
CURSOR CONTROL USING
FACIAL MOVEMENTS


ABSTRACT

- **AIM OF PROJECT :-**

  To implement a vision primarily based Human–Computer interface.

- The interface detects eye movements and interprets them as indicator management commands. The utilized image process ways embrace digital camera for investigation the face, and example matching method-based eye region detection.

- The classification of eye movements like eye open, eye close, eyeball left, and eyeball right movements area unit used for indicator high, bottom, left and right movement respectively.

- There's a necessity for developing different ways of communication between human and laptop that might be appropriate for the persons with motor impairments and would provide them the chance to become a section of the knowledge Society.

- Circular methodology is employed to regulate the indicator movements. This methodology is employed for physically challenged persons to work the computers effectively with their eye movements.

- We will present the model of face feature extraction which is based on the combination of HAAR Feature and the Adaboost algorithm and several image processing techniques. The precision is considerably good enough to utilize for facial feature detection.

- Facial feature will be applied for calculating the facial parameters for face recognition.Our system's aim is to control the mouse motions and events hands-free by using face, eye blinks and voice.

FLOW CHART

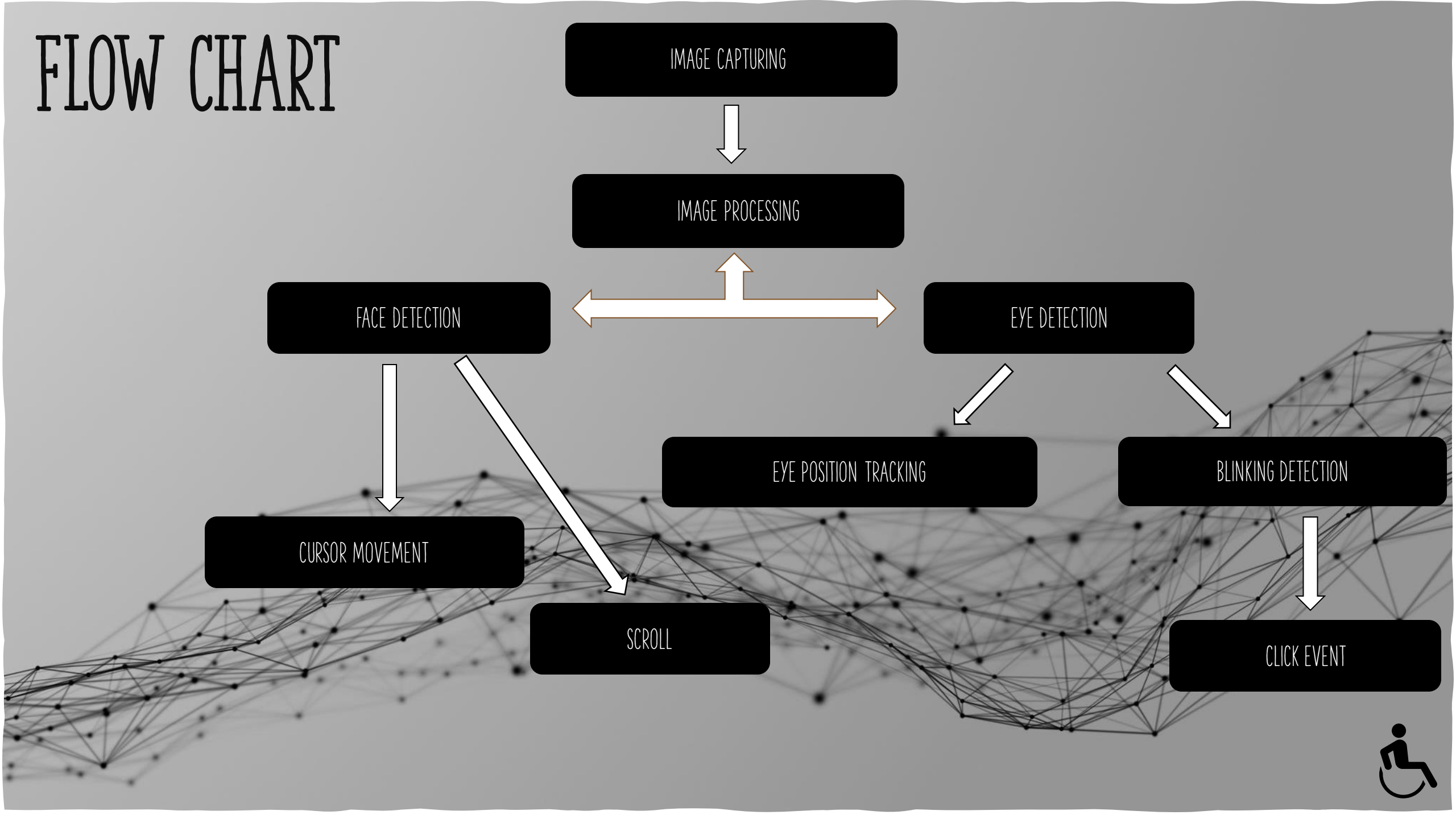
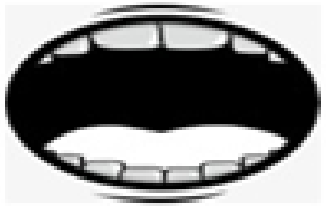
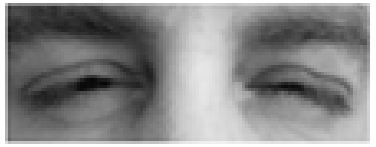
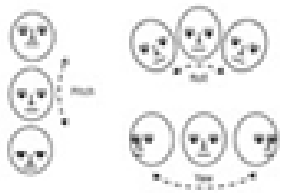


