



A Survey on Face Recognition Techniques in Video

Sonam Kesharwani and Sanjivani Shantaiya

Department of Computer Science and Engineering, Disha Institute of Management and Technology, Raipur, India
ksnm515@gmail.com

ABSTRACT

With facts and figures accumulating in riches, there is a severe extremity for high safety. Biometrics has now embraced more study. Face recognition grant an insubordinate question in the extent of image analysis and electronic computer vision. The security of information is comely very momentous and difficult. Face recognition is necessity in security. In this paper, an overview of some of the well-given methods in each of the groups is provided and some of the pros and cons of the schemes individualize therein are discuss. This fictitious also numerate some of the most novel algorithms developed for this view and trial to give a conception of the nation of the art of face recognition technology.

Key words: Face detection, face recognition, biometrics, person identification

INTRODUCTION

The most ascendancy of appearance biometric is its non-intrusive nature. Therefore, face is one of the most compatible biometrics for oversight applications. Face perception is necessity in biometrics, often as a part of facial recognition system. It is also used in video surveillance and human electronic computer interface. Some novel digital cameras custom face detection for auto focus. Face detection is an electronic computer technology that limits the locations and sizes of earthborn face in arbitrary conception. It detects only facial features and ignores the background [4]. Face detection is a novel approach through which we can extract the facial features from a human body [2].

Facial recognition used to recognize the faces of an individual's to identify or verify a person [4]. Face recognition system should be able to automatically detect a face in an image. The challenges of facial recognition in the visible range include reducing the impact of variable lightening and detecting a cover or picture. Some facial recognition systems use a real time process to detect a person's head and locate the face automatically. Major benefits of facial recognitions are that it is non-intrusive, hand free, uninterrupted and accepted by most operators. Face recognition system categorizes into two main works: verification and identification. Verification identifies a 1:1 match that compares a face image to that of template images whereas the identification identifies a 1: N match [11]. Face recognition for a huge face database has a rate greater than 90% with well-controlled postured. Template Matching is a high straight forward machine vision technique that assign to recognize the ability of an image to that of given image pattern. It can be used in manufacturing, navigation, or to detect edges in image.

The term video surveillance indicate the monitoring of the bearing, activities, or other changing compliant, or protecting them with some formula of video recording project. Advantages of a video surveillance system are that it helps for a security purpose like it deters companions from committing crimes, it can help apprehend criminals, it can allow people to watch exactly that how a criminal is doing crime and also used for online alarm generation to assist human operators. There also some disadvantages with this model are that it requires continuous manual checking which is infeasible because of cost of manual labour. The main role played in surveillance system includes motion detection, object classification, tracking, activity understanding, editor coordinating the review of this manuscript and approving it for and semantic depiction.

FACE DETECTION TECHNIQUE

Face Detection are used in biometrics, human computer interface, video surveillance and image database management. For face detection digital cameras used autofocus [4]. Applications of face detection are image and film processing, human-computer interaction and criminal identification. The goal is to implement the model for a

set of training images and find a mean image of all that images so as to calculate the difference between it and the input image for proper detection. The algorithms used for face detection are Knowledge-based, Feature invariant based, Template matching method, Appearance-based method and Part-based methods [2].

Although there are various approach for face detection but still it is very difficult to detect a multiple images in a real-time. In the above figure it contributes two main aspects. For face detection, feature expansion based on ICA is proposed with SVM. A new integrated approach of real time detection and tracking in variable environments using adaptive background removal. SVM for face detection is useful for broad view performance for different test data. Better results were obtained by extracting features using ICA.

