



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJIRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 5, May 2022

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 8.118



9940 572 462



6381 907 438



ijirset@gmail.com



www.ijirset.com

# A Review on: Human Machine Interface Based on Eye Tracking

Vedanti S. Raut<sup>\*1</sup>, Rupali Y. Rathi<sup>\*2</sup>, Avanti A. Agone<sup>\*3</sup>, Riddhi Y. Jajoo<sup>\*4</sup>, Jagruti S. Wankhade<sup>\*5</sup>

UG Student, Department Of Computer Science And Engineering, PRPCEM, Amravati, Maharashtra, India<sup>\*1,2,3,4</sup>

Assistant Professor, Department Of Computer Science And Engineering, PRPCEM, Amravati, Maharashtra, India<sup>\*5</sup>

**ABSTRACT:** Controlling the mouse by a physically challenged person is de facto a tricky one. To seek out an answer for the people that cannot use the mouse physically, we've got proposed this mouse cursor control using eye movements. Eye gaze is an alternate way of accessing a computer using eye movements to manage the mouse. For somebody who finds touchscreens, mouse inaccessible, eye gaze is an alternate method to permit a user to work their computer, using the movement of their eyes. Eye movement are often thought to be a pivotal real-time input medium for human-computer communication, which is particularly important for people with physical disability. So as to enhance the reliability, mobility, and value of eye tracking technique in user-computer dialogue, a completely unique eye system is proposed during this system using Webcam and without using any extra hardware. The proposed system focuses on providing an easy and convenient interactive mode by only using user's eye. The proposed system describes the implementation of both iris and movement of cursor in line with iris position which may be wont to control the cursor on the screen using webcam and implemented using Python.

**KEYWORDS::** Human Computer Interaction (HCI), Eyeball Movement, Computer Vision, OpenCV, Python .

## I. INTRODUCTION

Some persons who are disabled can't be ready to use the computers. Incorporating this eye controlling system with the computers will make them to figure without the assistance of other individual. Human-Computer Interface (HCI) is targeted on use of engineering to produce interface between the pc and also the human. There's a requirement for locating the acceptable technology that creates the effective communication between human and computer. Human computer interaction plays the important role. In recent years, the human computer interfaces are attracting the eye of various researchers across the world. The human computer interaction supported the recognizing the gesture of the human organs lives from early 1990s. Among the parts of the body utilized in HCI, eye based HCI was more popular because the easy gaze would enable to start out, stop and regulate the processing of the computers, and was very useful for people filled with disabilities. The controlling a computer interface through the attention was understood earlier because the extraction of the knowledge about the person was gazing at. Initially Robert Jacob identified the eye-gaze to be an input modality to open a computing device; nowadays the eye-gaze is employed to unlock the phone and thus the other portable devices. The eye-gaze or the eyes put into action for typing a text is termed the gaze typing or eye typing, it's mainly utilized by the parents that suffer from neuron disabilities, strokes or the body part injuries, dystrophy within the muscles the attention typing is found to be the straightforward similarly because the only real means of communication for the persons plagued by above disabilities and also the aged persons facing a motor activity that's reduced, arthritis or tremors, the figure.1 below provides the applications hierarchy related to the attention tracking. Within the proposed system, we've included the face detection, face tracking, eye detection and interpretation of a sequence of eye blinks in real time for controlling a non-intrusive human computer interface. This system will help the paralyzed person, physically challenged people especially person without hands to compute efficiently and with the convenience of use. Firstly, camera captures the image and focuses on the attention within the image using OpenCV code for pupil detection. This results the middle position of the human eye (pupil). Then the middle position of the pupil is taken as a reference and supported that the human or the user will control the cursor by moving left and right.