IMAGE CAPTURING
IMAGE PROCESSING
FACE DETECTION
EYE DETECTION
CURSOR MOVEMENT
SCROLL
EYE POSITION TRACKING
BLINKING DETECTION
CLICK EVENT

USAGE OF PROJECT

Action	Function
	Activate/ Deactivate of Cursor Movement
	Right Click
	Left Click
	Activate/ Deactivate Scrolling
	Scrolling/ Cursor Movement

TARGETED USER COMMUNITY

Our system is aimed for people with motor impairments who would find it very convenient to operate computer systems with the help of facial movements. Also, anybody who would appreciate rapid cursor movement can use it.

LIMITATIONS OF SYSTEM

- The Implementation of the system can be tricky and the usage might be hard to understand.
- The system may not work properly at times due to bugs and other malware which could be frustrating.
- The user might perform an unwanted operation at any step.

SOLUTIONS TO THE LIMITATIONS OF SYSTEM

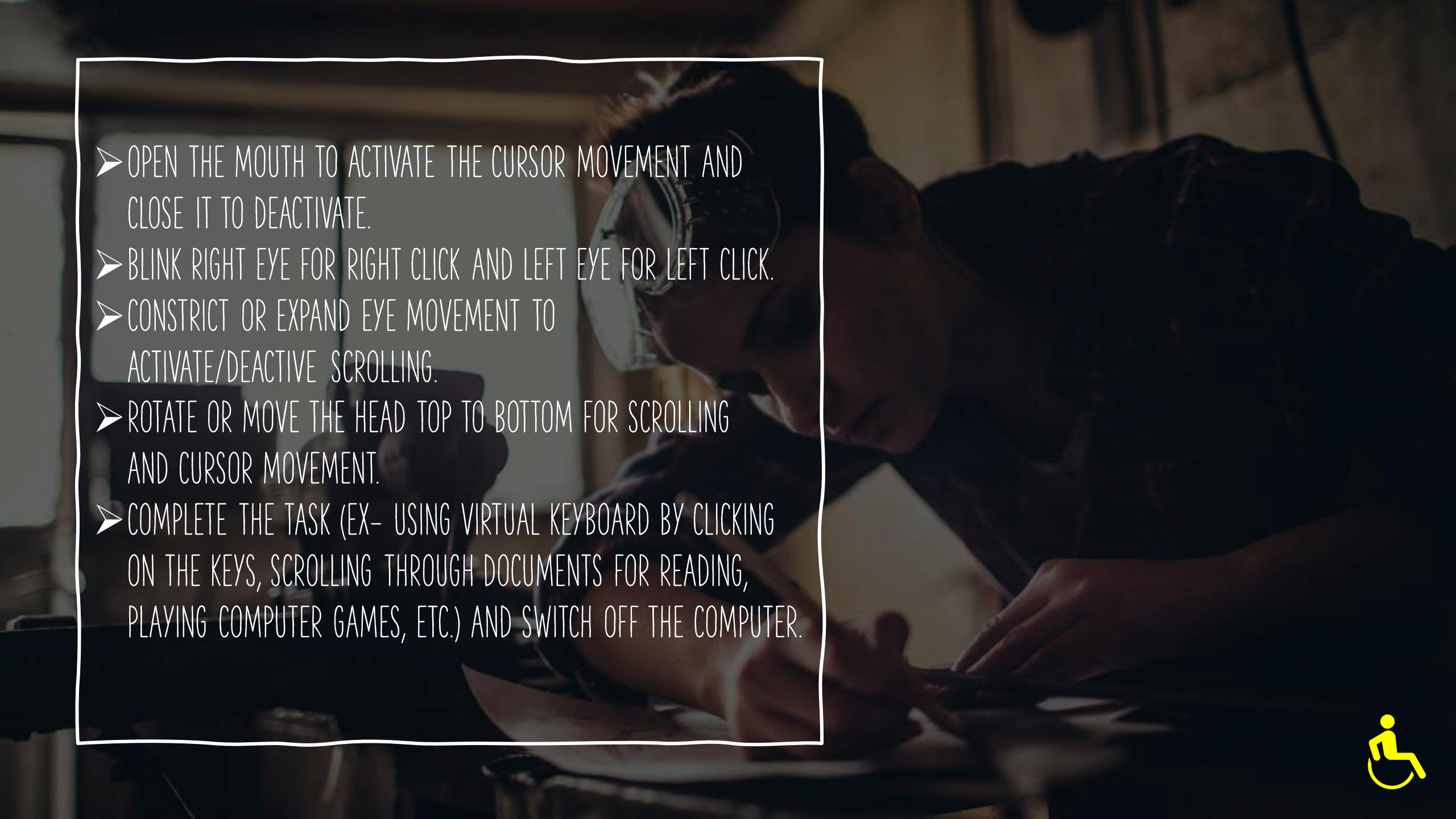
Proper coaching for using the system features through detailed user guides would be provided.