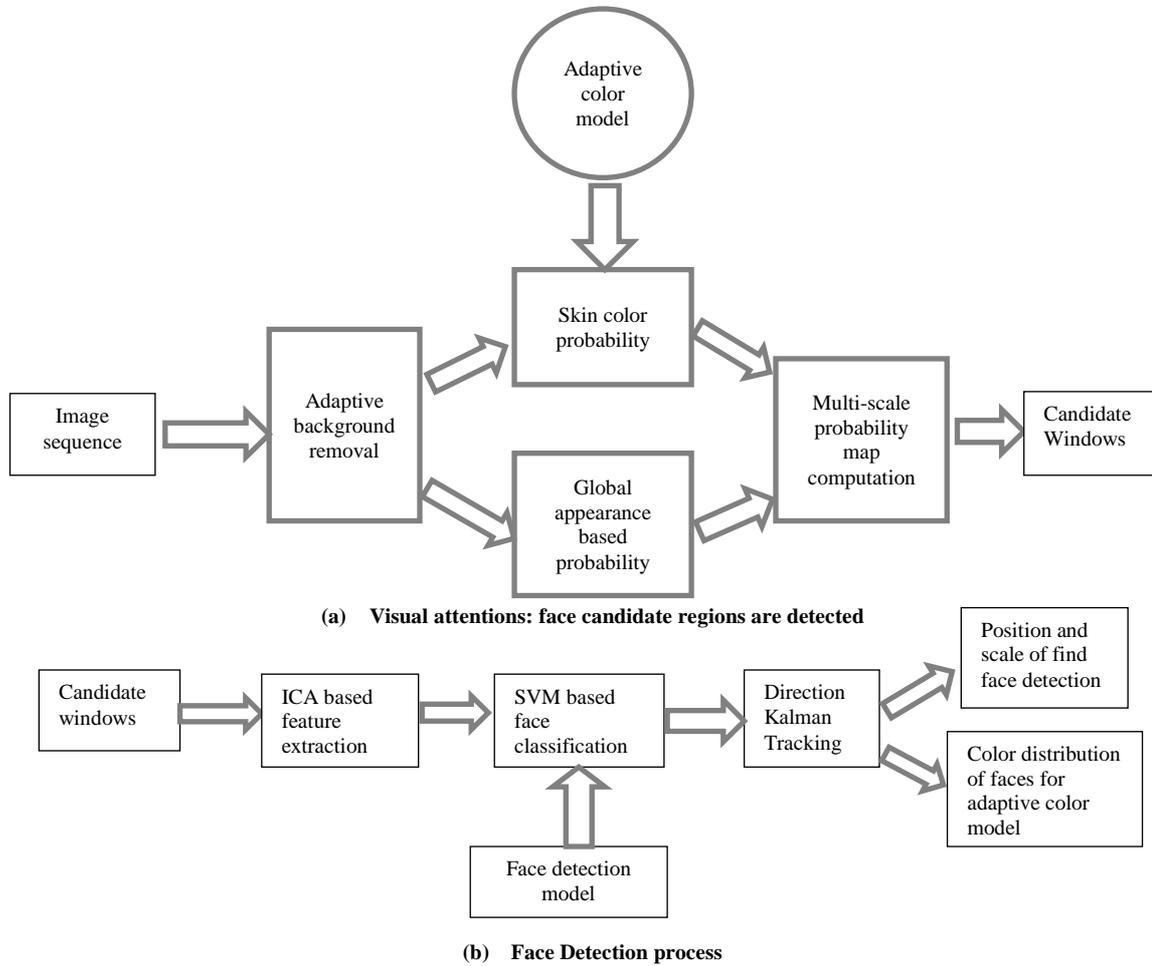


Fig.1 Architecture of the algorithm [8]

FACE RECOGNITION TECHNIQUE

Face recognition is a very challenging task for the researchers. Its application is very useful for personal identification and verification. Face recognition concept includes biometric approaches such as fingerprint, iris/retina and voice recognition. During recognition process we will take an unknown image and after that extract the features of that unknown image we had taken and next compared that image with the stored template during training, the face recognition system will return the applicant match list of possible matches. It can be divided into two approaches: Geometric feature based approach and Holistic approach.

