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Eye Tracking to Browse a Web Page

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Abstract:
In recent years, Web browsing is most common task performs by each users. Any advancement in this technology may result in users benefit and help to increase efficiency or satisfaction. So In this we are implementing an interface to track eye motion and obtain gaze point so that user can browse web page using his/her eye movements .In this proposed interface we are mainly focusing on obtaining gaze point. Primary objective is to give functionality to capture the movements of user's eye by using a camera and provide functions for eye motions. It would be use low cost, camera to get optimum results. It gets rid of infrared methods which increase cost and inconvenience and makes use of better algorithms using only a camera.

Keywords: Image Processing, Machine Learning

I. INTRODUCTION

Human eye is most valuable and major sense organ in human body. A person eyes gives a great deal of information about person observation as we can gather data and know person individual focus or area of interest. By tracking user's iris position useful interfaces can be developed that allow the user to control and manipulate devices in a more natural manner. We can use this to obtain gaze point which can be alternative to mouse pointer so that it will help user to browse web pages without any manual interaction. Using Eye Movements user will be able to Select links, Scroll page and perform various operation using eye's movements.

II. MOTIVATION

Browsing the web using mouse is the current technique. With new technologies emphasizing hands free techniques for convenience, web browsing using eye tracking is one step forward for user convenience. It will also helped the disabled browse the web easily. The existing techniques using infrared have their various disadvantages like interference from external infrared light and extra cost. Our project aims at low cost solution without using infrared light. It requires only the camera with the system.

III. PREVIOUS WORK

There are three major issues with eye tracking to obtain gaze point. They are:

- Eye tracking accuracy: The errors which are obtained by current eye tracking techniques and equipment lag in gaze point precision. Portrait Orientation.
- Sensor lag: The motion tracking limits speed of the system due to hardware or camera delay.
- Midas touch: In this it is hard to differentiate between intentional and unintentional gaze selection from user.

Sensor lag is not a big issue as long the lag is imperceptible.In terms of user as we know eye movement input is much faster than traditional mouse input.

In Eye tracking there are two common imaging techniques which are used to obtain gaze point are: Infrared imaging and Visible imaging. In infrared imaging technique we required infrared camera and infrared light source to obtain image in controlled light and better contrast of image.As a result infrared imaging is capable of performing eye tracking But there are some shortcoming include 1) Infrared imaging is most expensive techniques. 2) This system will fail if there is interference of any other infrared source 3) All user don't produce bright-dark effect so gaze point will fail 4) User having glasses will not be able use such techniques because glasses are still issue. Compared to Infrared imaging technique, Visible imaging technique don't require any infrared camera or infrared image source and this technique just required a high resolution camera and can be operated in environment ambient light conditions. In this paper,we concentrate on visible imaging technique to obtain gaze point using web camera in desktop environment for Eye tracking.

IV. PROPOSED WORK

The intention of this project is to implement an interface to track eye motion during web browsing. In other words, this proposed interface is capable of capturing movements of eye and let the users use them. This project mainly focuses on tracking eye motion. Primary objective is to give functionality to capture the movements of user's eye by using a camera. It would use low cost, camera to get optimum results. It gets rid of infrared methods which increase cost and inconvenience and makes use of better algorithms using only a camera.

A. ENHANCING THE IMAGE

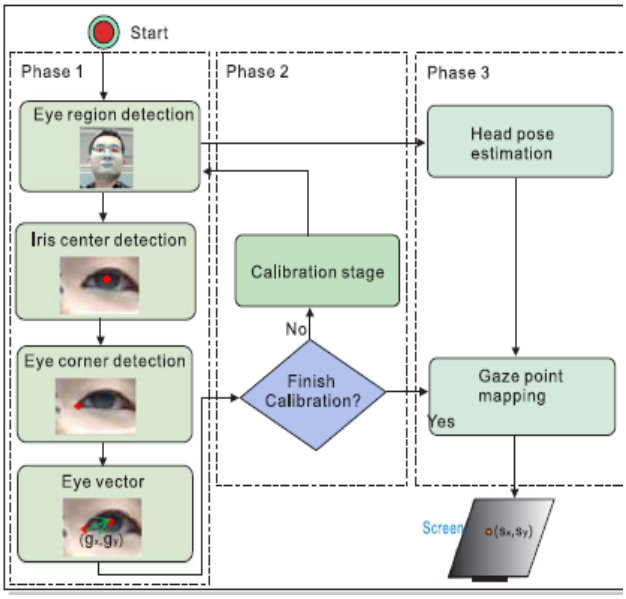
The image needs to be enhanced to remove blurs and noise. The goal of image enhancement is to process a given image so that the result is more suitable than the original image for a specific application. The steps ahead can function well only when the image is properly enhanced. The image has been enhanced here using histogram equalization. This enhances the image using it's histogram.

