

Facial Feature Point Extraction Methods-Review

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Abstract— Facial feature point extraction is an important step in automated visual interpretation and human face recognition. face recognition is difficult visual representation in large part because it requires differentiation among human faces which vary subtly from each other. The objective of this paper is that to find out different methods use for feature point extraction from faces and highlight their performance. Based on this study we are proposed one method which give better accuracy, less computational time & reduced complexity.

Keywords— Enhancement of image, Edge detection, Thresholding, Geometrical method, Susan corner detector, etc .

I .INTRODUCTION

Facial feature point extraction plays a very important role in human Computer interaction field. Facial feature point extraction is nothing but identifying exact location of different feature point on face which include detection of eyes, Mouth. Nose, Ebrows, Chin etc. It may lead to face Recognition which is must remarkable abilities of human Vision. Human being are able to recognize almost a thousand of faces in one's whole life and distinguish two faces without any difficulty. the development of face recognition by computer started approximately 20 year ago.

Recently techniques achieved in researches for detection of facial feature point can be broody classified as

- 1) Approaches based on luminance chrominance facial geometry and symmetry
- 2) Template matching
- 3) PCA base approaches
- 4) Hybrid Method.

In automated face recognition system the feature and representation of the face are extracted automatically from an input image and then compared in a matching process.

Feature point extraction plays an important role in many application such as face recognition, face detection, model base image coding, expression Recognition, facial animation and head face determination from these application face recognition can be used generally for police work purpose, for public safety suspected terrorist and missing children. It can widely used in credit card verification, criminal identification, teleconference.

Facial feature point extraction can be done on Gray as well as colour image also for steal image & moving image .Researches in these field is still going on but remarkable result is not achieved until now.

II. OBJECTIVES

Main objective is to focus on different methods used for feature point extraction to achieve following parameters

- 1)Reduced complexity:-It deal with system is confirmed to be very effective & robust when dealing with images of faces with complex background and scale variation.
- 2)High accuracy:-It means the method could locate the feature point from faces exactly & quickly even if there is complication of human face structure & diversity of face features and shooting angle.
- 3)Reduced computational time:- The average computing time of image is within few second it returned quite a satisfactory performance in speed.

4)Efficiency:-High efficiency can be determined by testing different face images and by comparing the result the effectiveness of method can be determined.

III. RELATED WORK

Due attention is being paid by the research community to face detection scheme ,several kind of approach to locate face boundary & facial features have been proposed in these regard as follows:

Detection of eyes:-

Eyes is one of important features for face recognition system Eye There are different method for eye detection .It includes detection of eyes area, two corners of eyes, eyelid detection ,eyeball detection ,Iris detection etc.

thresholding to separate eyes from face after that tag is assign to each isolated block & two block having similarity is detected as eyes[1] Horizontal integral projection for searching valley point of eyes auto adopted thresholded to get binary image of eyes areas & detect the edge & corner point by using Susan operator[2] Geometrical face model is used to locate eyes. but to improve detection due to poor lightning and shadow gabor filter is used[3] SCSM, HCSM,EIM & ESM for extract eyes from image by applying integral point but for high identification of two eyes gabor filter is used and after the SUSAN corner detector to detect the corner point for eyes.[4] two technique for eyes detection by PCA & by random transform because PCA is sensitive to scale variation but result accurate detection where as random transform does not provide accuracy of that of PCA but less sensitive to scale variation.[5] Skin colour is initially detected after that edge detection algorithm (Robert cross operator) is applied then segmentation is perform to determine face region & from the segment the object at same row classified as eyes.[6] Eye region correspond to high intensity variance hence eyes region identify by computing their variance as well as geometrical method is used to detect eye region [7] skin colour similarity map and hair colour similarity map extract face region in image by pattern matching eyes are detected using projection of edge

sign map & edge intensity map .multiple snake model can detect eyes also[8] SVM detector is employed for eyes region. binarizing these feature pattern & using the colour information in detected local region eyes can be located [9]Head boundary is determined by using snake. eye window are then set for detection of eyes but corners of eye is detected to set initial parameter of eye window [10] Three cues to detect eye window a) intensity of eye region is low b)Line joining the centre of eye determine by PCA (c) eye variance filter is used for extracting eye window .[11]

Mouth Detection :- It include mouth area detection ,detection of corners of mouth area, detecting upper lip & lower lip etc.

Different methods given by Authors are

After thresholding of the image largest block is consider to be mouth then lip corner is determine by scanning first & last column [1] With horizontal integral projection of luminance in mouth area valley point is search after that SUSAN operator is used to detect edge of mouth with its two corners [2] Filtering is perform to improves quality of image .Edge detection and Thresholding is perform to separate head and face boundary. after that Geometrical method is used to locate mouth[3] SCSM & HCSM face region from an image by applying Integral projection then ESM can used to locate mouth [4]Sobel operator is employed with a threshold to isolate the strong horizontal position of left lip corner is determine by searching from left boundary & horizontal position of Right lip corner is determine by searching from right boundary of edge image after that vertical position are determined by darkest pixel along corresponding column.[5] After skin colour detection from segmentation of image eyes are find out & see if there is any other object at this location between eyes it may be mouth.[6] skin detection by skin detection model. Mouth detection is performed based on redness property of lip using face boundary box.[7] projection of edge sign map & intensity map mouth location is determined as well as multiple snake model to detect mouth.[8] SVM detector is employed for mouth region. binarizing these feature pattern & using the

colour information in detected local region mouth can be detected [9]

Nose Detection:- It include detection of nose area ,tip of nose, nostril detection, midpoint of nostril etc. by many researcher as follows