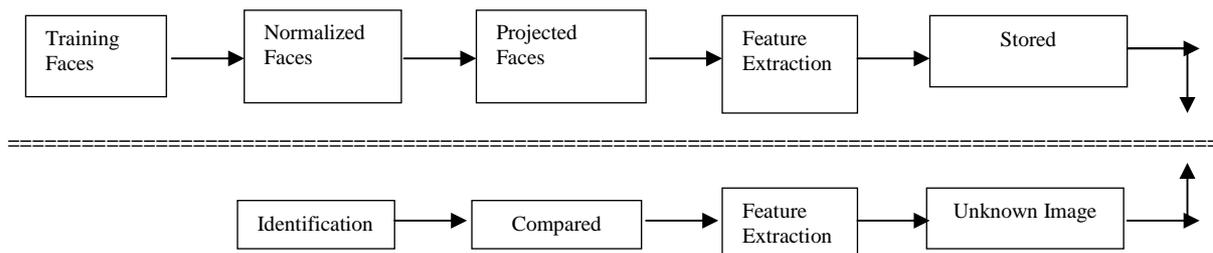


Fig.2 Face recognition block diagram [15]

Feature Based Approach

In feature based approach first of all the input image will be pre-processed to remove the unwanted noise and after that we extract the distinctive facial features like mouth, nose, eyes etc. In figure [3] we are simply extracting the features of a facial image like eyes, nose and mouth. Feature based can be made invariant to size orientation or lightening and it also include the solidity of the facial images and great speed matching.

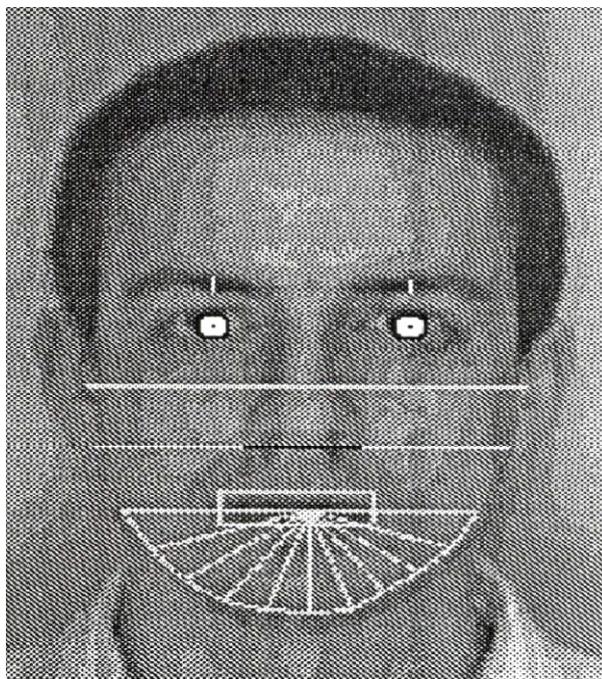


Fig.3 Geometrical features used in the face recognition experiments [7]

Holistic Based Approach

Holistic approaches used global representations to identification of the faces based on the whole images. Holistic approach is divided into two categories: AI approach and Statistical approach.

Statistical Approach

The easiest version of the holistic approaches, the image is symbolized as a 2D array of intensity values and recognition is performed by direct correlation comparisons between the input and all other images that stored in the databases. Under limited circumstances this approach has been shown, it is very expensive and suffers from shortcomings such as lightning, background, noise problems etc. to remove such drawbacks many other approaches has been proposed that employ statistical reduction methods to obtain the most important feature dimensions before performing recognition [7]. [Fig. 4]

