

Face Recognition And Signature Verification With Neural Network using GABOR Wavelet And Discrete Wavelet Transform

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Abstract - Face recognition is emerging as one of the popular field in the biometric research. It is used in various surveillance systems for the security purpose as it doesn't needs object comparison. The main advantage of using face recognition system is its uniqueness and acceptance over other biometric systems. Though this system is considered to be accurate but the detection of face is a difficult process as face detection is having the high degree of variability. Traditionally various method of the face recognition have been proposed but still the efficient results were not obtained. So in this paper the two biometric approaches are combined to increase the security of the system. The Gabor filter is used for the feature extraction. Later the ANN is used for the training of the network. The identification is done by matching the face and the signature person. From the results it concluded that this system is efficient, accurate and secure than the traditional technique. A comparison is performed between the traditional and proposed algorithm that shows proposed algorithm is more accurate.

Keywords- Face recognition ; biometric ; signature verification ;Gabor filter ;Artificial neural network .

I. INTRODUCTION

Biometrics is an effective technology for person authentication, and has been successfully adapted by various fields but still it has a lack that it is not a foolproof method for automatic identity authentication or recognition. Sensing, Feature Extraction and Matching Modules are the main components of a biometric System. Biometric sensors sense the biometric parameter such as fingerprints sensors and digital camera gives the output in the Digital form. The irrelevant information is discarded from the acquired samples by using the feature Extraction, the remaining extracted and discriminatory information is normally used for Matching Process. Fingerprinting, retinal scanning, hand geometry, signature verification, facial recognition etc are the most recognized biometric technologies.

Face recognition technique is widely used nowadays. There are some factors that can the photo and can also lead to a problem in authentication. At the time of capturing the image there should be proper lighting, posture of the person should be accurate, image quality should be good enough and all other parameters should be satisfied. There must be some techniques to analyze all above features or patterns to generate a reliable or accurate result. To increase the possibility of correct matches the technique of preprocessing should be applied i.e. to pre-process the image before sending it to the database for comparing or matching.

There are some other conditions or situations where face recognition system fails to work lack of lighting, low resolution image or other kind of things that covers the face or object partially. Another disadvantage occurs when the facial expressions vary in that case system also becomes irresponsive or less effective.

Signature verification is another approach for the biometric identification. In this technique, a system is used to verify the person through its signature that whether the person is authorized or not. This technique is widely used to detect the fraud especially occurs in banking area. In this process, first visual signature verification is applied then Automatic Signature Verification (ASV) checks signature and compares them to signature that are already stored in the database. This gives you better protection and security features.

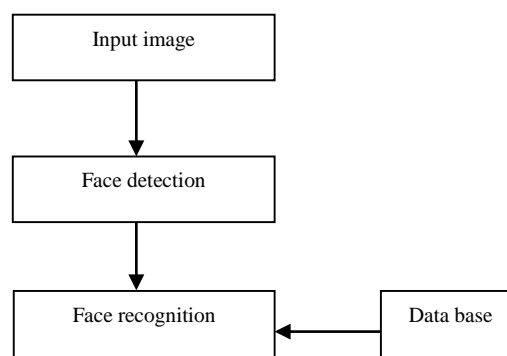


Fig. 1: Block diagram of face recognition system

The description of the face recognition system is given below:

In this step the input image is selected from the data set that is used for recognition process.

Next the face detection is done, by using various face detection method the features are extracted and face detection is done.

By comparing the selected input image and image existing in data base the face recognition is done.

II. PROBLEM OF THE TRADITIONAL APPROACHES

Face recognition systems are widely used for the identification purpose. This face recognition approach is much popular in many of the fields. The main and the important one is recognition or can say as the security or authentication purpose. Many researchers are working on this field from many of the years, many algorithms and techniques are developed to update the traditional systems the common these days. Various techniques like PCA, discrete wavelet transform etc were used as for the detection of the features. But still these methods were not that much efficient. The security of the system is still a problem. The system should be highly securely so that it should not be easy for unauthorized user to access it. The process of detection of face feature is also not an easy process due to various the high degree of variability. So security and the detection of the face feature are two important problem of the face recognition system.

