FACE RECOGNITION AND EYE DETECTION USING PYTHON

[1]Tambe Samreen Mohammed,[2]Rajeshwari p.
[1]Student,MTech,Digital Communication and Networking,
[1]Telecommunication Engineering,[2] Assistant Professor,
[1&2] Dayananda Sagar College of Engineering, Bangalore, Karnataka, India

Abstract : The requirement of eye detection is used in application like, face detection , face recognition eye-gaze tracking, iris detection and video conferencing. The proposed paper contains a technique for eye detection and face recognition using morphological image processing by python open cv. Their will be facial land-marking for different object but specially in this paper for eye and face. It is observed that their is different number land marks points for each region. The low luminous ,high density which are the characteristic of eye as compare to rest all parts of face. Proposed method uses haar classifier technique with additional python programming efficiency. This results in detection of face and eye in fraction of second and with greater accuracy. This technique used is really highly efficient and accurate for detecting face and eyes .

Index Terms **- Detection, Morphological, Image processing, Illumination, tracking.**

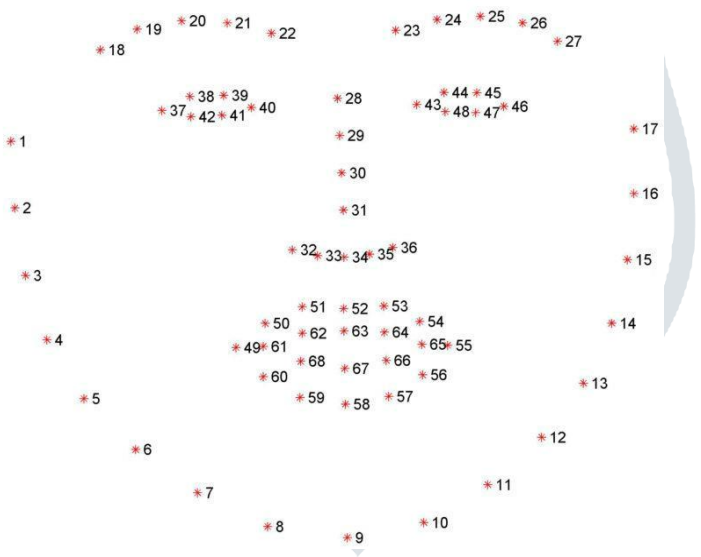
I. INTRODUCTION

In The analysis of human face, recognition and detection have befit the most important topic in field of research particularly in classification and computer vision. Face detection, face identification and recognition, and facial expression analysis are the potential applications which all this topic. Amid these topics, Automatic eye detection is most important have to solve. Human face contain a important feature and most significant part as eye compare any other facial feature. Person can be identified through iris matching using eye detection technique. Their is a subsequent image region for Face verification system which contain the possible eye pair. Face classification can be step for localization of eye. If faces are aligned we can compare two faces. As both the the inter-ocular distance and locations of eye between them are almost constant for majority of people, for face image normalization we used eye as consideration for detection. The facilitates of the detection of eye localization also further addition of features like facial landmarks. In addition, for face expression also eyes can used as reflection of person's emotion for human computer interaction application.The approaches for passive The commonly used approaches matching method as template [6, 7], eigenspace [2, 3, 8] method, and Hough transform-based method [1, 4]. In the method called template matching , input image is segmented and matched to the previously stored images,and evaluates likeness using correlation of the counterpart. Simple template matching have a problem that it cannot deal with expression, eye variation, illumination and rotation. Variation of eye scale and expression and roatation is the problem simple template matching . Compare to simple template multiscale templates is helpul solving previous problems . deformable templates process is proposed by Yuille et al [9]. some features of an eye like its shape and size at the same time was the additional advantage . But in this case the rate of success depends on initial position of the template. An eigenspace method for eye and face detection proposed by Pentland et al. [8]. The training method have a database variable with respect to orientation, illumination and appearance, which provides better performance compare to the simple template matching. Normalized sets of training and test images with respect to size and orientation will achieved by performance of this method is closely related to the training set used and this method .The popular eye detection method is obtained b by using the Hough transform. This method includes on the shape feature of an iris and is often used for binary valley or edge maps [10, 11]. But the performance depends on threshold values used for binary conversion of the valleys is the drawback of this approach. Aside from these three classical approaches, reported many other image-based eye detection techniques. The direction of the line joining the centers of the eyes is dependends on the intensity Feng and Yuen [12] , the face image responsed to the convolving an eye variance filter , and VPF [13] is the technique to detect eyes. The extension this idea to VPF to GPF (generalized projection function) Zhou and Geng [14] and results