## II. RELATED WORK

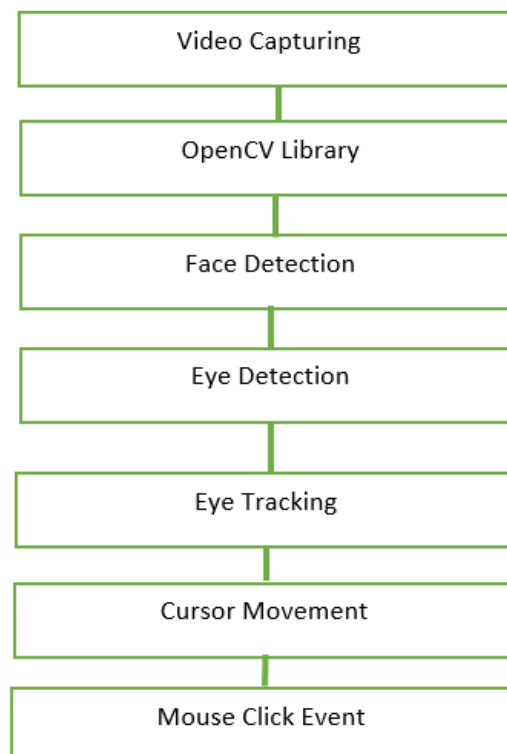
Normally, eye tracking measures the location of an eyeball and determines a person's direction, and eye movements can be tracked using a variety of techniques. It can be divided into four categories: infrared oculography (IROG), scleral search coil method (SSC), electrooculography (EOG), and video oculography (VOG). Currently, most HCI eye tracking studies are based on VOG, because the VOG method has reduced user attacks to some extent. Chin et al. proposed a computerized user interface control system, which included electromyogram

signals from facial muscles as well as positioning coordinates produced by the eye tracking system as embedded objects. While it may help with reliable clicks, it was slower than the control system using only eye tracking and the accuracy was low. This system relies on the location of the user's head to control the location of the mouse cursor. Unusual movement of the user's head will affect the accuracy of the click function. Eye movements are detected by the device and voluntary blinking is associated with a pictogram or keyword selection that reflects the patient's needs. More recently, several similar programs have been developed by experts, and the main idea of these programs is to take pictures with a camera or mounted on a user worn or remote-controlled gear and extract information from different eye features to get a point view. As commercial eye trackers became more expensive to use in HCI, all of the aforementioned eye control systems were proposed with the hardware and software built into them. You can use inexpensive eye trackers as standard equipment in your eye tracking control system. The program is created with all the functions of a mouse and keyboard, the user must first select the desired function and establish a real connection with the computer. The accuracy of the eye tracker control system depends on the eye tracker employed. However, the use of this program is against the user's experience and it is unnatural for the user to communicate freely with the computer. Therefore, this article presents an eye tracking management system that not only supports inexpensive eye trackers, but also provides a more natural and simple communication channel between the user and the computer.