It define the region for nostril using two eyes & mouth position information & check whether the nostril in the image are appeared in one block or not[1] It uses integral projection to locate nose area. by getting the accurate position of the midpoint of two nostril nose area can be determined [2] Filtering is perform to improves quality of image .Edge detection and Thresholding is perform to separate head and face boundary. after that geometrical method to locate nose area [3] Using SCSM, HCSM, EIM, ESM the region for face is detected after that integral projection is used to detect nose area.[4] Using Geometrical operation region around tip of nose has lower luminance & nostrils corresponding to valley region So we combine the curvature map with the thresholded image to obtain a binary image that highlights the tip of nose.[5]After skin colour detection from segmentation of image eyes are find out & see if there is any other object at this location between eyes it may be nose.[6] Using projection of edge sign map & intensity map. It also uses multiple snake model to detect nose.[8] SVM detector is employed to detect nose region. binarizing these feature pattern & using the colour information in detected local region of the nose can be detected [9]

III. DESIGN

So in proposed work to reduce complexity of existing method geometrical method is applied to find different feature point and to increase accuracy SUSAN operator is used.

It include following steps

STEP 1:-Enhancement of image:-It include improves the quality of image by different type of operation on image such as filtering of image by different filter which include median filter, average filter, wiener filter according to noise present in image, improving contrast of image by histogram equalization ,adoptive equalization etc .

STEP 2:-Edge detection of image :- edge detection of image is to be carried out by using any of edge detector such as Sobel, canny, pewitt etc.

STEP 3:-Thresholding of image :- Once edge image is obtain thresholding is performed. Thresholding means converting Gray level edge image into binary.

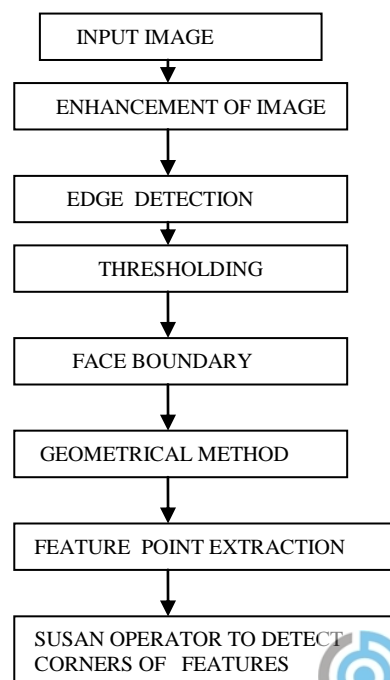
High thresholded image is used to obtain Head boundary and Low thresholded image is used to obtain face boundary.

STEP 4:-Geometrical method to detect different features:- Once getting the face boundary facial feature Candidate can be find out by Geometrical method.

It is assume that in most of faces the vertical distance between eyes and mouth are proportional to the horizontal distance between the two centres of eyes.

STEP 5:-SUSAN operator to detect corner for different features:- There are various edge detector available in DIP such as Sobel, Canny, Prewitt but they can only detect the edges. But SUSAN operator having advantages to locate corners of image in addition to edges. So to improve accuracy of feature point extraction SUSAN operator is applied on face area to detect far and near corner for two eyes and two corner for mouth area. Following block diagram depict the steps of proposed method

Fig 1 Block diagram of system



Conclusions

We are focus on for different method used for feature point extraction from which we are concluded that Geometrical method is used to locate different feature point with reduced complexity .Gabor filter can be used for determining eyes in poor lightening & shadow condition .Susan operator is used to locate corners for different feature point to increase accuracy .PCA used to increased accuracy & random transform used to scale variation .corners of eyes are detected and used to set the initial parameter of eyes templates and greatly reduced processing time for template. Thresholding& Locating similarity of pair use to detect two eyes .

Based on these study we proposed a technique for facial feature point extraction which will reduced complexity, reduced computational time, reduced complexity, increase accuracy.

References:

- [1] Jong-Gook Ko, Kyung-Nam Kim, & R.S. Ramakrishna. "Facial Feature Tracking for Eye-head Controlled Human Computer Interface," Kwang-ju institute of science & Technology 1999 IEEE TENCON
- [2] Hua GU Guangda Su Cheng Du "Feature Points Extraction From Faces," Image and vision computing NZ Palmerston North ,November 2003
- [3] Frank Y.Shih *,Chao-Fa Chaung "Automatic extraction of head & face Boundaries and facial feature Information Sciences 158(2004) 117-130
- [4] Haiyuan WU, Yukio YOSHIDA & Tadayoshi SHIOYAMA "Optimal Gabor Filters for High Speed Face Identification "Wakayama University, Japan
- [5] M. Garagesha & S. Panchanathan "A Hybrid Technique for Feature Point Detection" Fifth IEEE Southwest Symposium on image Analysis & Interpretation 2002 IEEE
- [6] Mohamed A. Berber, Hamdy M. Kelash and Amany A. Kandeel "Faces and Facial Features Detection in colour

Images "proceeding of the geometric modelling and Imaging 2006 IEEE

[7] "Facial Feature Extraction and principal component analysis for Face detection in colour Images" by MobisyM Project Enterprise Ireland.

[8] Taro Yokoyama ,Haiyuan Wu and Masahiko Yachida " Automatic detection of facial feature point and contours "IEEE international workshop on Robot and Human Communication 1996

[9] Chia-Te Liao,Yu-Kuen Wu,and Shang-Hong Lai "Locating Facial Feature Point Using Support Vector Machines" Department of computer science National Tsing-Hua University,Hsinchu,Taiwan300

[10] KIN-MAN LAM and HONG YAN "Locating and extracting the eye in human face images" pattern recognition,vol.29,no 5,pp.771-779,1996 Elsevier science Ltd.

[11] Guo can Feng,Pong c. Yuen "Multi -cues eye detection on Gray intensity image "pattern recognition the journal of the pattern recognition society.2000