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EYE IRISES TRACKING USING MEDIAPIPE AND OPENCV

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ABSTRACT

In this paper we are going to study, eye tracking methodology is detected. It is a commercial Webcam based system for detection of eye iris. Iris center detection is a part of eye tracking research. Instead of using a specific eye tracking device, we can track eye iris center under visible light can be used as an input for a low-cost consumer-grade webcam eye tracker. We can measure the eye movement activity using eye tracking technology. Eye tracking gives us information about where do we look? Eye blinking count. What is neglect and how the pupil reacts to different incentive. In this paper we discuss eye tracking technology and its various applications. The eye tracking concept is normal but its process and exploration can be very diverse and complex.

Keywords: Eye Irises Tracking, Webcam, Tracking Technology, exploration.

1. INTRODUCTION

Maximum of the information about our outside world is collected by using our eyes. So, vision is the most essential of our senses. Eye tracking implements different image processing and computer vision mode to determine and to track eye movements. Eye tracking produce investigate tool that is each day increasingly used in diagnosis of patients in ophthalmology, neurology and psychology. Because of that, it is of crucial importance to provide a system that will allow not only the accurate monitoring of the eye and provide knowledge about eye trajectory, but also about the movements that led to the formation of such eye path.

Eye tracking is the process of determining the eye location across video frames to detect the direction of gaze. Eye tracking is essential for research and development sector such as visual systems, psychological analysis, cognitive science and product design. An eye tracking system is an integration of a collection of devices and interconnected programs for calculating eye positions and eye movement, and associating the results to the same eye across images acquired consecutively over time. Because of its flexibility, eye trackers are earning popularity in most of all fields.

2. METHODOLOGY

In This, Eye Irises Tracking detection and tracking are achieved with open-cv based algorithms uploaded to a webcam.

2.1 Eye Irises Tracking Using Webcam

Eye irises tracking is used as important research tool. Now is more obtainable and is growing in popularity. The use of eye tracking in recent years has gone through many challenges in projecting an eye tracking investigating and analyzing the data.

Now days the smart phones, laptops, tablets and webcam connected computers with 4G,5G technology are very commonly used. As eye tracking is growing in popularity knowledge about it has become more accessible than ever, creating a vast ocean of intelligence. This algorithm can be applied to any kind of webcam with any programming language.

2.2 Processing Of Signal

In order to detecting and monitoring eye pupil over a certain period of time, i.e. through the video processing tools were used. First webcam captures your entire face then detect the eye. Now the eye irises detection signal is pass and it's Detect eye irises using various algorithms such as regression and support vector machine (SVM).

3. EVALUATION

$$E\ eye = \sqrt{(a-a')^2+(b-b')^2}$$

The coordinates of the ground truth iris are characterized by *a* and *b* for base line position and perpendicular to base line position, respectively. The coordinates of the estimated iris center are described by using *a'* and *b'* for base line position and perpendicular to base line position, respectively. The Euclidean distance between the ground truth position of the irises center and the estimated irises center is represented by E eye.

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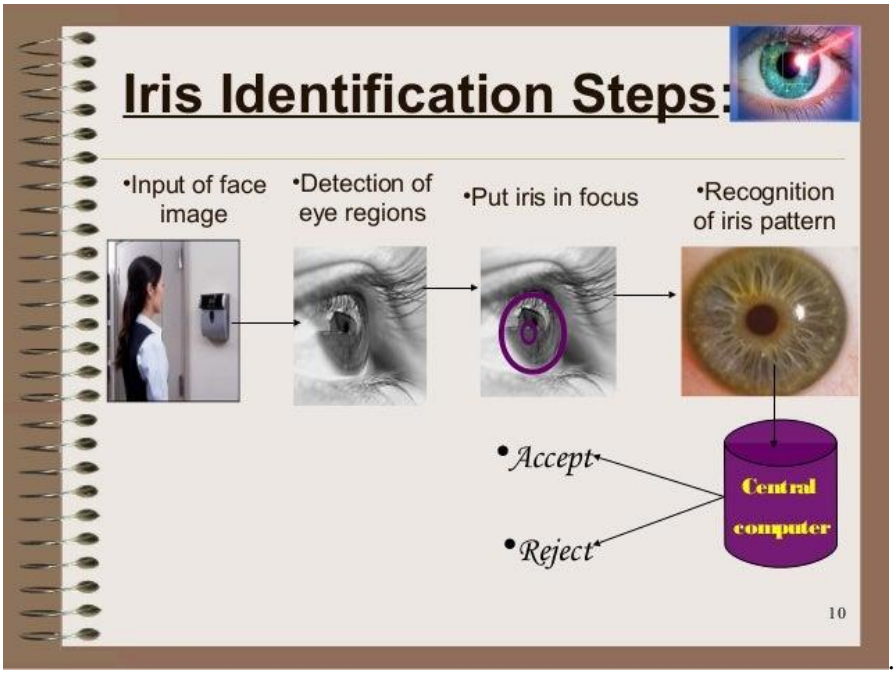

Figure 1-Iris Identification Steps.

4. RESULTS AND DISCUSSION

The innovative research was conducted by developing an eye tracking software based on Python 3.3.7. Specific libraries used for the image processing were OpenCV 3.4.3 and Numpy1.0. Meanwhile, we used PyCharm IDE Community Edition 2021. In future, the advance algorithm needs to be additional developed to reduce errors on iris detection during major head poses. Upgrade can be made by using machine learning approach.

The eye center interrelate are stored in a list that is loaded into the smart camera's guard for faster eye tracking. Then these points are written to a freeware file in the internal disk of the camera for future reference. This file is rectify from camera using FTP.