Updated software versions will be used which would perform smooth operation.

The user will be asked to confirm the operation in a yes/no box at every step to avoid discomfort.

TASK ANALYSIS

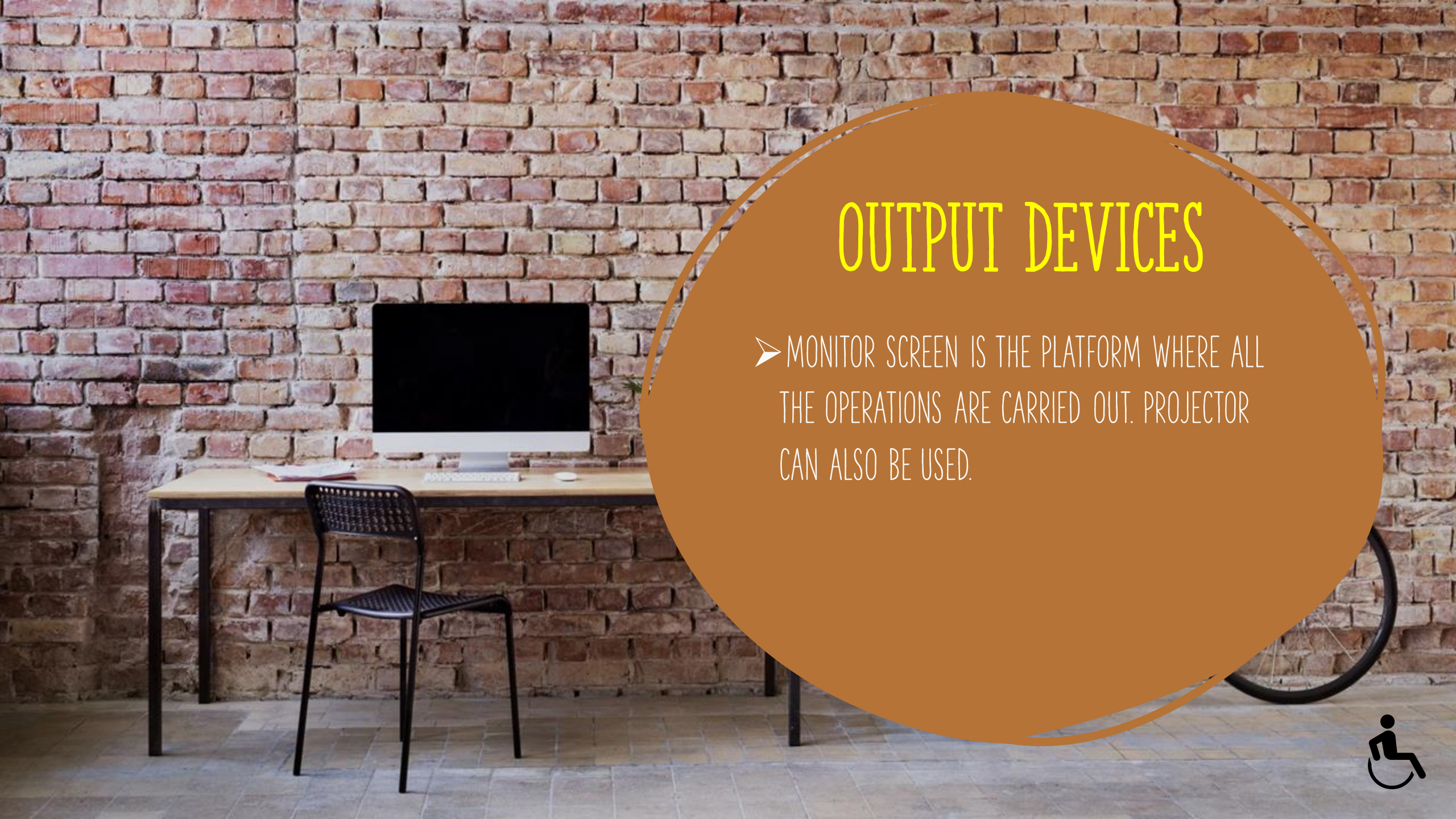
- PLUG IN TO THE MAIN AND SWITCH ON THE COMPUTER.
- OPEN THE OpenCV APPLICATION ON THE GRAPHICAL USER INTERFACE (GUI).
- CALIBRATE THE HEAD AND FACIAL FEATURES ACCORDING TO THE ACTION TO PERFORM COMMAND. (IMAGE CAPTURING)
- THE IMAGE CAPTURED IS THEN PROCESSED.



