

# VIRTUAL MOUSE USING EYE MOVEMENTS FOR HANDICAPPED

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**Abstract :** A disabled person's life is always dependent on someone else who needs aid with mobility or any other task. Individuals with disabilities may face challenges when using computers. The most common way of interacting with computers is using a mouse and keyboard. It is difficult for people with physical disabilities to use them. Facial movements and voice commands are one of the best possible actions by physically disabled individuals, by recognizing and responding to these movements and commands, it is possible for them to operate the computer using only their eye movements. Eye movement recognition and voice command is a contemporary approach to interaction between humans and computers. The proposed system can easily control the computers by using eye movement and voice command recognition. It can be a viable replacement for traditional system in the future. This research outlines the techniques utilized in the design, implementation, and evaluation of the experiments conducted and presents the results obtained.

**keyword - Email, Internet, Voice, Speech recognition, physically challenged, Text to speech, Blind, eye movements .**

## 1.INTRODUCTION

The concept of controlling a computer or any digital device with eye movements may seem like science fiction, but it is very much a reality today. This project explores the fusion of cutting-edge eye-tracking technology and voice commands with software interfaces to create a virtual mouse that is entirely controlled by the user's eye movements and voice commands. Such a system offers a host of possibilities, ranging from enhancing accessibility for individuals with physical disabilities to improving the efficiency and comfort of everyday computer usage. This project delves into the underlying technologies, methodologies, and applications of a Virtual Mouse using Eye and voice commands, offering a comprehensive look at its development, implementation, and real-world use cases. By understanding and mastering the intricacies of eye-tracking and voice commands technology, this project

aims to create a user-friendly and efficient interface that has the potential to transform the way we interact with our digital devices.

## II. METHODOLOGY :

The first step is to use a face detection algorithm to locate the face on an image frame captured by an ordinary (Built-in) camera/webcam. The next step is to detect only the eyes from this frame. We consider tracking only one eye movement for faster processing time. Then the iris movement is tracked. Since the color of iris is black the image has significantly lower intensity compared to the rest of the eye. This helps us in easy detection of the iris region. Taking the right and left corners of the eye as reference points, the shift of the iris as the person changed his eye focus is determined. The shift is then used to map cursor location / movements on the graphical user interface (GUI).

## III. IMPLEMENTATION

The algorithm for controlling the cursor by the eye iris movement was achieved through the following steps:

### A. Face detection

In order to capture the face image accurately, the user sat upright with the eye level parallel to the webcam

The image of the user's face is captured using a webcam or any other imaging tools attached to the PC. Fig. 1 shows the image captured by this tool.

### B. Extracting eye location

The image of one eye was then extracted and normalized in order to remove the background noises and then it was converted to binary image to enhance contrast.

### C. Capturing the right eye

Here the right eye is captured to perform the click operations. We need to blink our eye to perform a click operation.

### D. Capturing the voice commands

We have pre-defined voice commands through which user is able to perform operations totally using voice commands.

#### IV. OBJECTIVES

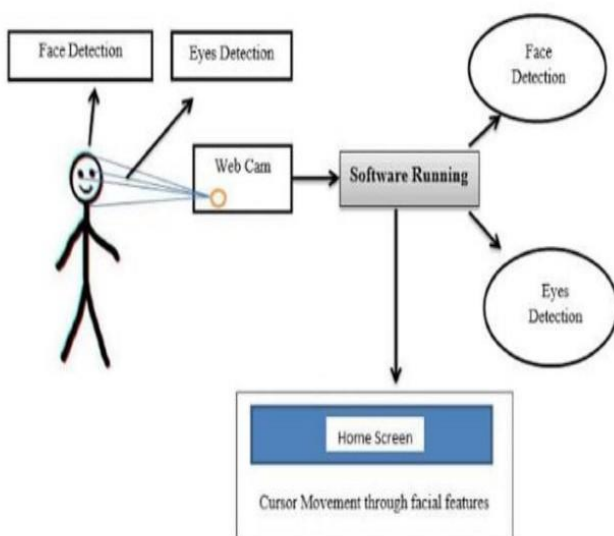
The objective of virtual mouse using eye movements is to help handicapped people operate and use computers.

