

## FACE RECOGNITION USING WAVELET DECOMPOSITION TRANSFORMS AND REDUCTION RATE

T. Mohan Raj<sup>1\*</sup>, A. Vinitha<sup>2</sup>, N. Suganya<sup>3</sup>

<sup>1\*</sup>Asso Professor, Department of CSE, Karpagam Academy of Higher Education, India. [mohanrajt.me@gmail.com](mailto:mohanrajt.me@gmail.com)

<sup>2</sup>Asst Prof., Dept of CSE, Karpagam College of Engineering, India.

<sup>3</sup>Asst Prof., Dept of CSE, Karpagam Institute of Technology, India.

Received: 07.12.2019

Revised: 16.01.2020

Accepted: 11.02.2020

### Abstract

The impact of the discrete Wavelet disintegration on the database which is utilized in biometric facial acknowledgment is the all out introduction of the paper. The individual distinguishing proof is such a lot of significant with regards to security. The recognizable proof of the face has become such a lot of significant nowadays. Since it is utilized in different parts like banking and financials which is of so much sense. The Olivetti and Oracle claim their facial acknowledgment preparing and testing. The Wavelet decay impacts of the information level were applied in testing and preparing which made the size of the database diminishing by 75% from their unique sizes. The primary part examination calculation is utilized to treat both the databases to get the impact on that on the facial acknowledgment rate. The primary segment investigation is biometric face acknowledgment. Subsequently, this diminished the face acknowledgment rate between the first and the decreased database is 2%. This strategy is progressively viable in the decrease databases and computational burden in providing for an adequate extent of acknowledgment rate.

**Keywords:** Reduction Rate, Acknowledgment Rate, Features to Identify.

© 2019 by Advance Scientific Research. This is an open-access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>)

DOI: <http://dx.doi.org/10.31838/jcr.07.04.169>

### INTRODUCTION

The process of automatically verifying or identifying a person by personal trait or physical identity so-called Biometric identification. The terminology of automatic means it must verify the human character portrayed without the intervention or help of the user. The main aim of this project work is to develop an automatic face recognition system which can improve the recognition rates for normal images and illuminated images and expression variations. This chapter gives a good introduction to the motivation and the real challenges behind this research.

#### 1) Objectives

- To know the process of facial recognition
- To review and know the currently available facial recognition techniques that already exist.
- To design and develop an efficient facial recognition system that is unique which has all improved parameters from the existing one of normal images, frontal images, illuminated images, and expression variations.

#### 2) Applications of Facial Recognition

There are many applications in facial recognition based on task, verification, and identification. Few existing applications of facial identifications are Surveillance general identity verification, security, Criminal justice systems, smart card applications, Image database investigators, Vide indexing, gender classification, multimedia environments with human face reconstruction, expression recognition and facial feature recognition and tracking.

### LITERATURE SURVEY

There are 3 different approaches to facial recognitions they are:

- Feature-based approach
- Holistic based approach
- AI-Based approach.

#### 1) Feature-based Approach

In the feature-based approach of facial recognition, the distinctive facial features such as eyes, nose, mouth are first extracted then the geometrical relations of all these features identified. By this process, the face image is transformed into a vector of geometrical features, and all these are used in recognition.

#### 2) Holistic Based Approach

In this method of a holistic approach, the recognition is carried out using the global representations of faces. That is instead of using any local features of the face to extract the features the entire image is used.

A two-dimensional image with both rows and columns can be viewed as a vector dimensional space, the process of verifying the images in high dimensions is very difficult thus it tries to reduce the dimension and retain the features to identify.

#### 3) AI-Based Approach

In this approach, neural networks and machine learning is used for facial recognition.

AlaEleyan at AI used 8 images for training and 2 images for testing and resultant output was it gave 95% accuracy in identification.

### SYSTEM ANALYSIS AND SPECIFICATIONS

#### 1) Existing System

The existing system of principal component analysis was given by Karl Pearson that involves the mathematical procedure that transforms the number of correlated variables into numbers and uncorrelated variables into principal components.