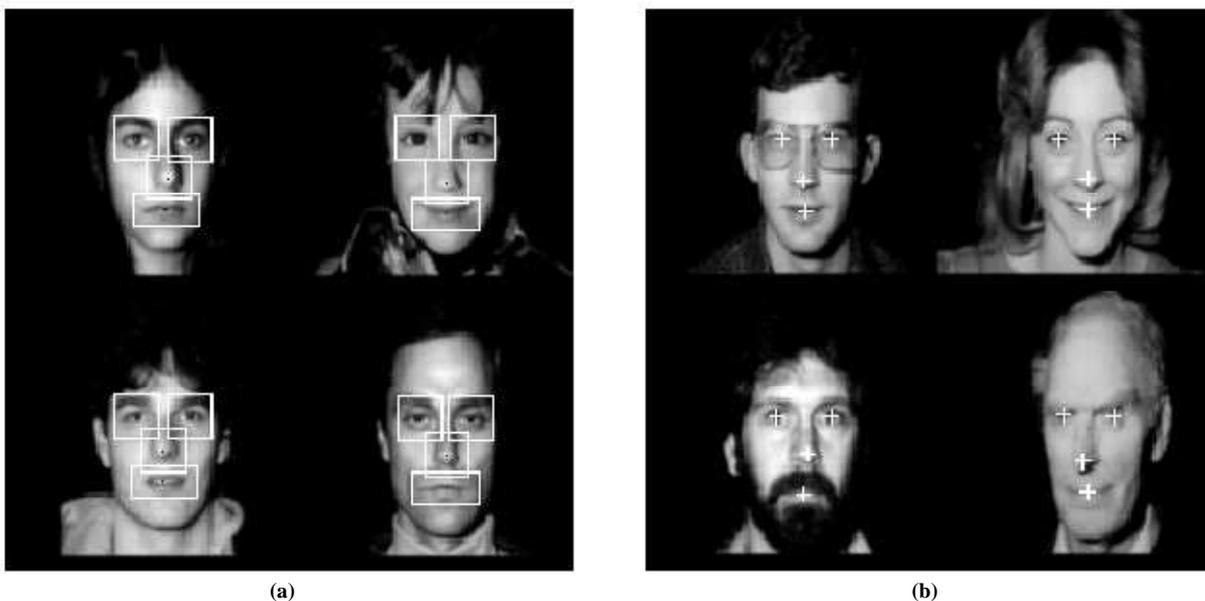


Fig.4 (a) Examples of facial feature of training templates used and (b) the resulting typical detections [7]

To deal with localized variations Eigen features has been proposed, where a low resolution depiction of the full face is improved by additional higher resolution details in terms of the salient facial features [fig. 5]. This system has produced slightly better results than the basic Eigen faces approach [fig. 5- 6].