III. PROPOSED METHODOLOGY

Face recognition systems are widely used biometric systems that plays important role in the surveillance systems as they don't required the objects. In this proposed work the face recognition and the signature verification is combined to increase the security of the system. Gabor wavelet approach is used for the extraction of the feature of the face and then the signature verification is done that will give the authentication of the person by comparing face and signature.

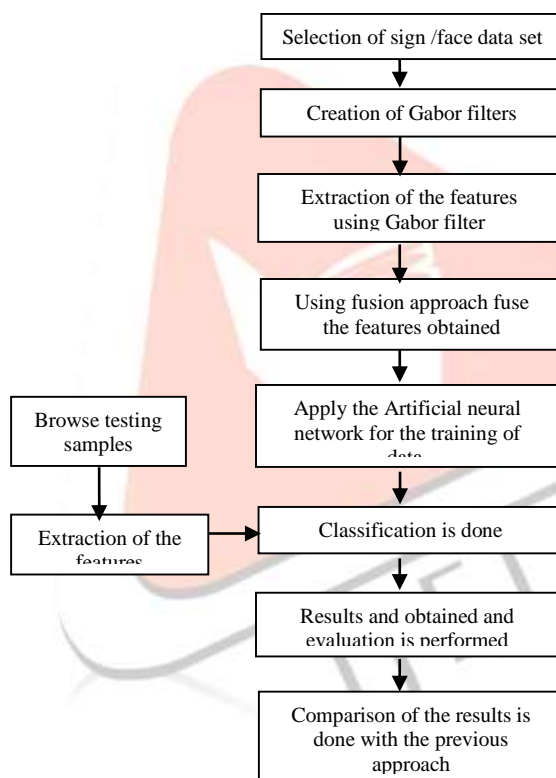


Fig. 2: Block diagram of proposed methodology

METHODOLOGY

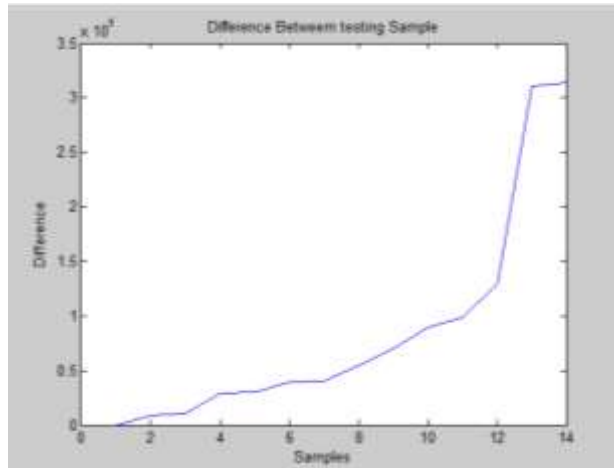
The methodology of the proposed work is defined below. In this firstly the Gabor filter method is used for the extraction of the feature, then the artificial neural network is applied for training of system and then the classification is done.

- 1) Initially selection of the images is done for creating the data base so that further this set is used for the classification. The images can be of sign or face.
- 2) After creating the data base, next step is to apply the Gabor filter on the created data base.
- 3) Now process of features extraction is done, with the help of Gabor filter. These features extracted are further used for the training purpose.
- 4) Select an image for testing, features of the testing image are extracted so that they can be further use for the classification purpose.
- 5) Now the testing results are obtained, by matching the features of the testing image and the data set of the image.
- 6) The calculation of the various parameters is done and the results are obtained, and the evaluation of the results is done.

7) Finally the comparison between the traditional technique and the proposed technique is done. On the basis of the comparison it is concluded that the proposed algorithm is better than the traditional technique.