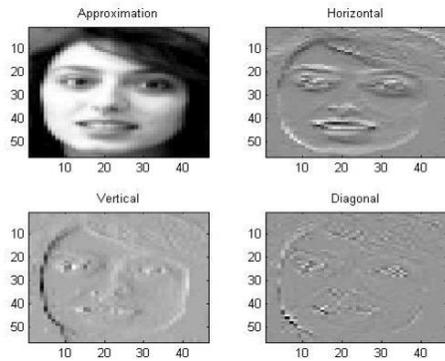


Figure 3.1

**a) Drawbacks of the Existing System**

This requires a full display of faces It is not sensitive to lighting conditions and the position of faces proposed. Considers every face in a database as different. Even the faces of the same person are not classified.

**2) Proposed System**

Deep learning is the important branch in machine learning which refers to a set of algorithms that can solve various problems using neural networking.

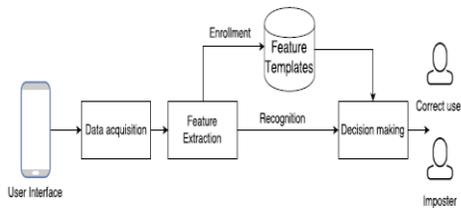


Figure 3.2

**3) System Specification**

- Hardware requirements:
- Processor: Intel I3 and above
- RAM: 2 GB and above
- Speed: 2 GHz and above

**4) Software Requirements**

- OS: Windows 7/8/10
- Programming: Matlab

**WAVELET TRANSFORMS**

A wavelet series is a mathematical representation of a square integral function by ortho-normal series generated by wavelets

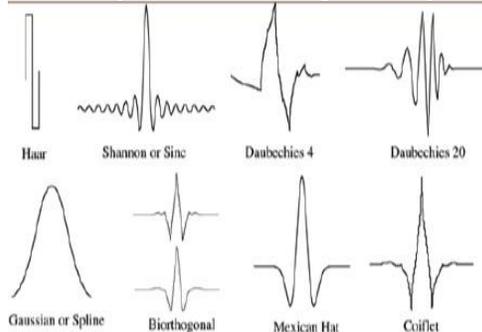


Figure 4.1: Wavelet transforms

**1) Benefits of wavelet transform**

- The security level is improved.

- The reconciliation process is simple
- The high exactness level declines deficiencies
- It is completely robotized
- Time extortion is prohibited.

**2) Drawbacks**

- Data processing and storing difficulties
- Image quality and size troubles.
- Camera angle influence

**3) Methodology**

In the enrolment phase, the system acquires the biometric data, extracts the distinctive features sets and built feature templates.

In recognition phase, the system acquires data but now, instead of storing it compares it with the already stored one to verify the user.

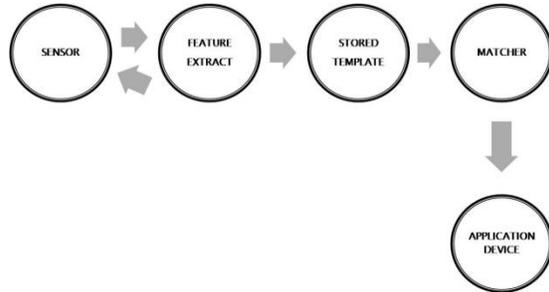


Figure 4.2: Steps for enrolment phase

**4) Face Detection**

The main problem in facial detection is the identification of different faces there must be distinctive landmarks in the face

There are two types of problems here

- Face detection from images

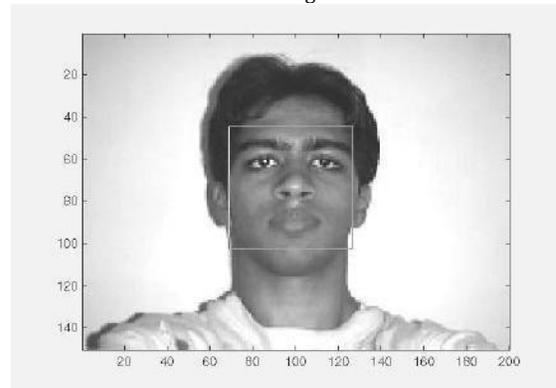


Figure 4.3: Face detection

- Real time face detection



Figure 4.4: Realtime face detection

**CONCLUSION**

This project is done in agile methodology, we have intended to build high performance scalable and low-cost facial recognition system, the entire project is subdivided and we have studied the neural networks and convolution neural network. Then the training is given from the available open data set, and the model will take a human face as a vector. Then the distance between vectors is compared and correlated to determine whether it is two different faces or a single one.