1. Create such application which is part of AI.
2. To design to operate with the help of a webcam.
3. To convert eye movements voice commands into mouse input that will be set to a particular screen position.
4. UI of application should be easy to use.
5. Program should run as fast as possible without any lag.
6. User should be able to easily install in their computer.
7. It must have Scrolled feature.
8. To design a virtual input that can operate on all surfaces.

#### V. SYSTEM ARCHITECTURE :

In this chapter the program with its sections and functions is presented. The subsections of the chapter follow the sectioning of the code to give a clear view of how the program was built. Each subsection gives information about functions in that part of the program, and what and how modules have been used.

The structure of a how a user's input is handled and a response is triggered looks like this:



#### VI. ADVANTAGES :

**Accessibility:** It provides a means of interaction with computers for individuals who have limited or no use of their hands.

**Independence:** Enables users to independently navigate and interact with digital devices, fostering autonomy and self-reliance.

**Precision:** Eye movements can offer precise control, allowing users to perform tasks that require fine motor skills.

**Ease of use:** Once calibrated, the system can be intuitive and straightforward to use, requiring minimal training.

**Customization:** The system can be tailored to individual needs and preferences, adjusting sensitivity and other parameters for optimal user experience.

**Safety:** Keeping the Covid-19 terms and conditions in mind its infectious to touch the devices that have been held by several other people.

