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A Competent Eyes Recognition In Facial Images Using Circular Hough Transform

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ABSTRACT-

This paper is to discuss a method to extract face region, Eyes and Irish. To maintain a database of a person this can be used for commercial as well as for non-commercial purpose like Aadhar Card. The first footstep is to extraction of face of the person. Identification of face is detected by image segmentation through skin color using an adaptive thresholding method. The benefit of adaptive thresholding method that it adapts mechanically to the skin color of the user. After face detection, eyes will be notice and trail. The basic Circular Hough transform algorithm is used to process the image to detect the iris. The algorithm is implemented and checked with different database. Most of the faces are frontal with open eyes. The detection accuracy is 84%.

Keywords— Preprocessing,Face detection,Eye detction,Irish detection, circular hough transform,

INTRODUCTION :

Human eyes play an significant role in face detection and facial expression investigation. In fact, the eyes can be measured salient and comparatively steady feature on the face in assessment with other facial features. Eye recognition is precious in influential the orientation of the face and also the gaze direction. The position of other facial features can be predictable using the eye position [1]. In addition, the size, the position and the image-plane rotation of face in the image can be standardizing by only the position of both eyes. This is also regarded as one of the most significant biometrics individuality for personal recognition. The existing work in eye position recognition can be classified into two categories. First, the active infrared (IR) based approaches and second the image-based passive approaches. Eye recognition based on active remote IR clarification is a simple yet effective approach [2]. But it relies on an active IR light source to produce the dark or bright pupil effects. In other words, this technique can only be functional to the IR illuminated eye images. This method is not generally used, because in many real applications the face images are not IR illuminated.

The image-based passive technique can be confidential into three categories. First, pattern based method [3-6], secondly is the appearance based method [7-9] In the pattern based method, a generic eye model, based on the eye shape, is designed first. Template corresponding is then used to search the image for the eyes. While this method can detect eyes precisely, it is usually time overriding.

LITERATURE REVIEW :

Eye recognition technique can be generally classified into two groups, first are those in which first the face is identify. This removes the background and other objects in the image, thus reduces the noise. Different methods are then used to detect eye in the face region of the image. In the second category eyes are notice unswervingly in the image using different techniques such as IR illumination. Various algorithms used for this purpose are discussed in this section.

A method was developed by [10] which were based on circular hough transform. They intended a headgear on which the camera was increase. The camera sensed the image of the eyeball and the eye ball was identifying using transform for circular detection. To highlight the eyeball they used dark pupil enlightenment method. In this method an IR LED was used to illuminate the eyeball. This process of illuminating the eye ball is similar to the red eye effect. However this method is not very suitable for the wheelchair user because the visibility is decreased due to the camera in front of eye.

The approach of [10] is very similar to our method. They used skin color segmentation to detect the face of the person. Skin color segmentation mainly refers to two aspects; content color space and skin color model. The color space used was YCbCr. Majority of the background eliminates in the first step.

In the next step adaboost algorithm is applied to detect the face accurately. This method reduces false detection rate and missing rate, however due to greater computational cost it is not suitable for real time applications.

METHODOLOGY

The block diagram of the proposed approach for the eye detection is shown in Figure 1 The process of identify the eye pair in the face image starts with obtain the grey scale face image from the face database. The image must be two dimensions with the rough face region consist of a face and eyes.

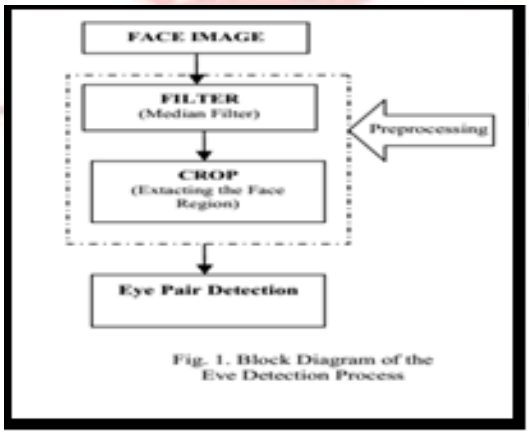


Fig. 1. Block Diagram of the Eye Detection Process

The algorithm built can only be used under this situation. The output image is known as the raw image. Face detection will process first locate the rough face region. In the second stage, an efficient feature-based method is used to locate two rough regions of the eyes in the face, which is the objective of the study.

A. Preprocessing:

In order to get a proper segmentation of the image, preprocessing of the image is carried out. To compensate for illumination variations and to obtain more image details, a median filter is used to enhance the brightness and the contrast of the images [11]. It is also used to eliminate the noise from the raw image. A median filter is based upon affecting a window over an image and computing the output pixel as the median value of the brightness within the input image.