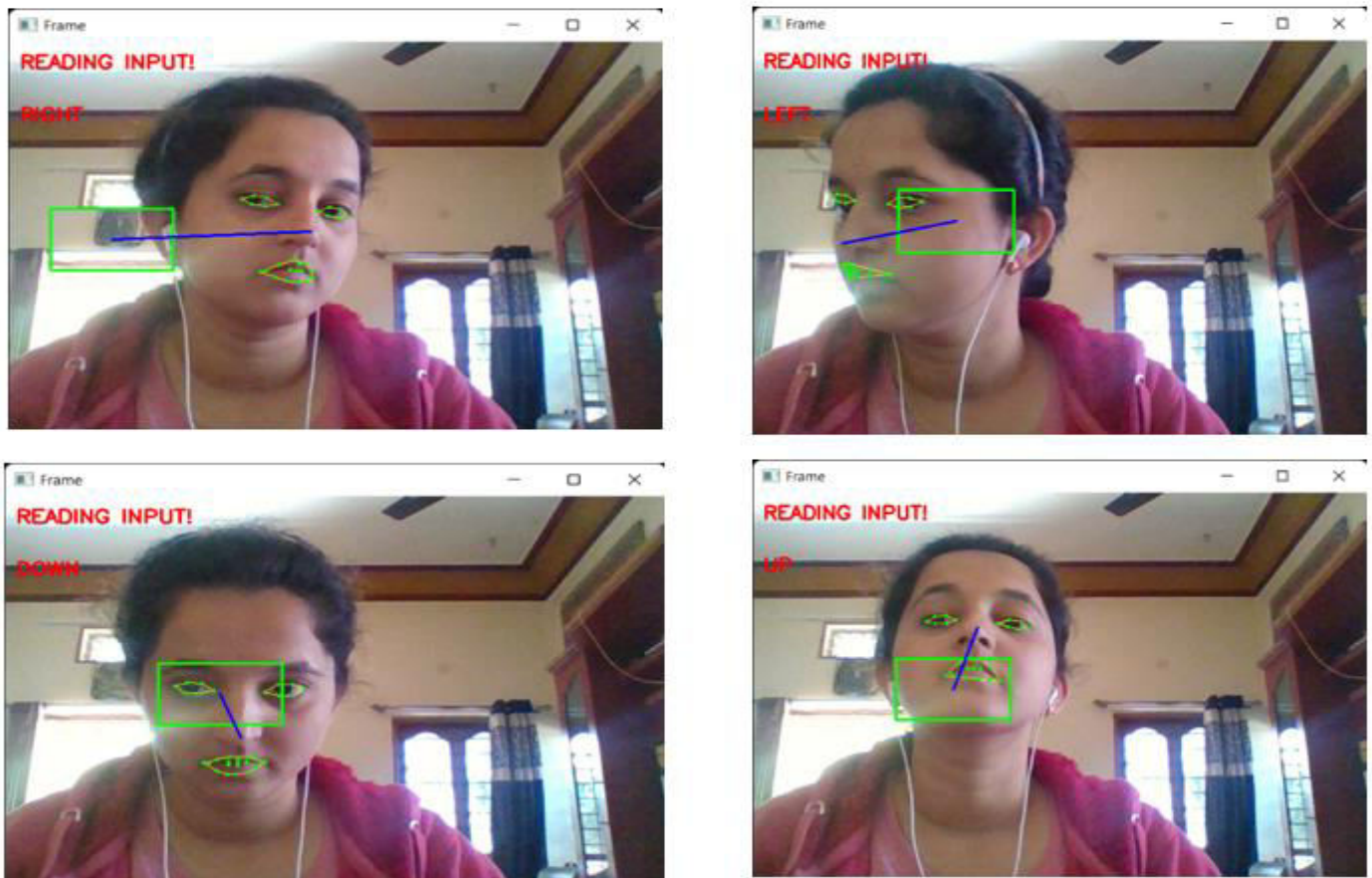
### III. METHODOLOGY

The first step was to use a face detection algorithm locate the face on an image frame captured by a standard webcam. The following step was to detect only the eyes from this frame. We consider tracking only 1 eye movement for faster time interval. Then the iris movement was tracked. Since the color of the iris is black, its image has a significantly lower intensity compared to the remainder of the attention. Taking the left and right corners of the attention as reference points, the shift of the iris as the person changed his eyes focus was determined. The shift was then used to map cursor location on the test graphical programmed.

### IV. FLOW CHART



#### SYSTEM EXECUTION DETAILS



#### V. CONCLUSION

To enable the user to interact with the computer naturally and efficiently using only his or her eye, we provide a control system based on eye tracking. The program combines both mouse functions and keyboard functions, so users can use our system to access almost all computer input except for the usual input. The program not only allows disabled users to use the computer in the same way as regular users but also provides general users with a new computer option. According to our research, it is considered our eye movement system to be easy to read. At that time, participants expressed their interest in using the proposed eye control system to search and browse information. They are looking forward to seeing some of our research results on the use of an eye tracking system to connect to a computer. From the process used it is removed that the cursor can be controlled by eyeball movements i.e., without using hands on computers

#### REFERENCES

- [1] [https://www.researchgate.net/publication/325919286\\_Eye-](https://www.researchgate.net/publication/325919286_Eye-)
- [2] <http://www.ijeert.org/pdf/v2-i8/20.pdf>
- [3] <https://www.hindawi.com/journals/cin/2017/5739301/>.
- [4] <https://ieeexplore.ieee.org/document/9182296>
- [5] [http://www.ijarse.com/images/fullpdf/1522053378\\_NIMT176ijarse.pdf](http://www.ijarse.com/images/fullpdf/1522053378_NIMT176ijarse.pdf)
- [6] <https://www.slideshare.net/venkatjavaprojects/eye-ball-cursor-movement-using-opencv>
- [7] <https://spast.org/techrep/article/view/2475>



**INNO SPACE**  
SJIF Scientific Journal Impact Factor  
**Impact Factor: 8.118**



**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
**INDIA**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 **9940 572 462**  **6381 907 438**  **ijirset@gmail.com**



**www.ijirset.com**

Scan to save the contact details