- OPEN THE MOUTH TO ACTIVATE THE CURSOR MOVEMENT AND CLOSE IT TO DEACTIVATE.
- BLINK RIGHT EYE FOR RIGHT CLICK AND LEFT EYE FOR LEFT CLICK.
- CONSTRICT OR EXPAND EYE MOVEMENT TO ACTIVATE/DEACTIVE SCROLLING.
- ROTATE OR MOVE THE HEAD TOP TO BOTTOM FOR SCROLLING AND CURSOR MOVEMENT.
- COMPLETE THE TASK (EX- USING VIRTUAL KEYBOARD BY CLICKING ON THE KEYS, SCROLLING THROUGH DOCUMENTS FOR READING, PLAYING COMPUTER GAMES, ETC.) AND SWITCH OFF THE COMPUTER.

INPUT DEVICES

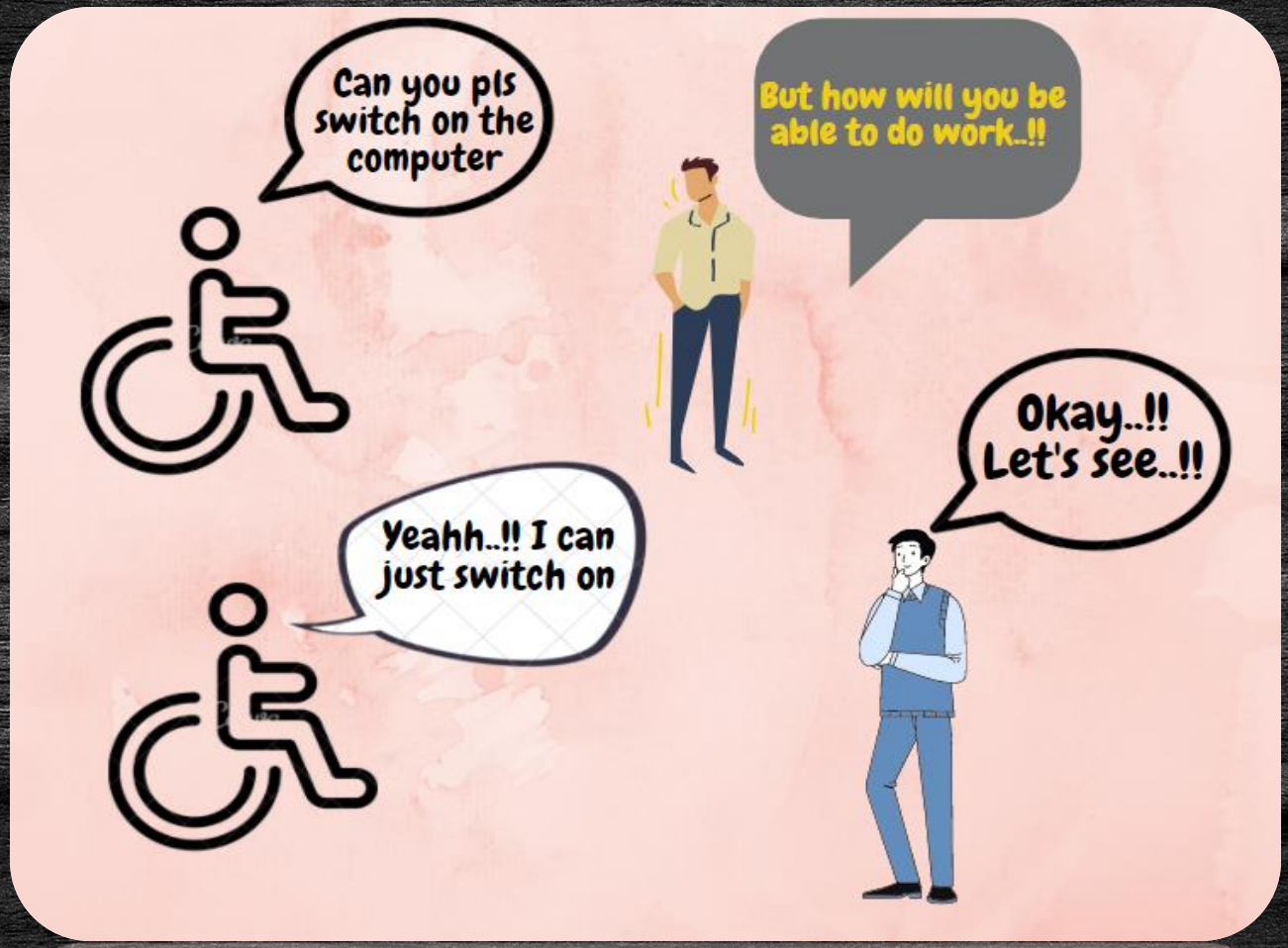
- MOUSE WHICH IS USED FOR CURSOR MOVEMENT AND SCROLLING. AN ALTERNATIVE IS JOYSTICK BUT IT HAS LIMITED USAGE FOR PERSONS WITH MOTOR DISABILITIES.
- KEYBOARD WHICH IS USED FOR CLICKING AND TYPING. AN ALTERNATIVE IS CAMERA WHICH IS USED FOR CAPTURING IMAGING AND PERFORMING TASKS BUT IT IS NOT SUITABLE FOR PEOPLE WITH FACIAL DISABILITIES.
- MICROPHONE IS USED FOR VOICE INPUT BUT AGAIN, IT HAS LIMITED USAGE FOR MUTE PERSONS