**REFERENCES**

1. E. Abbas and H. Farhan, "Face recognition using DWT with HMM", *Engineering & Technology Journal*, 30(1), 142-154 (2012).
2. J. Yang, D. Zhang, A. F. Frangi and Jing-yu Yang, "Two-dimensional PCA: a new approach to appearance based face representation and recognition", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 26(1), 131-137 (2004).
3. Z. Li and X. Tang, "Using support vector machines to enhance the performance of Bayesian face recognition", *IEEE Transactions on Information Forensics and Security*, 2(2), 174-180 (2007).
4. M. S. Bartlett, J. R. Movellan and T. J. Sejnowski, "Face recognition by independent component analysis", *IEEE Transactions on Neural Networks*, 13(6), 1450-1464 (2002).
5. Juwei Lu, K. N. Plataniotis and A. N. Venetsanopoulos, "Face recognition using LDA-based algorithms", *IEEE Transactions on Neural Networks*, 14(1), 195-200 (2003).
6. Gupta V, Puri R, Gupta S, Jain S, Rao GK. "Tamarind Kernel Gum: An Upcoming Natural Polysaccharide." *Systematic Reviews in Pharmacy* 1.1 (2010), 50-54. Print. doi:10.4103/0975-8453.59512
7. K. Singh, M. Zaveri, and M. Raghuvanshi, "Recognizing faces under varying poses with three states hidden Markov model", in *Proc. of IEEE International Conference on Computer Science and Automation Engineering (CSAE)*, 25-27 May 2012, Zhangjiajie, China, , vol. 2, pp. 359-363, IEEE, 2012.
8. P. Nicholl, A. Amira, D. Bouchaffra and R. H. Perrott, "Multiresolution hybrid approaches for automated face recognition", in *Proc. of 2nd NASA/ESA Conf. on Adaptive Hardware and Systems (AHS 2007)*, Edinburgh, Scotland, 5-8 Aug. 2007, pp. 89-96, IEEE, 2007.
9. Kulkarni, S.S., Sakaria, A.K., Mahajan, S.K., Shah, K.B. Lutembacher's syndrome(2012) *Journal of Cardiovascular Disease Research*, 3 (2), pp. 179-181. DOI: 10.4103/0975-3583.95381
10. Z. Elgarrai, O. Meslouhi, H. Allali, M. Kardouchi and S. Selouani, "Face recognition system using Gabor features and HTK toolkit", in *Tenth International Conference on Signal-Image Technology and Internet-Based Systems (SITIS)*, 23-27 Nov. 2014, Marrakech, pp. 32-36, IEEE, 2015.
11. M. Becigo, V. Murino and M. A.T. Figueiredo, "A sequential pruning strategy for the selection of the number of states in hidden Markov models", *Pattern Recognition Letters*, 24(2003), pp. 1395-1407, Elsevier, 2002. 050001-8.
12. J. Cai, H. Ren, and Y. Yin, "Non-overlapped sampling based hidden Markov model for face recognition", *3rd International Congress on Image and Signal Processing (CISP)*, Oct. 2010, Yantai, China, vol. 4, pp. 1901- 1904, IEEE, 2010.
13. H. Naimi and P. Davari, "A new fast and efficient HMM-based face recognition system using a 7-State HMM along with SVD coefficients", *Iranian Journal of Electrical & Electronic Engineering*, vol. 4, nos. 1&2, pp. 46-57, January 2008.
14. Rahiman, M. A., & Rajasree, M. S. (2009, October). A detailed study and analysis of ocr research in south indian scripts. In *2009 International Conference on Advances in Recent Technologies in Communication and Computing* (pp. 31-38). IEEE.
15. Muralidharan, V., & Sugumaran, V. (2012). A comparative study of Naïve Bayes classifier and Bayes net classifier for fault diagnosis of monoblock centrifugal pump using wavelet analysis. *Applied Soft Computing*, 12(8), 2023-2029.