that the HPF (hybrid projection function) ,GPF contains a special case of is better than VPF I comaprision is done and integral projection function (IPF) for eye detection. The location of iris is done by edge information edge and its intrnsity by Kawaguchi and Rizon [10] .The algorithm like a separability filter, the Hough transform, a feature template, and template matching. Dpending on linear and nonlinear filters an eye detection algorithm was proposed Sirohey and Rosenfeld [24] . Genetic algorithms and built decision trees to detect eyes are done by using Huang and Wechsler's method [16]., Wu and Zhou [17] employed size and intensity information to find eye-analog segments from a gray scale image, and exploited the special geometrical relationship to filter out the possible eye-analog pairs ,for the purpose of face detection. Han etal. [18] applied such techniques as morphological closing, conditional dilation and a labeling process to detect eye-analog segments.For eye detection Hsuetal. [19] used color information. The problem of automatic eye detection is still far from being fully solved owing to its complexity much effort has been spent and some progress has been made . Factors like face rotation in plane and depth, occlusion facial expression, and lighting conditions, all affects the performance of eye detection algorithms. The method proposed in this paper involves face detection to eliminate background components followed by eye detection.

II. HAAR CASCADE CLASSIFIERS

Haar feature is basis for the Haar classifier object detection . It uses the change in contrast values between adjacent rectangular groups of pixels, rather than using the intensity values of a pixel . To determine relative light and dark areas, they used contrast variances between the pixel groups. Haar features uses the two or three adjacent groups with a relative contrast variance. Haar-like features, are used to detect an image [8]. It can increased or decreased depending how much it has to examined using size o the pixel . An intermediate representation of an image can be done using the simple rectangular features of an image, called as integral image [9]. The integral image is defined as an array which contains the sums of the pixels' it locates at left of pixel intensity values and above [x,y] . So if A[x,y] is the original image and AI[x,y] is the integral image then the integral image is computed . Lienhart and Maydt introduced a features rotated by forty-five degrees, like the line feature, require another intermediate representation called the rotated integral image or rotated sum auxiliary image [5]. So if A[x,y] is the original image and AR[x,y] is the rotated integral image then the integral image is South Central Conference CCSC: integral image Summed area of rotated integral image 129 Summed area. Each array only takes to compute both integral image arrays two passes. Taking the difference between six to eight array elements forming two or three connected rectangles one for Using the appropriate integral image and , a feature of any scale can be computed. Thus their is a more efficient and fast calculation of a feature . The same amount of effort and time as objects of similar sizes since scaling requires no additional effort .The detection of various sizes of the same object [9]. A 24 × 24 sub-image is impractical [Viola 2001, Wilson 2005] Classifiers Cascaded Although calculating a feature is extremely efficient and fast, calculating all 180,000 features . Fortunately, To determine if a sub-image potentially contains the desired object only a tiny fraction of those features are needed [6]. Define an object are used when analyzing sub-images in order to eliminate as many sub-images as possible, only a few of the features . The process which do not contain object around 50% of sub_images will eliminate. Number of features used to analyze the sub-image at each stage continues increasing . The cascading of the classifiers allows only the sub-images with the highest probability to be analyzed for all Haar-features that distinguish an object. The accuracy of a classifier will vary. By decreasing the number of stages one can increase both positive hit rate and the false alarm rate. The inverse of this is also true. Their is a 95% accuracy rate for the detection of a human face using only 200 simple features were able to achieve a Viola and Jones [9]. A Haar classifier cascade could detect human faces at a rate of at least five frames per second Using a 2 GHz computer [5].

