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A STUDY OF EYE DETECTION USING RETINAL & PIXELS IN IMAGE PROCESSING (MATLAB)

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Abstract: Eye detection is required in many applications, like iris detection, video conferencing, face detection and face recognition etc. In this paper it states that A Study of Eye Detection Using Retinal & Pixels in Image Processing (MATLAB).We give the name retina because retina is most important part of eyes and whenever we don't know about retina we cant do the work very well, also pixels is the second most important part of this paper. We can try to use all the work which is base upon the retina & pixels implement in (MATLAB). In our thinking MATLAB is the heart of Image Processing, various types of coding we can do it and or can creates the programs using it. Like Histogram Equalization, Image Transformation, Blurring, Filtering, Canny's Method etc. Located all these information only for importance study of MATLAB. Retina is innermost membrane of the eye, which lines the inside of the wall's entire posterior portion. When the eye properly focused, light from an object outside the eye is imaged on the retina. A pixel is something that captures the notion of "intensity" and possibly "color". So focusing of pixels notification's and retina's position distances we can try to complete the work.

Keywords:
Eye Detection, Face Recognition, Experimental implant in MATLAB, Image Processing.

A] INTRODUCTION

In eye detection different types work has been done. The potential applications involve topics such as face detection, face identification, face expressions analysis etc. With that the study of human eye detection , eyes play the very important role because for example , if we watching that time we give the various types of eye expressions like Surprise, Anger ,Smile, Disgust ,Neural etc.Each human faces are unique, combinations of face features , can help us distinguishing their identities and expressions. Eye detection is also used in person's identification by iris matching. Eyes can be considered a salient and relatively stable feature on the face in comparison with other facial feature. The eye is most significant and important feature in a human face. Or localization of eye is also a necessary step for many face classification methods and positions of eye means that the size, location & the image plane rotation of face in the image can be normalized by only the position of both eyes. The eye position detection can be classified into two categories is active infrared (IR) based approach and image-based passive approaches. In additional work it is important to know about retina, which can be further divided into epiretinal and sub-epiretinal. The epiretinal referring to the side that faces the vitreous & the sub-retinal to the side that is adjacent to the choroids. The number of rod is much larger; some of 75 to 150 million are distributed over the retinal surface. Many face recognition evaluation such as the FERET tests contained image metadata specifying eye position. In eye visual information from the retinas 130 million photoreceptors are compressed into electrical signals carried by 1.2 million highly specialized ganglion neurons , whose axons from the optic nerve[3].We use cluster of pixels to represent intensity and to distribute errors among pixels then exploit spatial integration in our eye or display greater range of perceptible intensities. In basic Image Processing there are Single Pixel Operations and Multi-Pixel Operation. For this proposed system we should want to know about structure of eye.

B] STRUCTURE OF HUMAN EYE

The eye is nearly a sphere with an average diameter of approximately 20mm. There are three membrane enclose the eye: the cornea & sclera outer cover, the choroids and the retina. The cornea is a tough transparent tissue which covers the anterior surface of the eye and the choroids lies directly below the sclera. The choroids coat is heavily pigment & hence helps to reduce the amount of extraneous light entering the eye, the backscatter within the optic globe. The choroids is divided into the ciliary's body & iris. The central opening of the iris (the pupil) varies in diameter from approximately 2 to 8 mm. when the eye is properly focused; light from an object outside the eye is imaged on the retina. Pattern vision is afforded by the distribution of discrete light receptors over the surface of the retina. There are two classes of receptors i.e. cones & rods, the cones in each eye number between 6to7 million. They are located primarily in the central portion of the retina, called as fovea, and are highly sensitive, to color there fore human resolve fine details with these cones largely , because each one is connected to its own nerve end. Muscles controlling the eye rotate the eyeball until the image of an object of interest falls on the fovea. Cone vision is called photopic or bright light vision. For example object that appear brightly colored in eye light when seen by moonlight appear as colorless forms because only the rods are stimulate and these phenomenon is known as scotopic or dim light vision. In below fig it shows that, the density of rods & cones of a cross section of right eye passing through the region of

emergence of the optic nerve from the eye. The receptor density is measured in degrees from the fovea. This fig shows that not only the cones are most dense in the centre of retina but also the rods increase in density from the centre out to approximately 20° off axis and then decrease in density out to the extreme periphery of the retina.

