REAL TIME FACIAL RECOGNITION USING OPENCV PYTHON TECHNIQUES

Sachin Wakurdekar[1], Aman Rikhra[2], Melind Sharma[3], Sagarika Singh[4]

[1]Professor, [2,3,4]Student
Department of Computer Engineering
BV(DU)COE, Pune

***Abstract*: The biometric is an analysis of the human behavior and characteristics. Face-recognition is biometric technique in which Different approaches are used for this. In this article, a survey is included for all these strategies to evaluate different algorithms and processes. Face recognition is the new biometric division for health, since no faces can be overcome as a security strategy. So, how can we recognize a face using face detection method with the help of computer is given in this paper.**

***Keywords*: Face Recognition**

I. INTRODUCTION

Face recognition has since the last three decades become an active area of research in computer vision, neuroscience and biometrics. With a boom in computing power, deep-represented face recognition has been commonly used in many areas, such as security, advertisement and biometrics. Nevertheless, due to the large-scale identities required to be identified, it is still a challenging task to incorporate face recognition on minimal computing cost framework such as smartphone and embedded devices. For individual authentication, facial recognition is used. Eye also a component of the capacity of the human vision system. Every person has unique characteristics which do not share with the person of another.

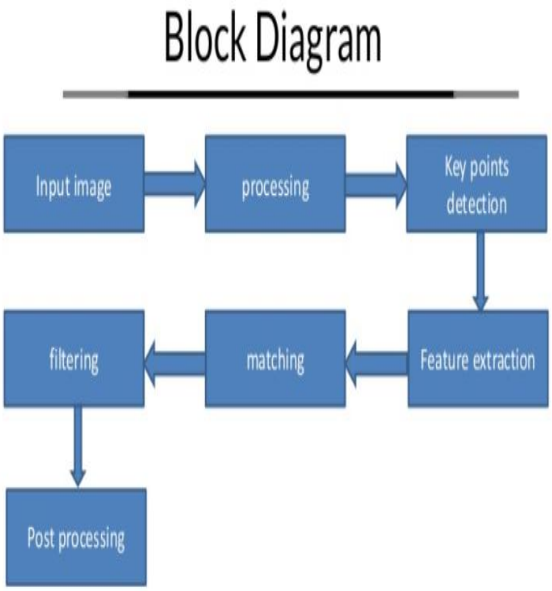

Fig.1.Block Diagram of Face Recognition

A broad facial image database, a suitable algorith-
m and a test protocol are required to validate the method in order to generate a consistent system.In this sense of biometric technologies and models, the methodology of face recognition emerges to be the most studied one Approaches to facial recognition are most used by people to make a personal identity in many areas of life such as: offenders, attackers and missing children. It has become worldwide, especially in: identity of individuals(national id numbers, passports, registration of voters, driving license).
It research area is promising for further development and implementation in the public sector suchas defense and surveillance, as well as in personal devices such as digital cameras, smartphones and laptops.Moreover, the precision becomes an essential part of the system owing to the use of the face recognition technology for security use. Recently many approaches have been developed for facial recognition. Many of these procedures rely on a lower dimensional space or on a transformed version projecting the image. Normal Study of Inequality (LDA), Central FactorAnalysis (PCA). It suggests a facial recognition
System that incorporates PCA as well as LDA.
These algorithms have been capable of finding, normalizing and recognizing faces from a distributeddatabase.In the same sense, s everal techniques

Have been used to assess the efficiency of these al-gorithms in order to achieve the final precision.