IV. RESULTS AND DISCUSSION

In this section there is discussion about the results of the proposed of the face recognition system. In this paper an approach is implemented in which the security of the face recognition system is increased. A comparison is made between the traditional method and the proposed method.



. Fig. 3: This graph represents the difference between the testing samples

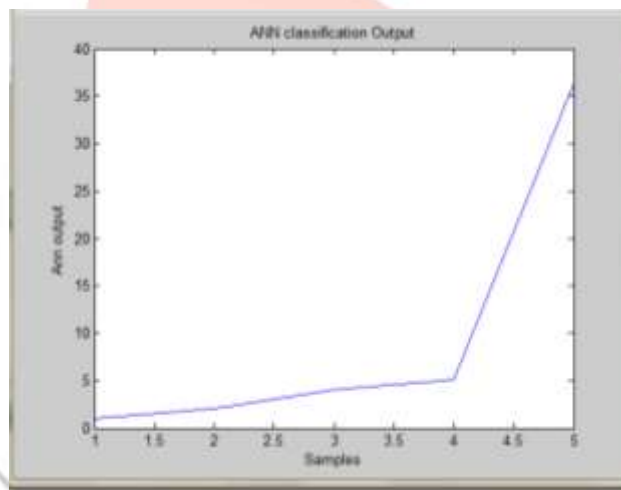


Fig. 4: This graph represents the Output obtained by the ANN

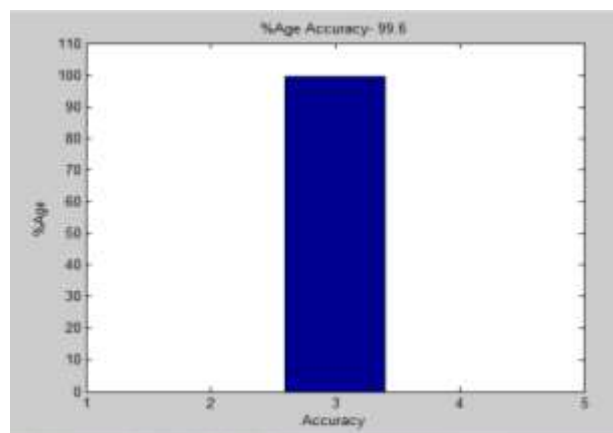


Fig. 5: This graph represents the Accuracy of the proposed method

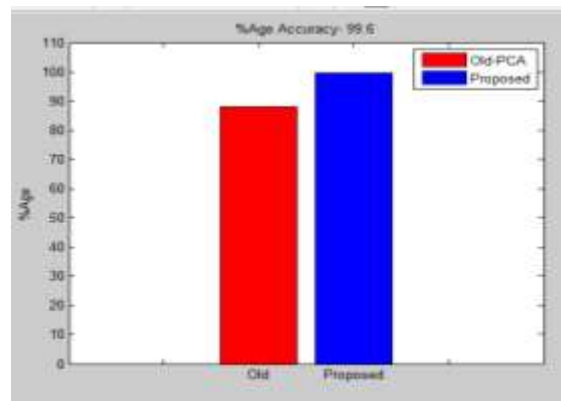


Fig. 6: This is a comparison graph between the traditional and the proposed algorithm on the basis of the accuracy of the system

V. CONCLUSION AND FUTURE SCOPE

Face recognition system is mostly widely used biometric systems. This system is considered to be efficient as it does not require any object. In face recognition system the extraction of feature and classification of the data plays important role. In this paper a new approach is presented in which the face detection is combined with the signature verification. The feature of the features of the face is detected by using Gabor filters, which the extractions of the features are done by using Gabor filters. By using ANN the system is trained. In this the face and the signature of the person are used for the identification purpose, if sign matches with the face then the system provide authentication. Form the results obtained it is concluded that this method is efficient, accurate and secure than the traditional approaches. A comparison is also performed that shows the accuracy of the system is more.