III. METHODOLOGY



The methodology used in our paper is simple and effective. Use of various library packages has been the main part. As the video from the camera starts, leading to the capturing of live images. The facial recognition starts with facial landmarking. This is basically done with the help of NumPy library and Dlib library. NumPy is a package in python used in faster complex mathematical computing and Dlib is a special kit containing machine learning algorithms. With the help of the these libraries we are able to localize and represent salient features of the face such as eyes, eyebrows, nose, mouth and jawline. These are basically marked with 68 x-y points and then finally region of interest is taken.

RESULT

The face recognition and blink detection which is part of proposed system is obtained successfully.The following figures shows the result obtained with steps to carried out to obtained result using python coding in open cv. Region of Interest (RoI) is found with the EAR calculation and winks for blink detection and face recognition using haar classifier algorithm.

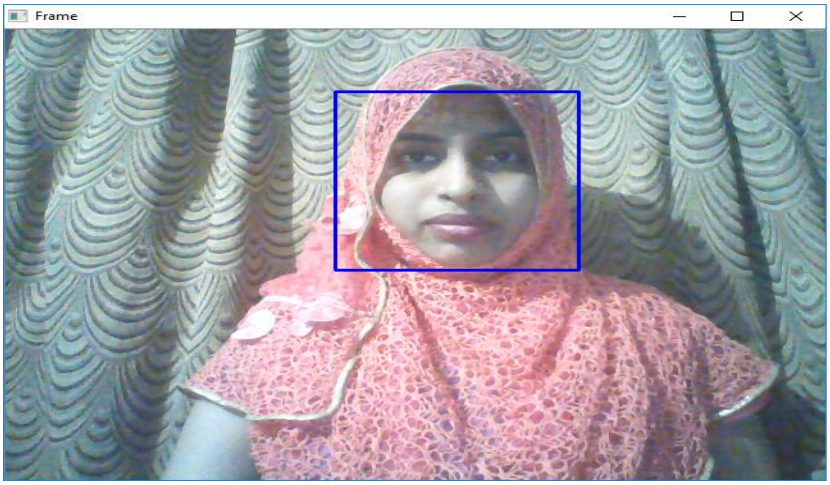


Fig1. Datasets collection For face recognition

Fig2. Datasets are properly trained

Fig3: face is recognized successfully

Fig4: excution using command prompt with exact path

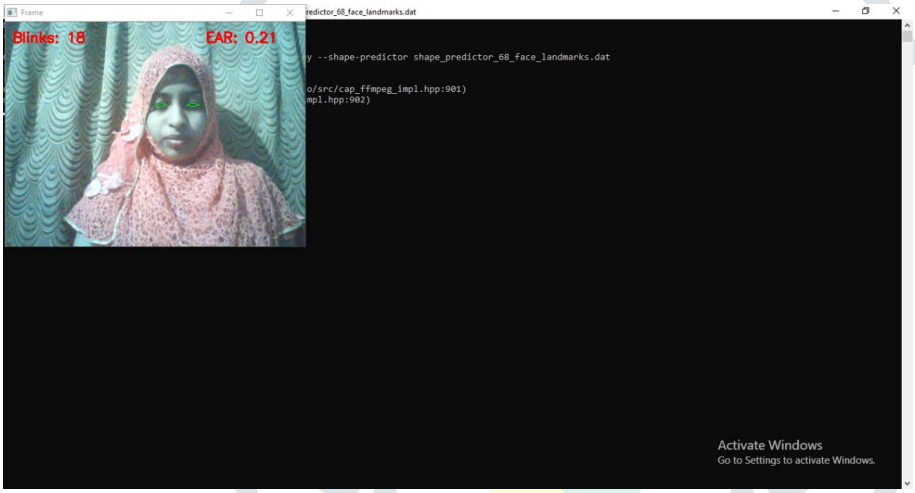


Fig5:Blinking is detected successfully

CONCLUSION

The face recognition and blink detection algorithms were thoroughly studied taking a number of test images and varying the conditions and variables. All the work mentioned above involved real time data. It is working as per our expectation using python 2.7.13 and open cv. Proposed sytem Further will convert into speech .

REFERENCES

[1] A Robust Eye Detection Method Using Combined Binary Edge and Intensity Information. Jiatao Song, Zheru Chi, Jilin Liu. Science Direct, Pattern Recognition 39 (2006) 1110-1125.

[2] A Simple and Efficient Eye Detection Method in Color Images. D.Sidibe, P.Montesinos, S.Janaqi. Parc Scientifique G.Besse, France.

[3] A Hybrid Method for Eye Detection in Facial Images. Muhammed Shafi, Paul W.H.Chung. Waset. www.waset.org.