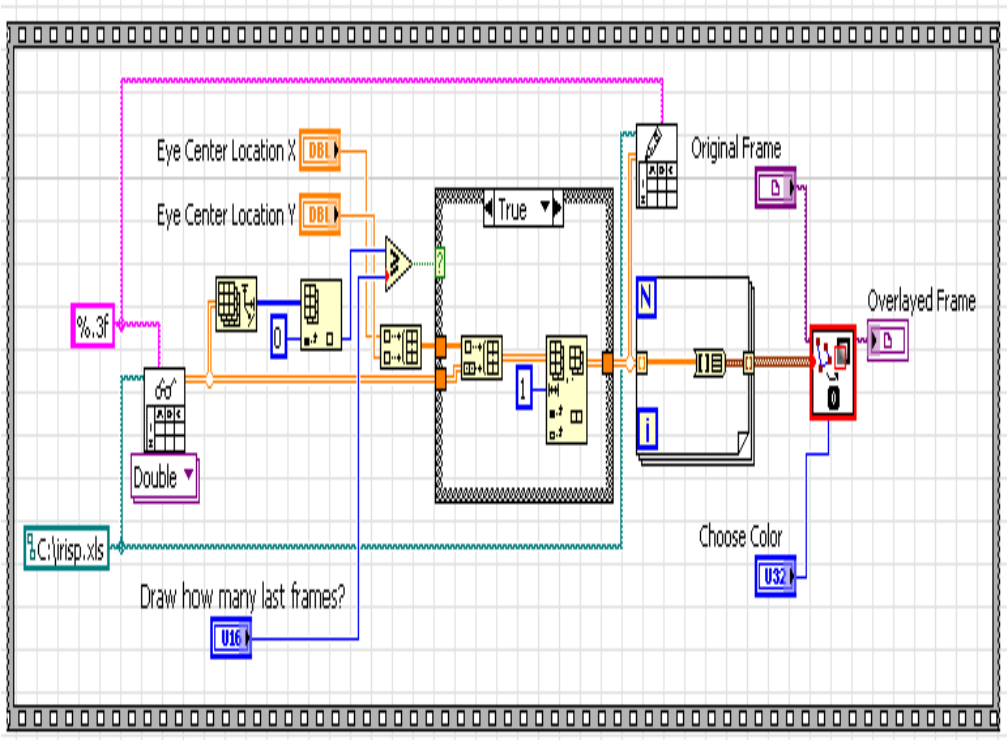

Figure 1. Sample Comparison

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Figure 2. Eye Blinking

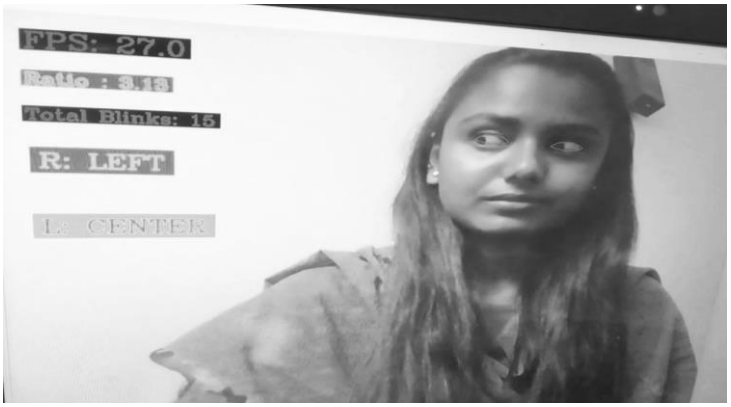

Figure 3. Eye Irises tracking and Blinking Count

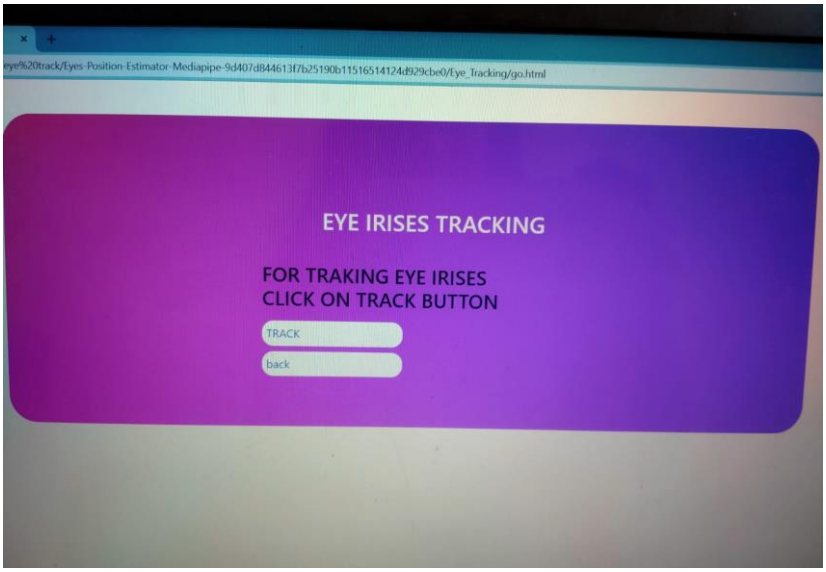

Figure 4. Home Page For Eye Irises Tracking System

5. CONCLUSION

The eye irises center detection system is actually the eye tracking technology which is developed using OpenCV and Media-Pipe. Previous research has developed an eye tracking system under visible light by implementing Circle Hough Transform to identify iris coordinates. But our system detect eye irises in visible light as well as in dark also. all the data processing is

performed on the smart camera. Eye color, by using the same parameters for detection of eye pupil and thresholds for classification of eye movements.

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