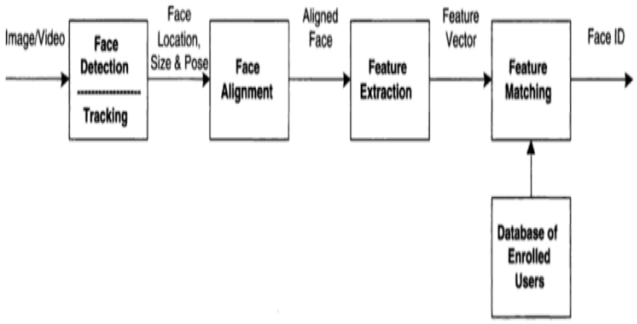

Fig.2.Face Recognition Processing Flow

II. LITERATURE SURVEY

Biometric acknowledgment turned into a necessary piece of our living. This paper manages AI strategies for acknowledgment of people dependent on face and iris biometrics. The primary aim of AI territory is to arrive at a state when machines (PCs) can react without people unequivocally programming them. This zone is firmly identified with man-made brainpower, information revelation, information mining and neurocomputing. We present significant AI strategies with fundamental spotlight on neural systems. A few parts of hypothesis of neural systems are tended to, for example, perception of procedures in neural systems, inside portrayals of info information as a reason for new element extraction techniques and their applications to picture pressure and arrangement. Iris acknowledgment is dissected from the perspective of state-of-the workmanship in iris acknowledgment, 2D Gabor wavelets, utilization of convolution portions and opportunities for the plan of new parts. Programming and equipment usage of face and iris acknowledgment frameworks are talked about and an execution of a multimodal interface (face and iris some portion of a framework) are introduced. Additionally, a commitment of Machine Learning Group working at FEI SUT Bratislava to this exploration territory is demonstrated. The picture of a face differs with the enlightenment, posture, and outward appearance; therefore, we state that a single face picture is of high vulnerability for speaking to the face. Right now, face picture is only a perception and it ought not to be considered as the completely exact portrayal of the face. As more face pictures from a similar individual give more perceptions of the face, more face pictures might be helpful for diminishing the vulnerability of the portrayal of the face and improving the precision office acknowledgment. Be that as it may, in a true face acknowledgment framework, a subject for the most part has just a set number of accessible face pictures and in this manner, there is high vulnerability. Right now, endeavor to improve the face acknowledgment exactness by decreasing the vulnerability. They devise a portrayal approach dependent on the chose valuable preparing tests to perform face acknowledgment.

Exploratory outcomes on five broadly utilized face databases exhibit that our proposed approach can get a high face acknowledgment precision, yet in addition has a lower computational intricacy than the other state-of the-workmanship approaches .Face acknowledgment is an emanate investigate region, traversing over numerous orders, for example, picture handling, PC vision and sign preparing. For every facial picture a spatially improved, connected portrayal was gotten by getting a histogram from every network of the partitioned input picture. These histograms were anticipated to bring down measurements by applying PCA which speaks to nearby highlights to describe the face of a subject. The worldwide face portrayal of a subject was inferred by anticipating a few pictures of the subject into lower measurements applying PCA. Face Recognition was performed with various closeness measurements on ORL, JAFFE and INDIAN face databases and contrasted and different works. It was discovered that the nearby highlights (MBLBP) are superior to the worldwide highlights (PCA) for face acknowledgment. Human-PC communication framework for a programmed face acknowledgment or outward appearance acknowledgment has pulled in expanding consideration from specialists in brain research, software engineering, phonetics, neuroscience, and related orders. Right now, Automatic Facial Expression Recognition System (AFERS) has been proposed. The proposed technique has three phases: (a) face identification, (b) highlight extraction and (c) outward appearance acknowledgment. The principal period of face recognition includes skin shading location utilizing YCbCr shading model, lighting remuneration for getting consistency on face and morphological activities for holding the necessary face parcel. The yield of the principal stage is utilized for removing facial highlights like eyes, nose, and mouth utilizing AAM (Active Appearance Model) strategy. The third stage, programmed outward appearance acknowledgment, includes basic Euclidean Distance technique. Right now, Euclidean separation between the component purposes of the preparation pictures and that of the question picture is looked at. In view of least Euclidean separation, yield picture articulation is chosen. Genuine acknowledgment rate for this strategy is around 90% - 95%. Further alteration of this technique is finished utilizing Artificial Neuron Fuzzy Inference System (ANFIS). This non-straight acknowledgment framework gives recognition pace of around 100% which is satisfactory contrasted with different techniques. Face acknowledgment has been concentrated broadly; in any case, genuine face acknowledgment despite everything stays a difficult assignment. The interest for unconstrained reasonable face acknowledgment is ascending with the blast of online sight and sound, for example, informal organizations, and video reconnaissance film where face investigation is of critical significance. Right now, approach faces acknowledgment with regards to diagram hypothesis. We perceive an obscure face utilizing an outer reference face chart (RFG). The RFG is created and recognition of a given face is accomplished by contrasting it with the countenances in the developed RFG. Centrality measures are used to recognize particular faces in the reference face chart. The proposed RFG-based face acknowledgment calculation is hearty to the adjustments in posture and it is additionally arrangement free. The RFGrecognition is utilized related to DCT region touchy

hashing for productive recovery to guarantee adaptability. Tests are led on a few freely accessible databases and the outcomes show that the proposed approach beats the cutting-edge strategies with no pre-processing necessities, for example, face arrangement. Because of the extravagance in the reference set development, the proposed strategy can likewise deal with enlightenment and articulation variety.

