APPLICATIONS OF AI

VIT-AP
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[APPLICATIONS OF AI PROJECT]

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APPLICATIONS OF AI

PROJECT REPORT

TITLE: VIRTUAL MOUSE USING HAND GESTURES

1.ABSTRACT:

The PC mouse is one of the wondrous developments of people in the field of Human-Computer Interaction (HCI) innovation. In new age of innovation, remote mouse or a contact less mouse actually utilizes gadgets and isn't liberated from gadgets completely, since it utilizes power from the gadget or might be from outside power sources like battery and gain space and electric power, likewise during COVID pandemic it is encouraged to make social separating and keep away from to contact things which gave by various people groups. Inside the projected AI virtual mouse utilizing hand signal framework, this constraint might be resolve by involving advanced camera or sacred camera for perceive the hand motions and fingers recognition abuse PC machine vision. The algorithmic rule used in the framework utilizes the man-made consciousness and AI algorithmic rule. Upheld the hand signals, the gadget might be controlled pretty much and might do left click, right snap, looking over capacities, and PC gadget pointer perform while not the utilization of the genuine mouse.

This paper proposes a novel camera vision based cursor control system, using hand gestures captured from a webcam through a color detection technique. The system will allow the user to navigate the computer cursor using their hand bearing color caps or tapes and left click and dragging will be performed using different hand

gestures. And also it performs file transfer between two systems in a single same network. The proposed system uses nothing more than a low resolution webcam that acts as a sensor and it is able to track the users hand bearing color caps in two dimensions. The system will be implemented using the python and OpenCV. The hand gesture is the most effortless and natural way of communication. The output of the camera will be displayed on the monitor. Shape and position information about the gesture will be gathered using detection of color. The file transferring scheme is implemented by using the python server programming.

2.INTRODUCTION:

In the new present day progresses at extends the areas of exaggerated reality and contraptions that we will generally will as a rule use in our existence, these devices have gotten diminished at ranges the sort of Bluetooth or far off advancements. This paper proposes Associate in Nursing AI virtual mouse system that produces use of the hand signals and hand tip acknowledgment for performing articulations mouse limits at ranges the advantageous PC cheating adaptable PC vision. The most impartial of the projected system is to perform device pointer works and material performs using a web camera or a characteristic camera at extends the smaller PC rather than using an obsolete mouse contraption. Hand signal

The most efficient and expressive way of human communication is through hand gesture, which is a universally accepted language. It is pretty much expressive such that the dumb and deaf people could understand it. In this work, real-time hand gesture system is proposed. Experimental setup of the system uses fixed position low cost web camera high definition recording feature mounted on the top of monitor of computer or a fixed camera on a laptop, which captures snapshot using Red Green Blue [RGB] colour space from fixed distance. This work is divided into four stages such as image pre-processing, region extraction, feature extraction, feature matching.

While utilizing a remote or a Bluetooth mouse, a few gadgets particularly like the mouse, the contraption to interface with the pc, and also, battery to drive the mouse to control a utilized, yet all through this paper, the client utilizes his/her inborn camera or visual camera and utilizations his/her hand signs to deal with the PC mouse works out.

Inside the projected construction, data interstate camera hinders this cycle the edges that square measure got accordingly see the different hand signals and hand tip developments shapes the specific mouse work.

3.LITERATURE SURVEY:

Various techniques and approaches have been developed to control the cursor of a computer using hand gestures. Some of the popular methods include the use of depth cameras, web cameras, infrared sensors, and accelerometers. Depth cameras have high accuracy but can be expensive, whereas web cameras are low cost but may not be accurate. Infrared sensors are robust, but the setup can be complex, and accelerometers can be unreliable.

4) Methodology:

Pre-processing or to be specific picture handling is an earlier advance in PC vision, where the objective is to change over a picture into a structure reasonable for additional investigation. Instances of tasks, for example, openness rectification, shading adjusting, picture sound decrease, or expanding picture sharpness are exceptionally significant and very consideration requesting to accomplish adequate outcomes.

For this article, I propose to introduce a part of the typically used picture taking care of methodology using an outstandingly notable Comp uter Vision library, Open-CV. I'll endeavour to portray immediately the manner by which each movement works and spotlight more on dealing with the point even more basically, giving you all the code, you truly need so you have a functioning experience of the material.