A useful difference on the theme of the median filter is the percentile filter. Here the centre pixel in the window is replaced not by the 50% (median) brightness value but rather by the p% brightness value where p% ranges from 0% (the minimum filter) to 100% (the maximum filter). Values other then (p=50) % do not, in general, correspond to smoothing filters. This step simultaneously normalizes the brightness across an image and increases contrast. As a result, the image is enhanced and corrected from noise. The face region from the filtered image is cropped out from the background. This is done to eliminate the unwanted region and also to facilitate the process of detecting the eyes. The output image from this stage is known as the filtered image.

B. Eye couple recognition

When the rough face region is identifying, the eye pair detection is in sequence applied to locate the rough regions of both eyes. Figure 2 shows the process of the proposed method.

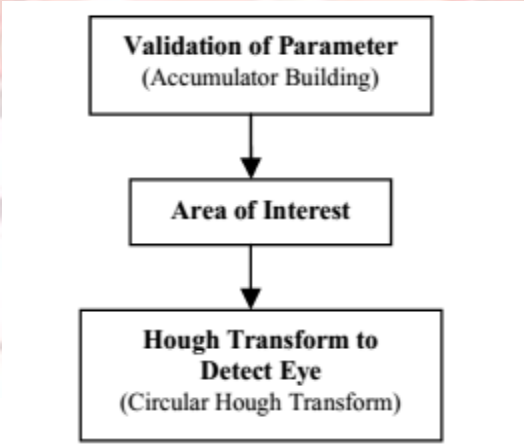


Fig. 2. Block Diagram of the
Eye Pair Detection Process

C: Legalization of Image Parameter.

This step is to validate the filtered image parameters in order to ensure that the subsequent algorithms used can be applied. The parameters that need to be considered are as follow-

i. Dimension (2-D)

ii. Size (minimum 32X32)

iii. Type (greyscale image)

***D.* Structures The Gathering Array:**

To construct the assembly array, the first step is to compute the incline and the gradient magnitude of the rough face image region. It is the first derivative of two-dimensional image. The equations used are as follow:

1. **Two dimensional first derivative;**

$$[h\theta] = \cos\theta \bullet [h_x] + \sin\theta \cdots [h_y]$$

where; h_x :denotes a horizontal derivative,

h_y :denotes a vertical derivative,

$h\theta$:denotes the arbitrary angle derivative.

ii. Gradient, $\nabla a[m,n]$, of an image:

$$\nabla a = \frac{\partial a}{\partial x}\vec{ix} + \frac{\partial a}{\partial y}\vec{iy} = (h_x \otimes a)\vec{ix} + (h_y \otimes a)\vec{iy} \qquad (2)$$

where i_x *and* i_y are unit vectors in the horizontal and vertical direction, respectively.

iii. Gradient magnitude,

$$|\nabla a| = \sqrt{(h_x \otimes a)^2 + (h_y \otimes a)^2}$$

Approximated by;

$$|\nabla a| \cong |h_x \otimes a| + |h_y \otimes a|$$

The linear indices of the gradient magnitude are computed using the equation as follows;

$$f_k(x_i) = \sum_{j=1}^{n} {}^{k} a_{ij} X_j \qquad (5)$$

where; a_{ij} :gradient magnitude,

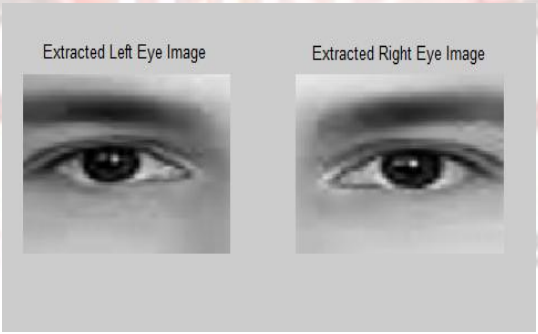
X_j : Symmetry square matrix,

$f_k(x_i)$: Linear indices of the gradient magnitude.

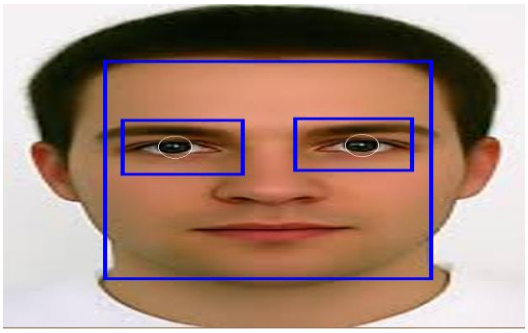
I. RESULT:

Input image

PROCESSING



EYE COUPLE RECOGNTION



IRIS DETECTED USING CIRCULAR HOUGH

CONCLUSION :

In this paper an algorithm has been discussed to identify the eyes of a single person in indoor and outdoor surroundings with complex backgrounds. The algorithm uses a skin color model to categorize an image into skin and non-skin regions. The main benefit of this method is that this is fast and competent to be used for real time reason. The skin region is then extracted from the image and eye detection algorithm is applied. The algorithm uses the method of circular Hough transform to detect the eyes in the face region.

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