In future this technique can be enhanced further by using some other classifier that can increase the accuracy of the system. By using some other classifier the feature extraction process can be further enhanced. Better are the extracted features more accurate is the system and thus the efficiency of the system increases. Also the security of the system can be increased so that the identification is done is authenticate.

REFERENCES

- [1] Ahmad, Faizan, "Image-based Face Detection and Recognition" International Journal of Computer Science, (2012), Vol no. 6.
- [2] Ben Niua "Two-dimensional Laplacian faces method for face recognition" ELSEVIER, Vol 41, 2008, Pp 3237 – 3243.
- [3] C Nagaraju, "An efficient Facial Features extraction Technique for Face Recognition system Using Local Binary Patterns", International Journal of Innovative Technology and Exploring Engineering (IJITEE), May 2013, Volume-2, Issue-6, May, Pp 74-78.
- [4] Grafsgaard, "Automatically Recognizing Facial Expression: Predicting Engagement and Frustration", 2013, Pp. 43-50.
- [5] Hehua Chi a, "Facial expression recognition based on cloud model "The International Archives of the Photogrammetric, Remote Sensing and Spatial Information Sciences, Vol. 38, Part II, Pp 124-128.
- [6] Hiremath, "Face recognition using Eigen face approach." In IDT workshop on interesting results in computer science and engineering, Sweden. 2009.
- [7] Jeremiah r. Barr "face recognition from video review", International Journal of Pattern Recognition and Artificial Intelligence, (2012), Volume 26, Issue 05.
- [8] Liao, Sheng Cai, "Face recognition using ordinal features.", In Advances in Biometrics., Springer, 2006, Pp 40-46.
- [9] Mayank Agarwal, "Face Recognition Using Eigen Faces and Artificial Neural Network", International Journal of Computer Theory and Engineering, August, 2010, Vol. 2, No. 4, Pp 624-629.
- [10] Mohamed," A new Method for Face Recognition Using Variance Estimation and Feature Extraction."
- [11] Nagi, Jawad., "A MATLAB based face recognition system using image processing and neural networks." In 4th International Colloquium on Signal Processing and its Applications, Pp. 83-88.
- [12] Navneet Jindal, "Enhanced Face Recognition Algorithm uses PCA with Artificial Neural Networks", International Journal of Advanced Research in Computer Science and Software Engineering, June 2013, Volume 3, Issue 6, Pp 846-872.
- [13] N.G.Chitaliya, "An Efficient Method for Face Feature Extraction and Recognition based on Contour let Transform and Principal Component Analysis using Neural Network", International Journal of Computer Applications , 2010, Volume 6– No.4, Pp 28-32
- [14] Pawan Sinha, "Face Recognition by Humans: Nineteen Results All Computer Vision Researchers Should Know About" , Proceedings of the IEEE , (2006) , Vol. 94, No. 11, Pp 1948-1962.
- [15] Ribarić, "Eigen phase-based face recognition: a comparison of phase-information extraction methods." In Nineteenth International Electro technical and Computing Science Conference ERK 2010.
- [16] Senior, Andrew W "Face recognition and its application." In Biometric Solutions, Pp. 83-97. Springer US, 2002." Achievements and Challenges in Fingerprint Recognition", Pp 101-115
- [17] Soninder Singh Garcha, "A robust technique implementation for facial recognition under Eigen feature extraction", Journal of Global Research in Computer Science , 2013 ,Vol 4, No 8.

- [18] Sujata G. Bhele, "A Review Paper on Face Recognition Techniques", International Journal of Advanced Research in Computer Engineering & Technology , October 2012 Volume 1, Issue 8, Pp 338-347
- [19] Tayal, Yogesh,"Face Recognition using Eigen face.", International Journal of Emerging Technologies in Computational and Applied Sciences , 2013,Vol 3, no. 1 Pp 50-55.
- [20] Teja, Ravi.s, "Face recognition using subspaces techniques", Recent Trends In Information Technology (ICRTIT), International Conference , April 2012, Vol 19 issue 21 , Pp103 – 107