OUTPUT DEVICES

- MONITOR SCREEN IS THE PLATFORM WHERE ALL THE OPERATIONS ARE CARRIED OUT. PROJECTOR CAN ALSO BE USED.

STORY BOARDING


Can you pls switch on the computer
But how will you be able to do work..!!
Okay..!! Let's see..!!
Yeahh..!! I can just switch on

PLUG IN TO THE MAIN
AND
SWITCH ON THE COMPUTER

CLICK ON OpenCV application on GUI

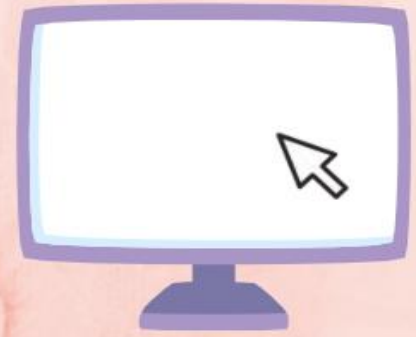
CALIBRATE HEAD AND FACIAL MOVEMENTS

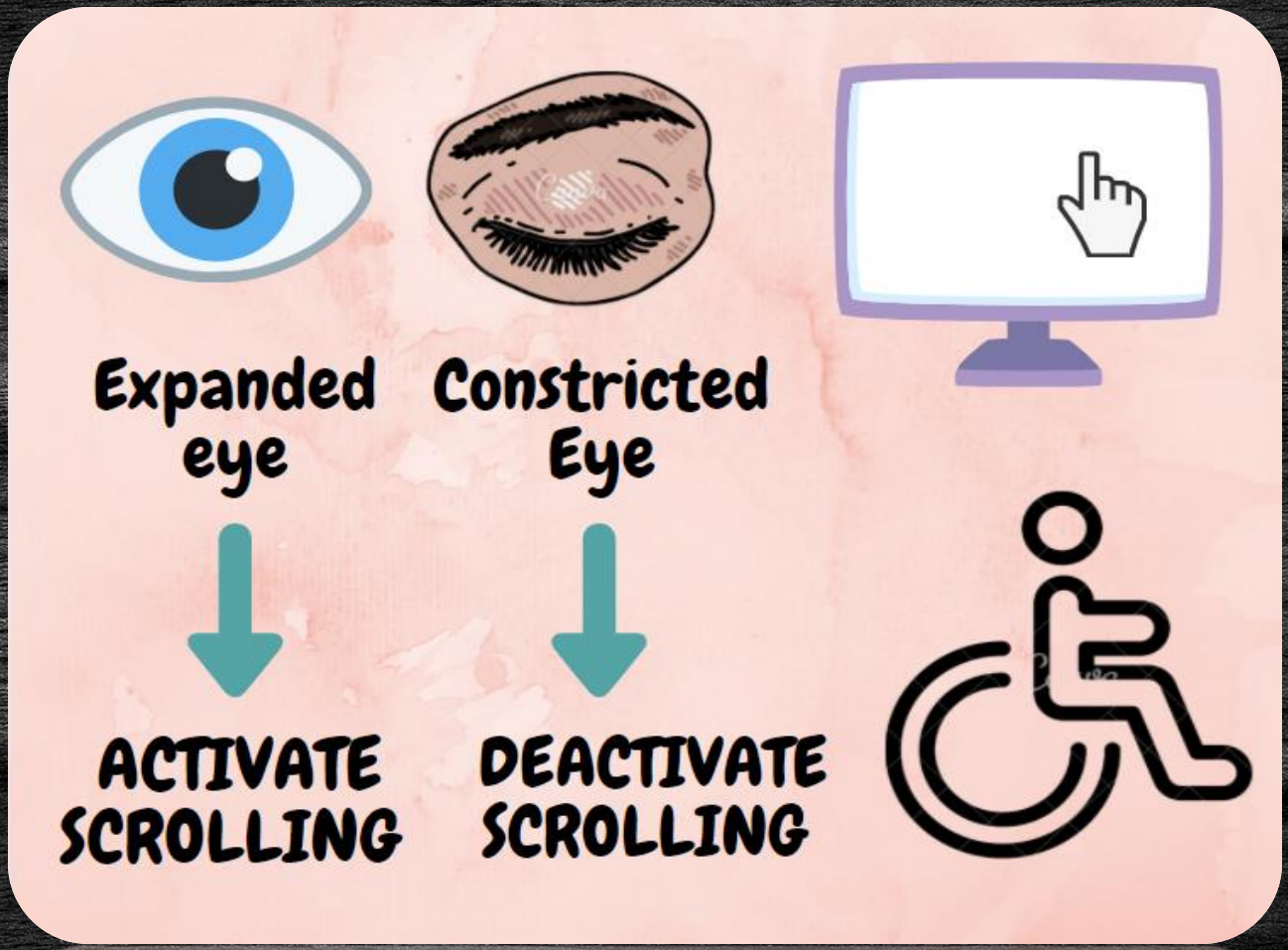
IMAGE CAPTURE IS PROCESSED

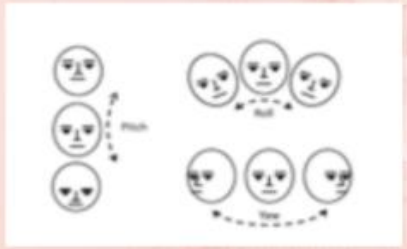
Open the mouth to activate the cursor control movement