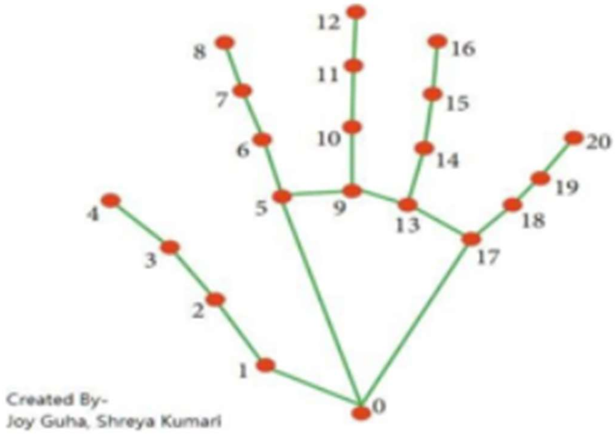


Fig 5: working co-ordinates

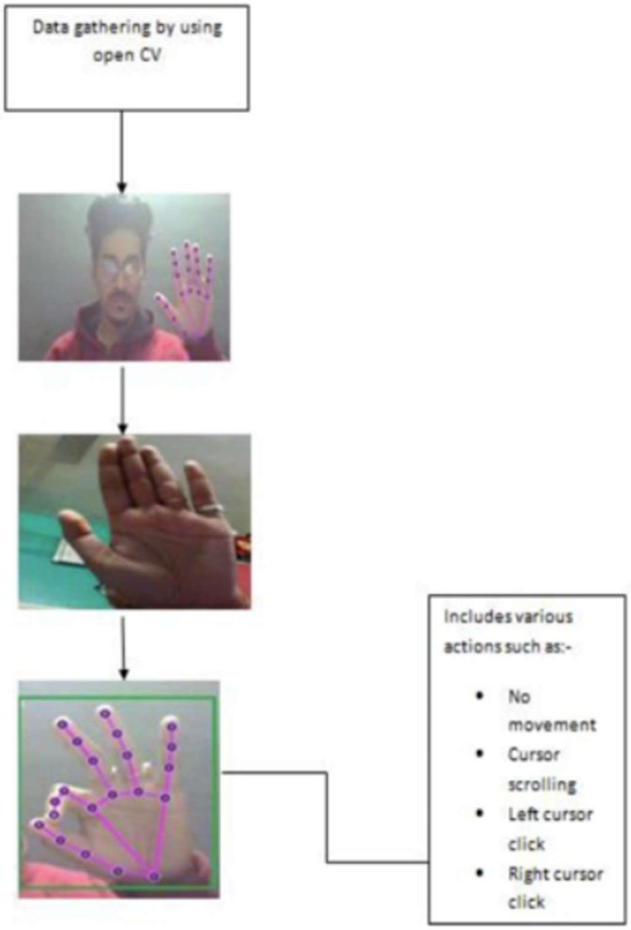


Fig 5.1 flow chart of Methodology

A. Camera Used in the Virtual Gesture Mouse project

Open-CV is python vision library that contains Associate in the organized AI virtual mouse system depends upon the edges that are gotten by the camera in Associate in nursing passing PC. Pictures can be conveyed in concealing layered with 3 channels (Blue, Green, and Red), Grayscale with pixel values fluctuating from 0 (dull) to 255 (white), and twofold portraying dim or white characteristics (0 or 1) specifically.

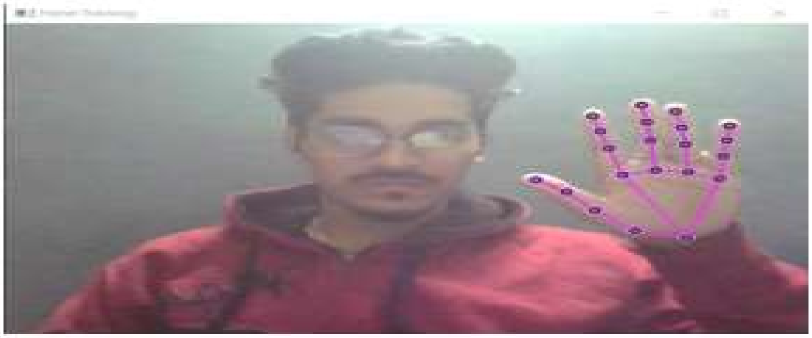


Fig6: Capturing videos using webcam

B. Moving Hand through the Window using Rectangular Area

The AI virtual mouse framework utilizes the instructive algorithmic rule, and it changes over the co-ordinates of tip from the camera screen to the pc window full screen for the mouse. whenever the hands unit saw and keeping in mind that we've missing to see that finger is up for topic the specific mouse perform, Associate in Nursing rectangular box is attracted concerning the pc window at ranges the camera locale any spot we've a penchant to will every now and again move all through the window plan the mouse pointer, as displayed fig