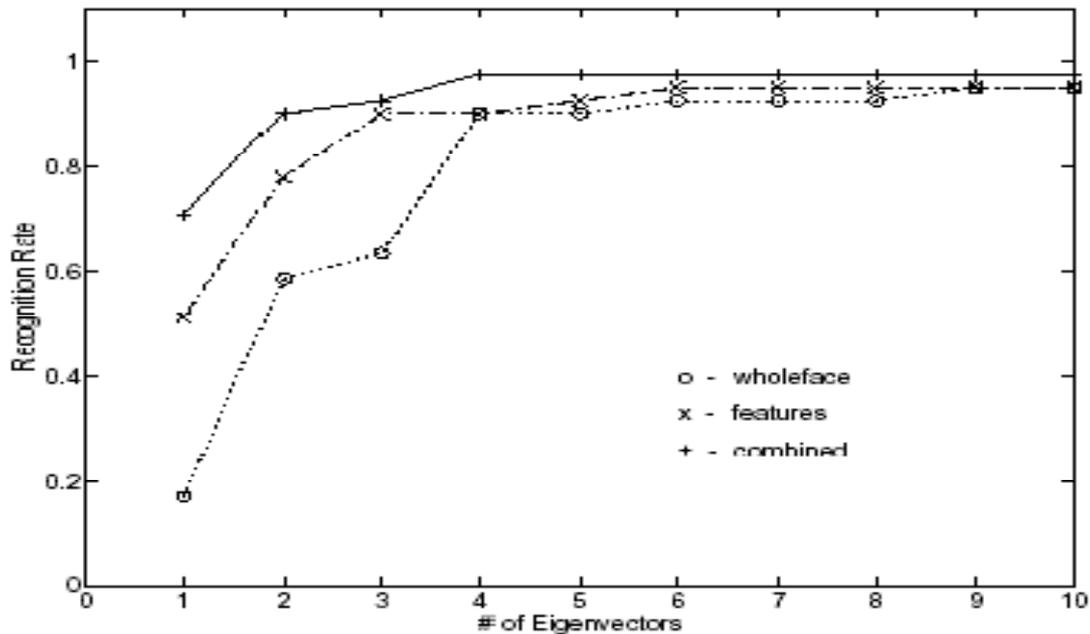


Fig.5 Recognition rates for Eigen faces, Eigen features and the combined modular representation [7]

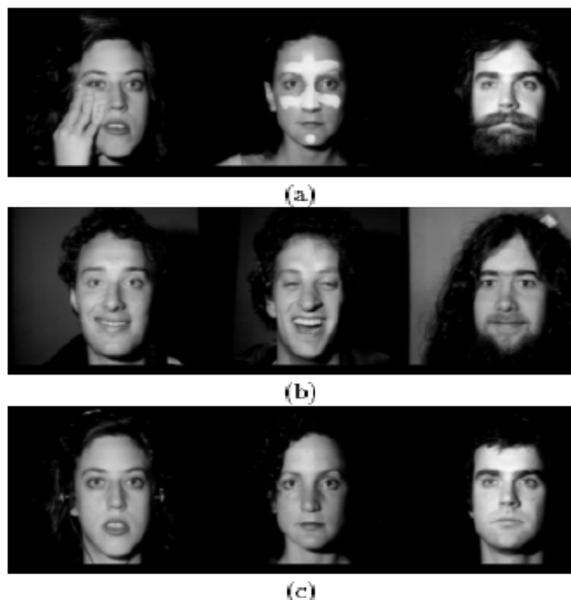


Fig.6 (a) Test views, (b) Eigen face matches and (c) Eigen-feature matches [7]

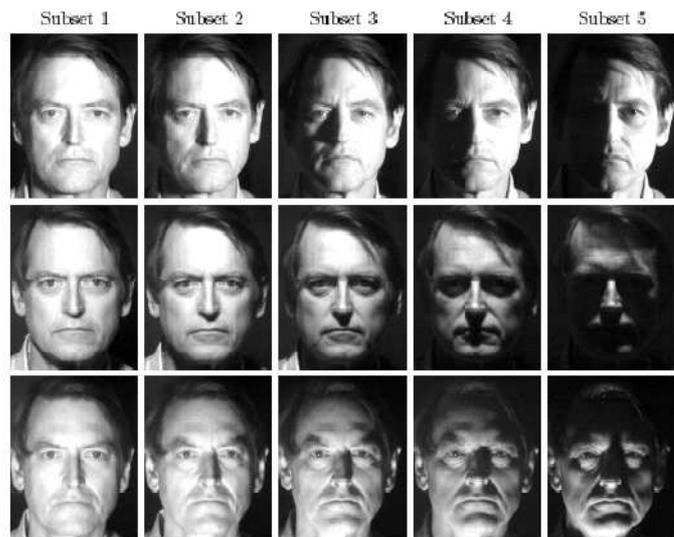


Fig.7 The same person seen under varying light conditions can appear dramatically different [7]

AI Approach

To recognize faces, AI approaches used neural networks and machine learning techniques. The main advantage of this approach is that they do not remove any of the data in the images by focussed on limited area. The major disadvantages of this technique is that it is very expensive and require a high degree of correlation between the test images and the training images.

CONCLUSION

Face recognition is a perplexing task in the turf of image analysis and computer vision. The ultimate aim of researchers in this region is to enable computers to emulate the human vision system. This research paper gives the brief description of various face detection techniques, face recognition techniques like feature and holistic based. According to the researchers, “strong effort among the computer vision, digital signal processing, and psychophysics and neurosciences groups is looked-for” to attain this aim.