Blink Left Eye for Left Click

Blink Right Eye for Right Click

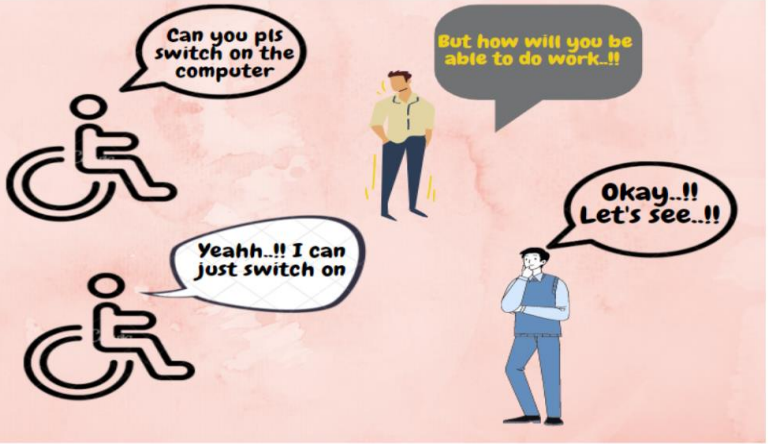



Expanded eye
Constricted Eye
ACTIVATE SCROLLING
DEACTIVATE SCROLLING



Rotate / Move the head For SCROLLLING

Complete the tasks using virtual Key board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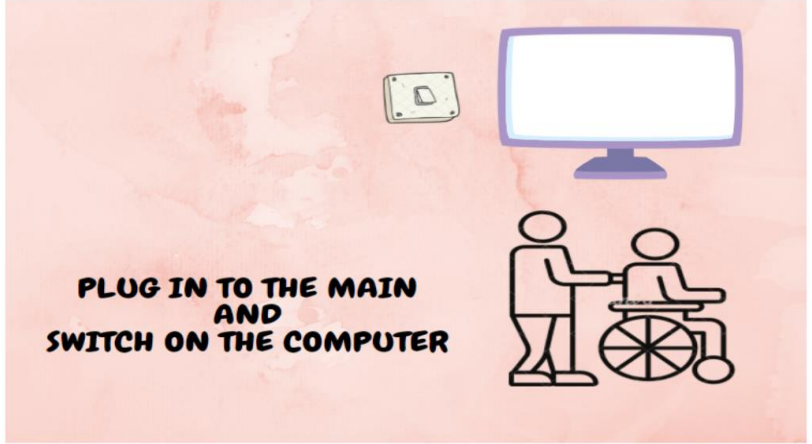
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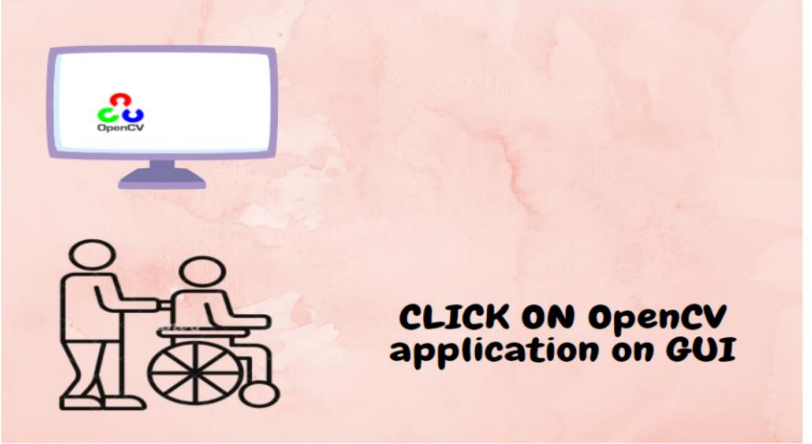
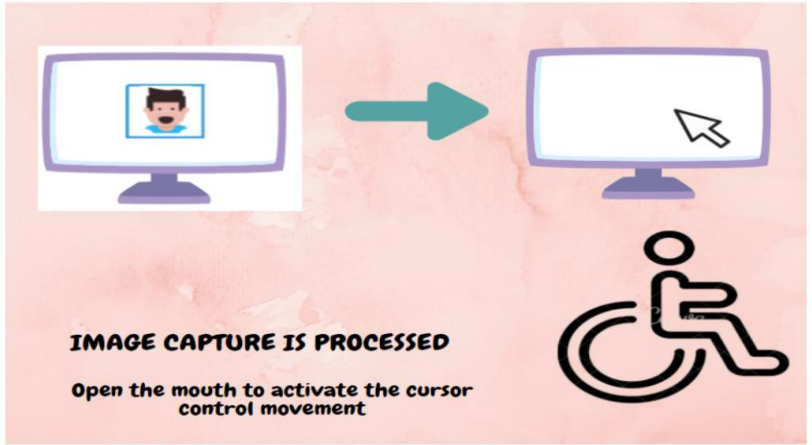

