

# Eye Gaze Recognition System

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**Abstract—** Eyes are like window to this large universe. The Advancements in the field of biomedical electronics and in the field of electronics and communication system have changed the perception of eye. People suffering from paralysis do not have sensation to make any motion using hands or legs. It results them of being dependent on others. Failing them being independent .using of joystick cannot be implemented too since they can't move their hand. It is estimated 150, 00 severely disabled persons able to control only the muscles of their eyes without any problem. Hence using eye gaze we can develop wheelchair that moves on the motion of the eye gaze.

**Keywords:** Eye movement detection; video processing; wheelchair control.

## I. INTRODUCTION

People encountering loss of movement don't have sensation to make any development using hands or legs. Individuals with extraordinary motor failures are not prepared to move their members willfully and talk clearly, however the subjective parts of their cerebrum are interface The noteworthy issue defied by loss of movement patients are correspondence and commuting [1]. For correspondence, daze system exists. In any case, each time using flashes to control a wheelchair winds up clearly tiring for the eyes It comes to fruition them of being dependent on others; failing them being free. Thusly another structure should be perceived for helping the stifled to move their wheelchair. Since pushing the wheelchair himself is out of question [5]. Utilizing of joystick can't be executed too since they can't move their hand, Even however their subjective parts of the cerebrum is intuitive. [6]

## II. LITERATURE SURVEY

A couple asks about have been done starting late to create Human Computer Interface [HCI][4]. Human Computer Interface as an assistive advancement helps the overall public with motor insufficiencies and who can't move their arms in this way mind bogging human PC interface must be more created, particular to that of the data charges, balanced - to the inadequacy of the client, outlined in a shielded and clear way. Under to human PC interface the most created strategies are eye [EOG] Electrooculography is the technique used to gage the resting capacity of the retina. The resulting banner is

known as an Electro gram hail. This system was proposed by Emil-du-Bois Reymond (1848) he watched that the cornea of the eye is electrically positive in regard to the dull of the eye. In this the cathodes are set around the eye and fore set out toward recording the eye advancement [EOG] Electrooculography hail has a broad assortment of employments such has area and taking after. Video-oculography [VOG] and Electrooculography [EOG] are two significant procedures in the back and forth movements investigate used for the acknowledgment of the eye course [3]. Electro-oculographic heading of a wheelchair using eye improvement A helpful remote eye improvement controlled Human Computer Interface (HCI) for incapacitated person Eye controlled killing on and the electronic contraptions Launching the rocket using look in war field.

The impediments in EOG are: There will be changes in the look in the midst of the head improvement.

The potential refinement between the retina and cornea changes with the component, for instance, lighting, temperature fluctuated

To the extent bio signs to gage the eye improvement the framework used is electrooculography [EOG]. The recording of the eye advancement ought to be conceivable through video oculography (VOG) [3]. The related issues and distinguishing proof of nystagmus is done through the method called Electronystagmography (ENG).

## III. SETUP

The block diagram for a real time video processing based eye gaze recognition system to assist paralysed patient is as below.

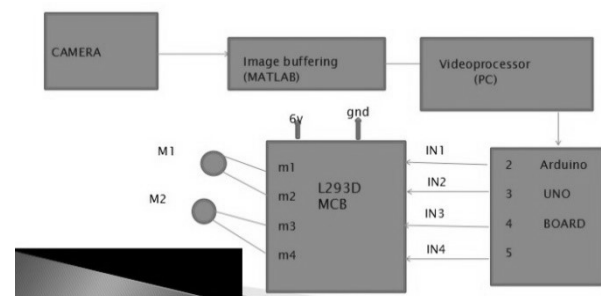


Fig 1. Setup

The video of the eye image is obtained by the webcam which is being attached to the head worn cap. The camera is adjusted such a way it focuses the eye along with the forehead. The images are being captured continuously from that of the video input. The image that is being captured by the web camera is the Raw RGB image.

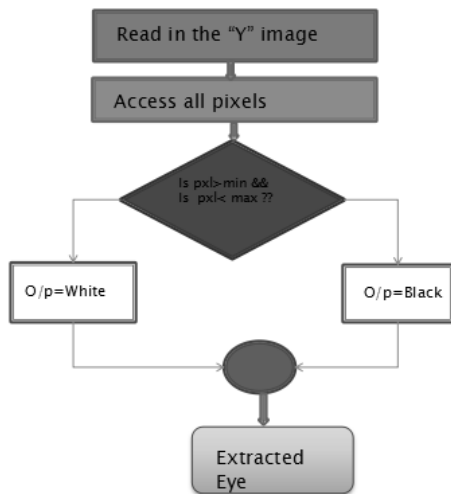


Fig 2. Flowchart

#### IV. METHODOLOGY

This image is been converted to Y parameter which is found best among all that of RGB, YCBCR and HSV. Y parameter is the best to differentiate between the Iris and Cornea of the eye. The conversion of the RGB to YCbCr image is done using Matlab. The conversion is done while the image access all the pixels and compares the threshold and conversion is done.

The conversion of the RGB image to Y-parameter is done under the category Image buffering using the software Matlab. The colour space conversion enables to convert colour information from RGB to YCbCr colour space as specified by recommendation ITU-R BT 601\_5.

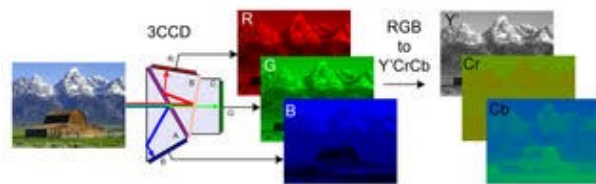


Fig 3. Colour Conversion

The casestudy is done for the four samples. These four samples are the image being extracted from that of the webcam. The samples of the converted images being observed for the pixel content. The four images are checked for the maximum and minimum value of the pixel for that of the Iris and scleria part of the eye. The average of the minimum and maximum value of the Iris

and scleria is calculated and its value is being noted. The maximum value of the pixel is being observed also with respect to minimum values. The image is then converted to black and white image by providing a function with a level of thresholding otherwise the default value is 0.5. The image is then extracted compared with the maximum value taken from that of the reference. It access all the pixels of that particular image. If the pixel is greater or equal to the minimum value the output of that image is being converted to white. If at all the pixel value is less than or equal to the image the output is black. Hence extraction of the eye is done by the above procedure.

#### V. RESULTS



Fig 4. Extracted Eyes

The above figure shows how the extraction of the eye is being complete. The Iris and scleria is been easily identified hence extraction of the eye is completed. The errors were removed by the method of erosion and emulsions.

#### VI. CONCLUSION

Using the approach of EOG, VOG and ENG we can enable the advancement of the wheelchair we to evacuate the improvement of the eye using the MATLAB and after that matched up with the gear part Aurdino is the hardware used which is being aided by the advancement of the eye. From now on a constant video taking care of based eye gaze affirmation system to help debilitated patient is done.

#### VII. FUTURE WORK

At the point the motor has to be turned on manually. We would introduce blink system into the system following which the motor can be on, handling such a way if the person blinks for continuously 5 times the motor would turn on and vice versa.

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