REFERENCES

- [1] J.Sunitha, A survey on Video-based Face Recognition Approaches, *International Journal of Application or Innovation in Engineering & Management (IJAIEM)*, **2014**, 3(2), 208-215.
- [2] Mr. Rahul D. Dhotkar, Mr. Prakash R. Chandore, Dr. Prashant N. Chatur, Face Recognition Techniques and its Application, *International Journal of Application or Innovation in Engineering & Management*, **2014**, 3(3), 498-500.
- [3] Divyarajsinh N. Parmar and Brijesh B. Mehta, Face Recognitions Methods & Applications, *Int.J.Computer Technology and Applications (IJCTA)*, **2013**, 4(1), 84-86.
- [4] Ms. Jaishree Tawaniya, Ms. Rashmi Singh, Ms. Neha Sharma, Mr. Jitendra Patidar, Image-Based Face Detection and Recognition using MATLAB, *International Journal of Core Engineering and Management (IJCEM)*, **2014**, 1(2), 23-26.
- [5] Yao-Chuan Chang, Yen-Yu Lin and Hong-Yuan Mark Liao, Multi-view Face Detection in Videos with Online Adaptation, *IEEE International Conference on Image Processing (ICIP)*, Taiwan, **2013**, 3949-3953.
- [6] Dr.S.Vijayarani, Mrs.M.Vinupriya, Facial Image Classification and Searching-A Survey, *International Journal of Information Technology, Modeling and Computing (IJITMC)*, **2014**, 2(2), 19-27.
- [7] Rabia Jafri and Hamid R. Arabnia, A Survey of Face Recognition Techniques, *Journal of Information Processing Systems*, **2009**, 5(2), 41-68.
- [8] Tae-Kyun Kim, Sung-Uk Lee, Jong-Ha Lee, Seok-Cheol Kee and Sang-Ryong kim, Integrated Approach of Multiple Face Detection for Video Surveillance, *IEEE Computer Society*, **2002**, ICPR(2), 394-397.
- [9] Nazil Perveen, Darshan Kumar and Ishan Bhardwaj, An Overview on Template Matching in Image Processing, *International Journal of Research in Computer and Communication Technology*, **2013**, 2(10), 988-995.
- [10] T Mahalakshmi, R Muthaiah and P Swaminathan, An Overview of Template Matching Technique in Image processing, *Research Journal of Applied Sciences, Engineering and Technology*, **2012**, 4(24), 5469-5473.
- [11] Yin Jian, Liu Xiaohe, Extraction from Surveillance Video Based on Face Detection, *IEEE Joint International Computer Science and Information Technology Conference (JICSIT)*, China, **2013**, 1-4.
- [12] Mrs. Sunita Roy and Prof. Samir K. Bandyopadhyay, Gender Recognition using SOM-An Unsupervised ANN Approach, *International Journal of Emerging Research in Management and Technology*, **2013**, 3(8), 36-39.
- [13] Muhammad Hassan, Tasweer Ahmad, Nudrat Liaqat, Ali Farooq, Syed Asghar Ali and Syed Rizwan Hassan, A Review on Human Actions Recognition using Vision Based Techniques, *Journal of Image and Graphics*, **2014**, 2 (1), 28-32.
- [14] Aisha Azeem, Muhammad Sharif, Mudassar Raza and Marryam Murtaza, A Survey: Face Recognition Techniques under Partial Occlusion, *The International Arab Journal of Information Technology*, **2011**, 11(1), 1-10.
- [15] Mahmud S. Alkoffash, Shihadeh Alqrainy, Hassan Muaidi and Mohammed Wedyan, A Novel Approach for Face Recognition based on a Multiple Faces Database, *Journal of Software Engineering and Applications*, **2012**, 5, 1008-1012.
- [16] Rekha A L, Dr. Chethan H K, Automated Attendance System using face Recognition through Video Surveillance, *International Journal for Technological Research in Engineering*, **2014**, 1(11), 1327-1330.