OpenCV
CLICK ON OpenCV application on GUI


CALIBRATE HEAD AND FACIAL MOVEMENTS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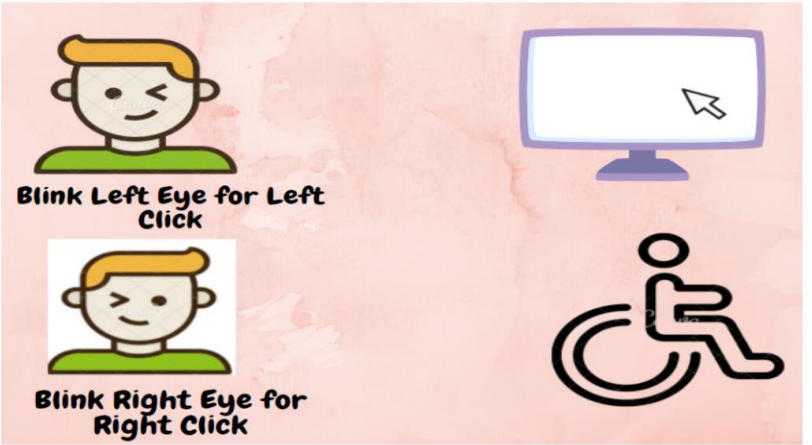
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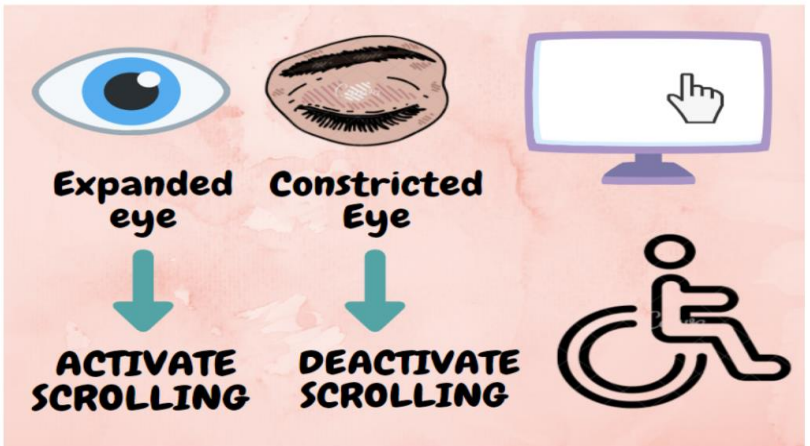
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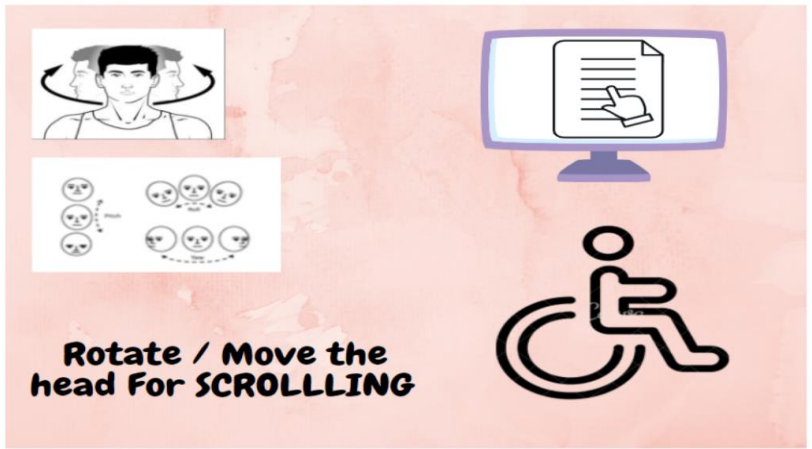
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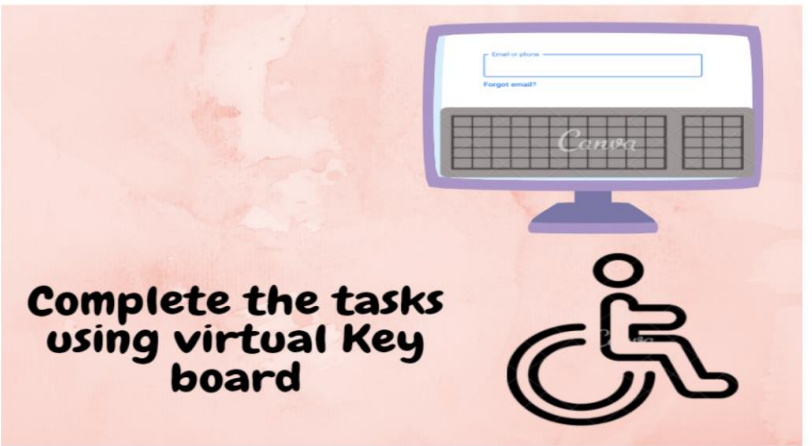
Complete the tasks using virtual Key board

LITERATURE SURVEY

- HAAR cascade algorithm is used for face detection. Object is recognized using HAAR cascade feature. This feature consider adjacent rectangle at a specific location in a detection window. The common HAAR feature for face detection has two adjacent rectangles that lie above the eye and the cheek region. HAAR cascade algorithm always captures positive images as well as negative images for face detection. In face detection edge detection and line detection is carried out.
- The Graphical User Interface (GUI) captures the live video from webcam and tracks the motion of head/face. The Mouse Tracking module is responsible for reading the motion parameters and translating them into mouse movement on computer screen. The conversion from human motions to move mouse cursor falls into three different categories direct mode, joystick mode and differential mode.

- The grayscale image requires less number of information for each pixel. As, the grayscale intensity is stored as an 8-bit integer with 256 different possible shades of gray from black to white, 0 is black colour and white is represented as 255.
- This is done by:

Grayscale = 0.299 * R + 0.587 * G + 0.114 * B

THANKYOU

BY

ADITYA SUNIL MISHRA (19BIT0336)

MINNALLAGARI PUNEETHA REDDY (19BIT0026)