B. EDGE DETECTION

Sobel operators are used for Edge detection to distinctly detect the edges around faces and eyes.

C. EYE AND FACE DETECTION

To specifically detect the face and eyes of a user haar classifiers are used. These classifiers make the detection more accurate by classifying the correct and wrong images into positives and negatives.



D. CONVERTING THE IMAGE TO GRAYSCALE

Different users have different eye colors and this feature must not affect the working of our system. Converting the image into grayscale makes detecting the pupil and sclera (the white portion of the eye) easier and efficient.

E. TRAINING OF INTERFACE

Accuracy is a major hurdle in this project. Training of our interface is a great step at improving accuracy. With more training data, the interface can adapt and improve.

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V. SCREENSHOTS

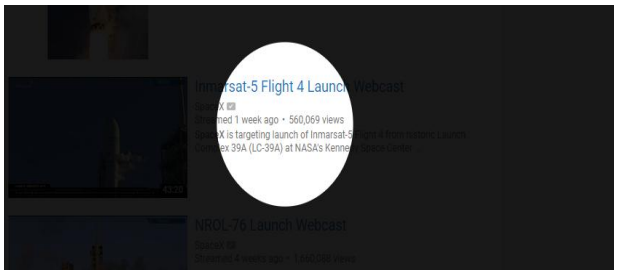

Figure. 1. Calibration

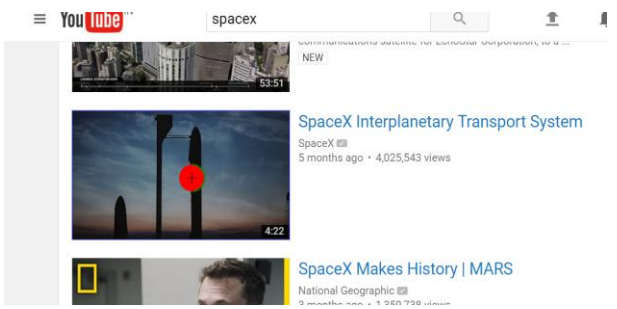

Figure. 2. Load

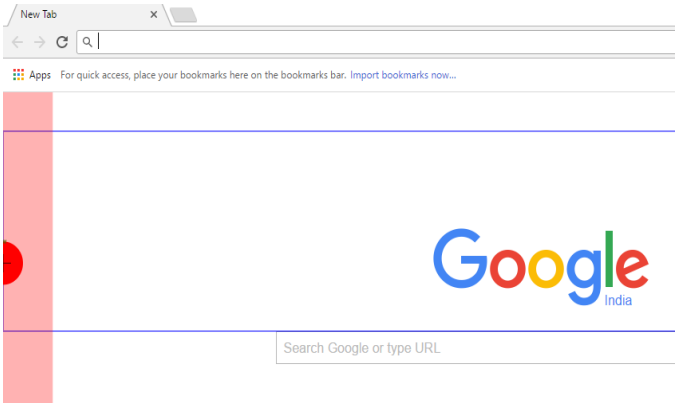

Figure. 3. Back

VI. CONCLUSION

This paper proposes a system to detect gaze point while browsing a website without using external hardware which can be both intrusive and expensive. It uses more image processing algorithms instead of depending purely on high resolution of input frames. It uses platform independent code which any website developer can integrate into their website. This can be used by ux designers to check the areas of interest by recording tester activity on their website. This can further be applied for quicker navigation throughout the website. This is one step forward to ubiquitous computing.

VII. ACKNOWLEDGMENT

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VIII. REFERENCES

[1]. Yiu-ming Cheung, Senior Member, IEEE, and Qinmu Peng, Member, IEEE, Eye Gaze Tracking With a Web Camera in a Desktop Environment, IEEE August 2015

[2]. Seung-Jin Baek, Kang-A Choi and Chunfei Ma, Eyeball model-based iris center localization for visible image-based eye-gaze tracking systems, IEEE June 2013

[3]. http://opencv.org/documentation.html