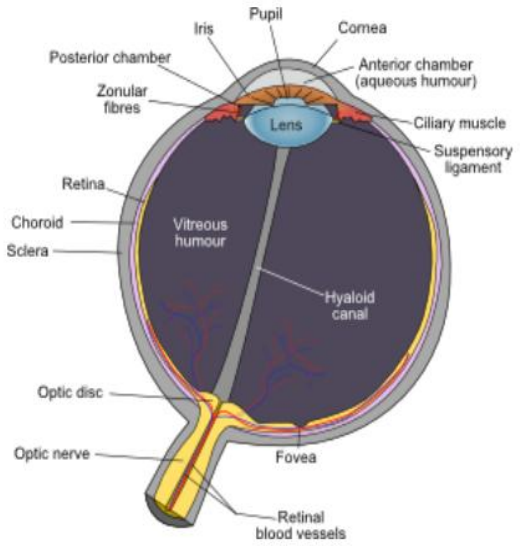

Figure1:- Structure of Human Eye

C]HOW TO WORK PIXELS

A single point within the image is known as a pixel. A gray-scale binary pixel consists of one data value, a color pixels consists of 3 data values. In most common data types of the individual pixels are unit8 unsigned integer: data range is 0…255 and double precision float: data range is 0.0….1.0. The eye position by translating eye co-ordinates in concentric circles around their original positions, since the eyes are of nearly uniform size, the experimental content does not vary across subject. Suppose we want to the eye region extraction, then the eye corners have been detected, the manual distance is found out using the 'data cursor' operator of MATLAB, which gives the (x, y) co-ordinates values of the eye corner pixel, on selection of these pixels [4]. Like the same method use for eye detection do some changes in MATLAB coding. After getting the co-ordinate values of both eyes, the row and column distances measures. For performing a vertical projection to all pixels in horizontal region of image and a peak of this projection can be found near the vertical centre of face image & the position of the vertical peak can be treated as the position of vertical centre of face, because the area between both eyes is most bright in the horizontal region [5]. Using gray-scale images for proper eye detection, to extract the eye region from input image, Harris corner detector has been used to detect the corners on the images. After corner detection, manual analysis has been done to find out the possible ranges of distances between the detected eyes corners using data cursor of MATLAB and used is as predefined distance [4]. In order to improve the accuracy of this method has to match the whole face with an eye template pixel by pixels. If a pixel is black, then adding random noise to it, we are less likely to turn it into a white pixel then if the pixel were dark gray [15].For example pixels identified as having red-eye artifacts are modified to a substantially monochrome color, while the bright specular reflection masks computed over the facial region. The masks are created by threshold per-pixel metrics, designed to detect red-eye artifacts. One the red-eye pixels have been found, the redness is attenuated with a tapered color desaturation. A detector implemented with this that system corrected 95% of the red-eye artifacts in 200 tested images. For each pixel, a vector pointing to the closest edge pixel is calculated [7]. The magnitude (length) & the slope (angles) of each vector are the two values assigned to each pixel. To detect the eyes on an image, the length & angle maps of candidate regions are projected on the spaces spanned by the eigenvectors found during training and the similarity of projection weights with those of model eyes are used to declare an eye presence [7]. The light intensities are sampled at equally spaced intervals. A larger sampling rate will create a larger number of pixel data and thus a better resolution.

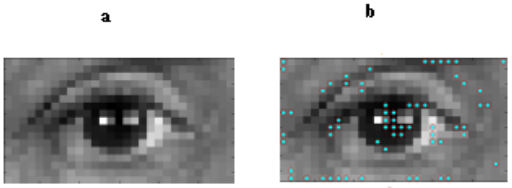

Figure2:-a) 17x29 rectangular patch used for eye detection.
b) 64 most discriminative pixels used by our SVM classifier that jointly optimizes pixel weighting and SVM parameters.

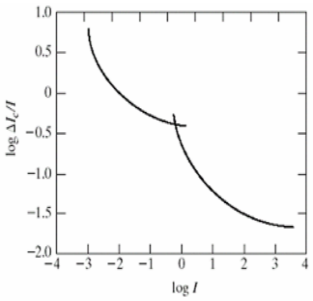

Figure3:-Light intensity resolution than the typical Weber

D] IMAGE FORMATION OF EYE

In our work, we take this topic image formation of eye because this topic shows the example of how the retinal image is focused primarily on the region of the fovea. In an ordinary photographic camera, the lens has a fixed focal length and focusing at various distances is achieved by varying the distance between the lenses & the imaging plane. In human eye, the converse is true, the distance between the lense and retina is fixed. The

distance between the centre of the lens and the retina along the visual axis is approximately 17mm. The range of focal length is approximately 14mm to 17mm , the latter taking place when the eye is relaxed & focused at distances greater than about 3m , in this below fig it shows that , how to obtain the dimensions of an image formed on the retina with suitable example , suppose that a person is looking at a tree 15m light at a distance of 100 m, letting h denote the height of that object in the retina , which shows in above figure yields 15/100 =h/17 or h=2.55mm, as indicated the section of[B].

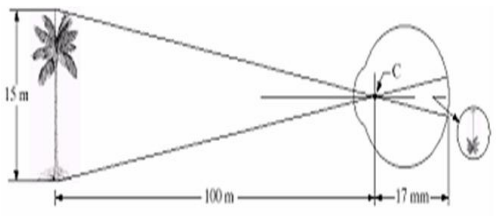

Figure:-4 Graphical representation of the eye looking at a palm tree

E] CONCLUSION

Pixel is the basic unit of the image (Pixel), are can no longer be divided into smaller units, which by many of the same size pixels along the horizontal direction and vertical direction by the uniform rows of matrix rows.Image processing is very understandable subject for pupil. So our total work is based on that subject. In this work, we focus on the structure of eye detection and work of a pixel. We try to keep best of our work, because the topic is very challenging for us, to implement in 'MATLAB'.No doubt in our paper a lot of work is remaining as well a lot of the implementation. But in future we will try to complete our work very well.

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