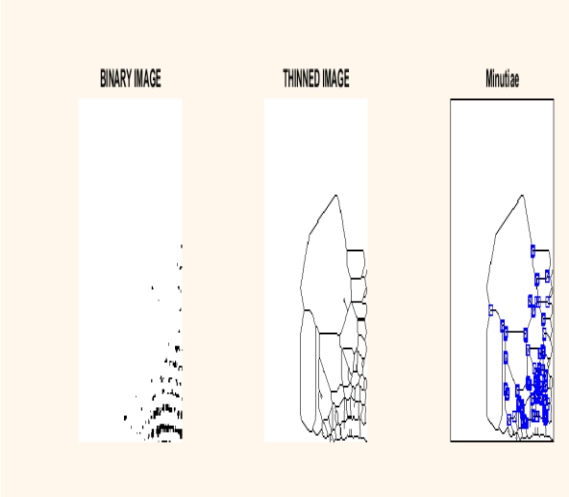

Figure 10. Fingerprint Processing

The figure 10 shows the fingerprint panel in which the processing is done using bifurcation and extraction of ridges in terms of extracted munities. This is one of the main part in the processing of the fingerprint images and shows the thinning and munities extraction of the image samples

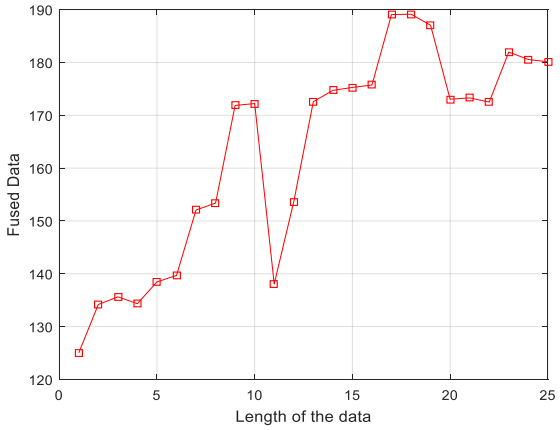

Figure 11. Fused Data

The figure 11 shows the fusion data in which the iris and fingerprint features are fused and shown in the graphical manner

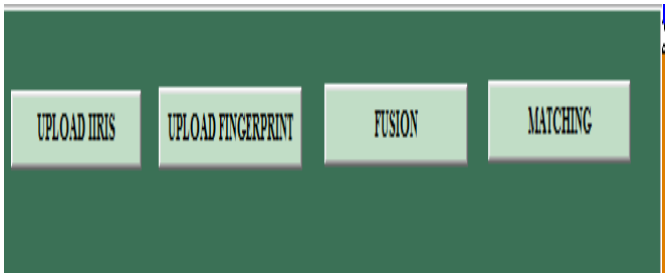

Figure 12. Testing Panel

The figure 12 shows the testing panel in which the uploading buttons are built for the uploading of the testing samples for fingerprint and iris and also the user interface for the fusion and matching of the samples

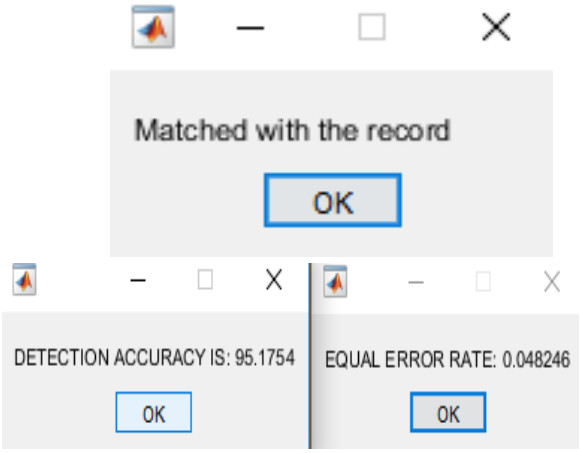

Figure 13. Performance evaluation

The fig 13 shows the performance evaluation of the proposed approach and shows that the proposed approach is able to achieve high. detection accuracy and less error rate which is our desired output.

The result shows that the proposed approach is able to match with the right record and shows the accurate authenticity. Also it shows the detection accuracy of recognition rate which is approximate 96 % and also the error rate which act as a classification error which is 0.048246 to have low error rates. This must be low for false detections and high true positive rates.

V. CONCLUSION AND FUTURE SCOPE

Biometrics based individual authentication systems have recently gain intensive investigate interest due to the untrustworthiness and inconvenience of traditional authentication systems. Biometrics newly became a vital component of any victorious person identification solutions as biometric character cannot be stolen, shared or even beyond. Among biometric technologies, iris based verification systems bear

more compensation than any other biometric technology as it offers an outstanding recognition performance. Iris patterns with fingerprint extraction are invented to be exceptional due to the complexity of the fundamental environmental and genetic processes that influence the generation of iris pattern. In this research our proposed system is able to achieve high authenticity with low error rates with high accuracy of the system in terms if recognition rates.

VI. REFERENCES

[1]. Prof. Jin-Xin, Shi, and Xiao-FengGu. "The comparison of iris recognition using principal component analysis, independent component analysis, and Gabor wavelets." Computer Science and Information Technology(ICCSIT), 2010 3rd IEEE International Conference on. Vol. 1. IEEE, 2010

[2]. K. P. Hollingsworth, K. W. Bowyer and P. J. Flynn "Improved iris recognition through the fusion of hamming distance and fragile bit distance", IEEE Trans. Pattern Anal. Mach. Intel., vol. 33, no. 12, pp.2465 -2476 2011

[3]. Kocer, H. Erdinc, and N.Allahverdi. "An efficient iris recognition system based on modular neural networks." Proceedings of the 9th WSEAS International Conference on Neural Networks. World Scientific and Engineering Academy and Society (WSEAS), 2008

[4]. Kshamaraj, Gulmire, and Sanjay Ganorkar. "Iris Recognition Using Independent Component Analysis." International journal of emerging technology and advanced engineering 2.7 (2012): 433-437.

[5]. K. Saminathan, M. Chithra Devi, and T. Chakravarthy. "Pair of Iris Recognition for Personal Identification Using Artificial Neural Networks." IJCSI International Journal of Computer Science (2012)

[6]. Chaudhary, Sheetal, and Rajender Nath. "A Robust Multimodal Biometric System Integrating Iris, Face and Fingerprint using Multiple SVMs." International Journal of Advanced Research in Computer Science 7, no. 2 (2016).

[7]. Meva, Divyakant T., and C. K. Kumbharana. "Design and evaluation of multimodal biometric system with fingerprint and face recognition." International Journal of Scientific and Research Publications 5, no. 4 (2015): 1-4.

[8]. Hassan, Norsalina, Dzati Athiar Ramli, and Shahrel Azmin Suandi. "Fusion of Face and Fingerprint for Robust Personal Verification System." International Journal of Machine Learning and Computing 4, no. 4 (2014): 371

[9]. Dandawate, Yogesh H., and Sajeeda R. Inamdar. "Fusion based multimodal biometric cryptosystem." In Industrial Instrumentation and Control (ICIC), 2015 International Conference on, pp. 1484-1489.IEEE, 2015.

[10]. Kihal, Nassima, Salim Chitroub, and Jean Meunier. "Fusion of iris and palm print for multimodal biometric authentication." In Image Processing Theory, Tools and Applications (IPTA), 2014 4th International Conference on, pp. 1-6.IEEE, 2014.