III. Proposed Methods

III.1. Eigenfaces

It is based on PCA algorithm which extracts features using set of images. It is very important that the images are in the same lighting condition and the eyes should match in each images used in this method should in grayscale. All the images taken in datasets should be combined in a single matrix resulting a matrix with columns with number of images. Each raw data of the image is concatenated to create a vector, resulting a 1*n^2 matrix. After all these steps the matrix normalized to get an average face from the given vector images to obtain unique features of the face and images.

Next step is computing the covariance matrix result from the result. To obtain the Eigen vectors from the data, principal component analysis performed. In the matrix where there is highest variance is considered the 1st Eigen vector. The next highest variance is the 2nd Eigen vector and it is 90 degree to the 1st vector. 3rd Eigen vector will be next highest variance and so on. After when we get all the Eigen vectors we reassemble them from columns of matrix and from a face that is known as eigenfaces. When a face is recognized using principal component analysis, the image is imported, resized to match the same dimensions of the test data. If the same image it will mix the values when distribution is calculated and cannot be effectively calculated and we will get not wrong Eigen values.

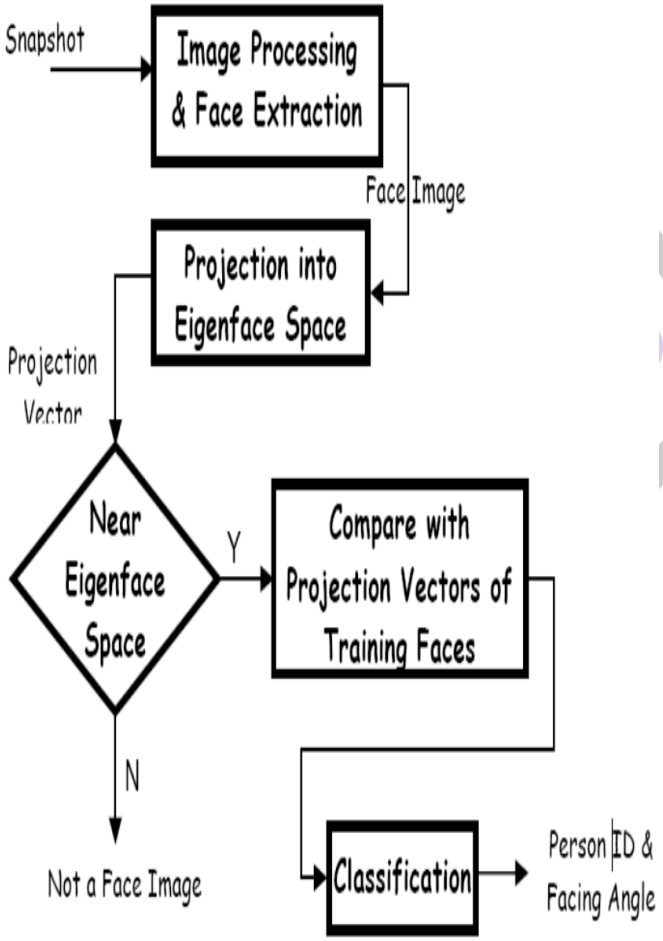

Fig.3.Eigenface Process Flowchart

III.2. Fisherface

It is a technology build upon eigenfaces and is done by linear discriminant technology used for pattern recognisation while reducing dimensions. PCA looks at the greatest variance while LDA does not look for the greatest variance. In this method the lighting effect does not affect the process as it does not uses the greatest variance factor as PCA uses. Eigen faces maximizes the variance whereas fisher face maximizes the mean distance between the different classes and minimizes variation between the classes. This way this method better describes the features as compared to eigenfaces method, it takes less space and is the best method in this project. Therefore PCA can be used for representation whereas LDA is used for classification in this method. It is a powerful way to represent data easily and effectively. Linear discriminant analysis performs a class specific dimensionality reduction. The idea behind this technique is that same classes should cluster tightly together. While different classes are away from each other in lower

dimensional represent action. This method discriminates between faces from the features of faces. Fishersfaces depends on the input data only. Fisher faces also helps to reconstruct any image from its original image easily as eigenfaces do.