[4] Digital Image Processing. R.C. Gonzalez and R.E.Woods, 2nd edition PHI, Chapter 9, Morphological Image Processing.

[5] Handbook of Image and Video Processing. (AL Bovik) Section III, Chapter 3.3, Morphological Filtering for Image Enhancement and Detection.

[6] R.Brunelli, T.Poggio, Face Recognition, Features versus templates, IEEE Trans. Patt. Anal. Mach. Intell. 15(10)(1993) 1042-1052.

[7] D.J.Beymer, Face Recognition under varying pose, IEEE Proceedings of Int. Conference on Computer Vision and Pattern Recognition (CVPR'94), Seattle, Washington, USA,1994, pp.756-761.

[8] A.Pentland, B.Mognanddam, T.Starner, View based and modular eigenspaces for face recognition in , IEEE Proceedings of Int. Conference on Computer Vision and Pattern Recognition (CVPR'94), Seattle, Washington, USA,1994, pp.756-761.

[9] A.L.Yuille, P.W.Hallinan, D.S.Cohen, Feature Extraction From Faces Using Deformable Template, Int. J.Comput.Vision 8(2)(1992) 99-111.
[10] K.M.Lam, H.Yan, Locating and extracting eye in human face images, Pattern Recognition, 29(5)(1996) 771-779.
[11] G.Chow, X.Li, Towards a system of automatic facial feature detection, Pattern Recognition (26)(1993) 1739-1755.
[12] G.C.Fang, P.C.Yuen, Multi cues eye detection on gray intensity image, Pattern Recognition (34)(2001) 1033-1046.
[13] G.C.Fang, P.C.Yuen, Variance Projection function and its application to detection for human face recognition, Pattern Recognition Lett. 19(1998) 899-906
[14] Z.H.Zhou, X.Geng, Projection functions for eye detection, Pattern Recognition (37)(5)(2004) 1049-1056.
[15] S.A.Sirohey, A.Rosenfield, Eye detection in a face image using linear and non linear filters, Pattern Recognition (34)(2001)(1367-1391).
[16] J.Huang , H.Wechsler, Visual routines for eye localization using learning and evolution. IEEE Trans.Evol.Comput.(4)(1)(2000) 73-82
[17] J.Wu, Z.H.Zhou, Efficient face candidate selector for face detection, Pattern Recognition (36)(2003) 1175-1186.
[18] CC.Hen, H.Y.M.Liao, G.J.Yu, L.H.Chen, Fast face detection via morphology based pre processing. Pattern Recognition 33(2000)1701-1712.
[19] .L.Hsu, M.Abdel Mottaleb, A.K.Jain, Face detection in color images, IEEE Trans. Patt. Anal. Mach. Intell. 24(1)(2002) 34-58.