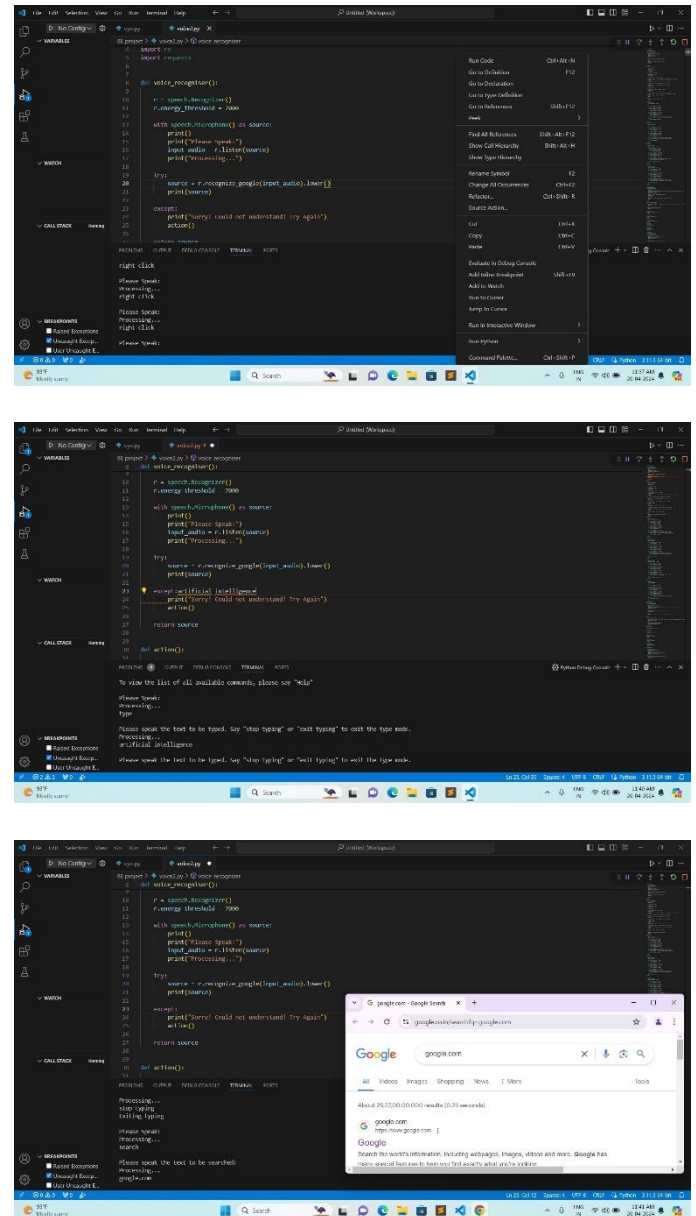
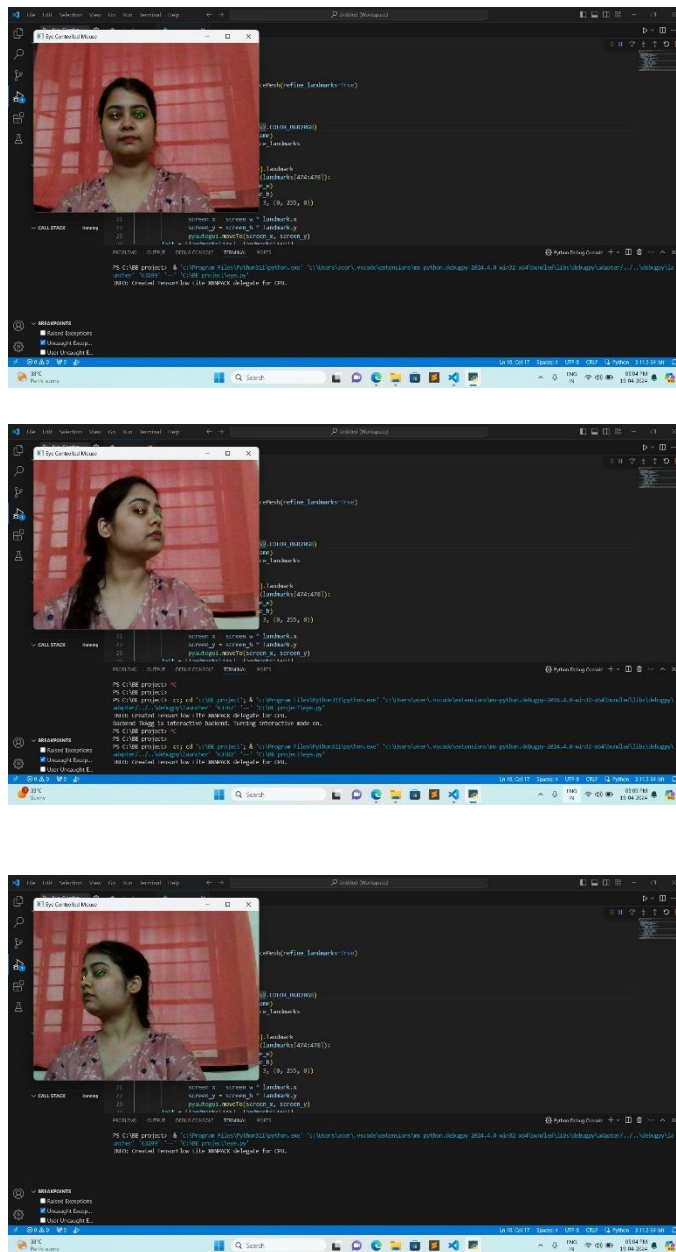
#### VII. DISADVANTAGES:

1. Staring of screen : Continuous staring at the screen is harmful for human eyesight
2. Vision Movements : Our vision continuously makes movements which can make unnecessary clicks. So care must be taken of the same.

#### VIII. FUTURE SCOPE

- The future scope of virtual mouse is quite promising. Here are some potential areas for growth and development :
- This project will definitely help the people with disabilities .
- This proposed system will not only be useful for the handicapped but also a normal person can use it .
- Furthermore , the proposed will reduce the cost of external hardware.

## IX. OUTPUT



## X. ACKNOWLEDGMENT

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