III.3. Local binary pattern histogram

For feature encoding in this method the image is divided into cells. (4*4) pixels if we consider the matrix we go to counter clockwise or clockwise we compare all the pixels with the central pixel of the matrix. The value of intensity of each neighbor is compared with the central pixel. The result gives 8 bit value of the cell. If the difference is higher lower than 0 then 1or 0 is assigned to the location. This technique has an advantage that if the luminosity of the image is changed them the result remains the same or before. In this method histogram are used for large cell to find the frequency of occurrence of values making the process faster. The edges can be detected by analyzing the results in the cell. In this method known and unknown both faces can be recognized easily eigenfaces and fisher faces compute the dominate features of the whole training set while linear binary pattern histogram analyze them individually and in a accurate manner having cells and matrix. It helps to form pattern histogram as 8 bit numbers. With the help of patterns and 8 bit number generated we can find the faces of known as well as unknown person easily as compared to eigenfaces or fisher faces.

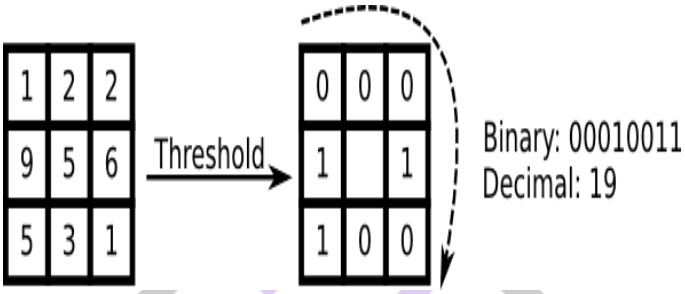

Fig.4.Working of LBP Histogram

Conclusion:

Face recognition technology has come a long way inside the last twenty years. Today, machines are able to automatically confirm identity facts for steady transactions, for surveillance and safety tasks, and for access control to homes etc. These applications generally art work in managed environments and reputation algorithms can take benefit of the environmental constraints to obtain excessive recognition accuracy. However, next era face reputation structures are going to have large software in clever environments -- where computer structures and machines are more like useful assistants. To achieve those aim pc structures have to be capable of reliably perceive nearby humans in a way that fits naturally inside the pattern of normal human interactions. They have to not require unique interactions and must agree to human intuitions approximately when recognition is likely. This implies that future smart environments have to use the same modalities as humans, and have about the identical limitations. These dreams now seem in reach however, large studies stays to be done in making individual recognition generation art work reliably, in considerably varying situations using information from single or more modalities.

References:

[1] Garg, Bindu & Aggarwal, Shubham & Sokhal, Jatin. (2018). Crop yield forecasting using fuzzy logic and regression model R. Computers & ElectricalEngineering.67. 10.1016/j.compeleceng.2017.11.015.

[2] Ramesh D, and Verdean V. Data Mining Techniques and Applications to Agricultural Yield Data. Int. JARCECE. 2013 Sept; 2(9).

[3]docs.rapidminer.com/latest/studio/operators/modeling/predictive/functions/polynomial_regression.html

[4] H. Wang, S.Z. Li and Y. Wang. Face recognition under varying lighting conditions using self quotient image. In IEEE International Conference on Automatic Face and Gesture Recognition (AFGR), pages 819-824. 2004.

[5] Dr. Priya Gupta, Nidhi Saxena, Meetika Sharma, Jagriti Tripathi. Deep Neural Network for Human Face Recognition. © 2018 Published by MECS Publisher. Selection and/or peer review under responsibility of the Research Association of Modern Education and Computer Science.

[6] K. Kollreider, H. Fronthaler, M. I. Faraj, and J. Bigun, "Real-time face detection and motion analysis with application in assessment," IEEE Trans. Inf. Forensics Security, vol. 2, no. 3, pp. 548–558, Sep. 2007.

[7] L. Best-Rowden, H. Han, C. Otto, B. F. Klare, and A. K. Jain, "Unconstrained face recognition: Identifying a person of interest from a media collection," IEEE Trans. Inf. Forensics Security, vol. 9, no. 12, pp. 2144–2157, Dec. 2014.

[8] B. Moghaddam, W. Wahid and A. Pentland. Beyond eigenfaces: probabilistic matching for face recognition. IEEE International Conference on Automatic Face and Gesture Recognition, pages 30-35. 1998.

[9] J. Galbally, S. Marcel, and J. Fierrez, "Image quality assessment for fake biometric detection: Application to iris, fingerprint, and face recognition," IEEE Trans. Image Process., vol. 23, no. 2, pp. 710–724, Feb. 2014.

[10] 5) Chung-Hua Chu* and Yu-Kai Feng. Study of Eye Blinking to Improve Face Recognition for Screen Unlock on Mobile Devices.

[11] X. Tan and B. Triggs. Enhanced local texture feature sets for face recognition under difficult lighting conditions. IEEE Transactions on Image Processing, 19(6):1635-1650, 2010.