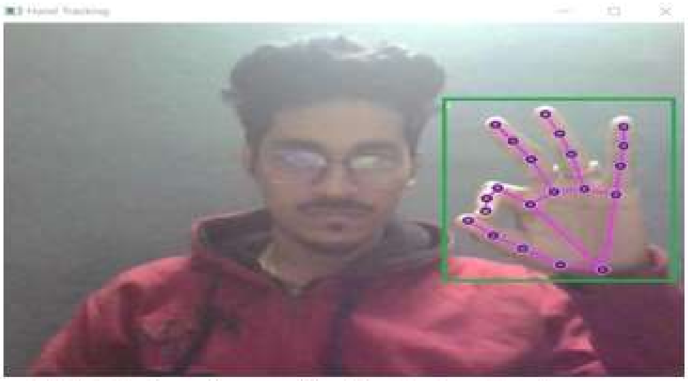


Fig7: Rectangular area for Moving hand in the screen

C. Detect the Finger tips & doing the Mouse Cursor Movements

In this framework, AI mouse is police evaluation that finger is up misleading the spot co-ordinate of the particular finger that it'll found abuse the Media-Pipe and hence the singular bits of the fingers that reg ion unit up, and according to that, the authentic mouse perform is pla yed out its assignments.

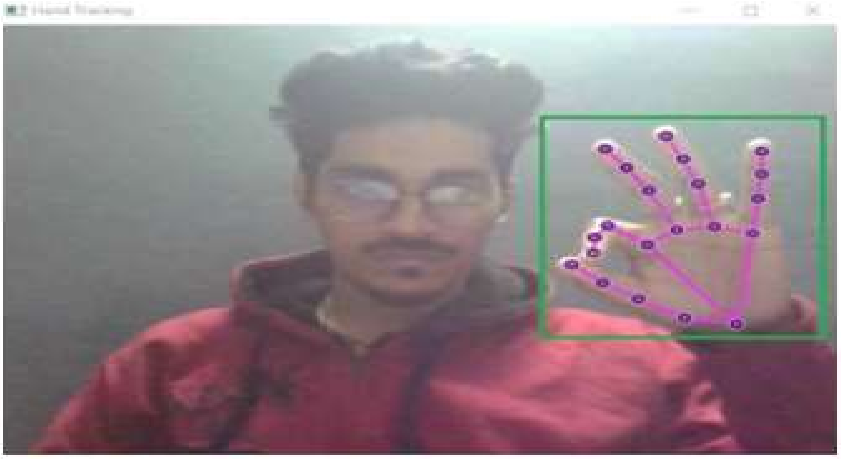


Fig8: finger tips are detecting

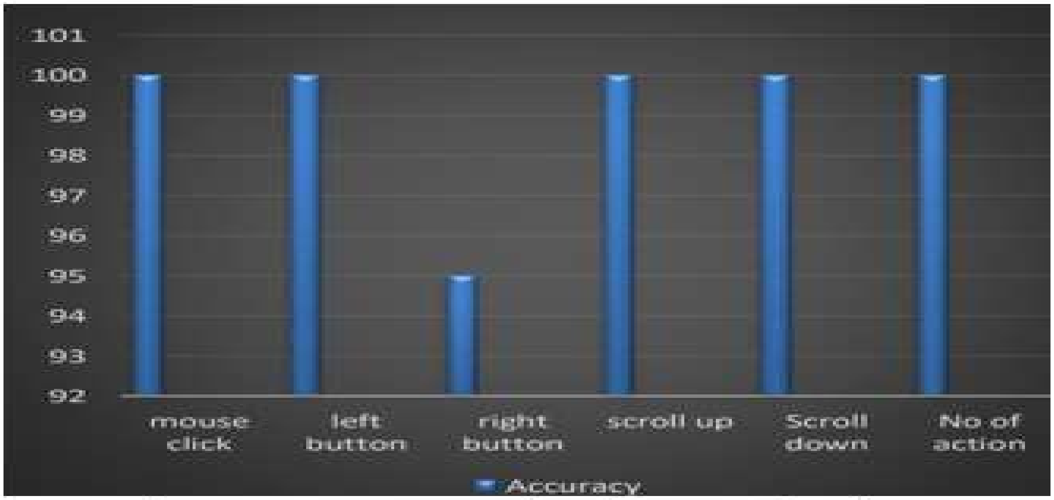
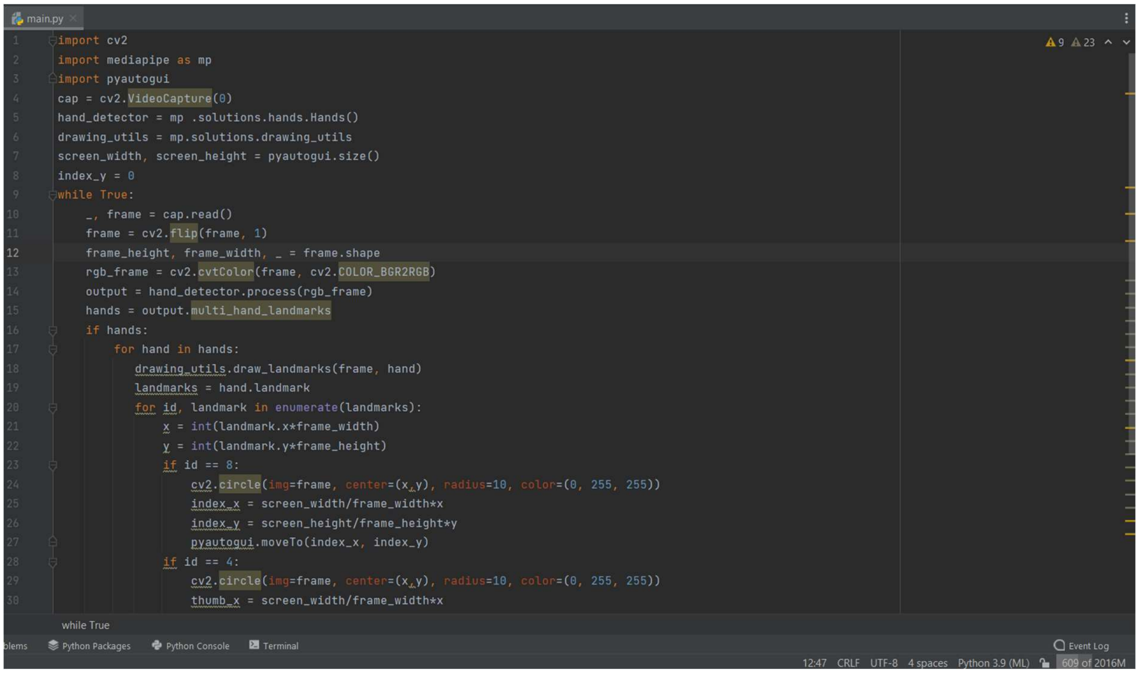
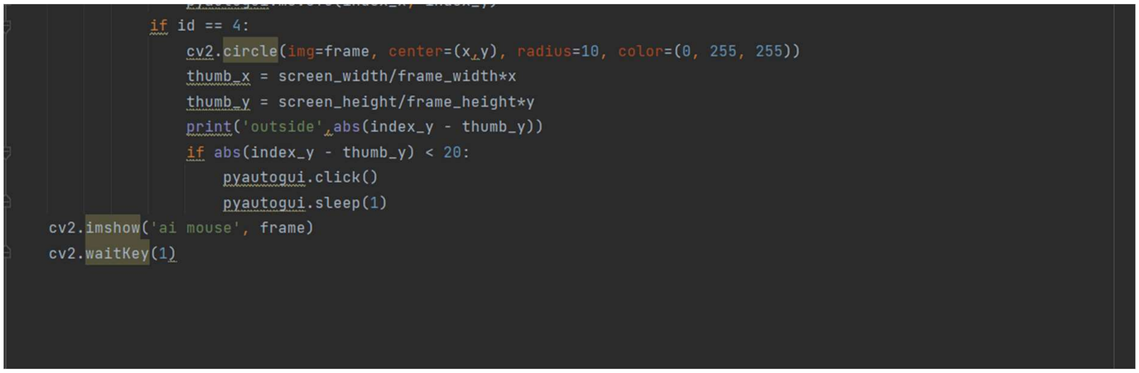


Fig 9: Accuracy Graph of Mouse functions

5.CODE:

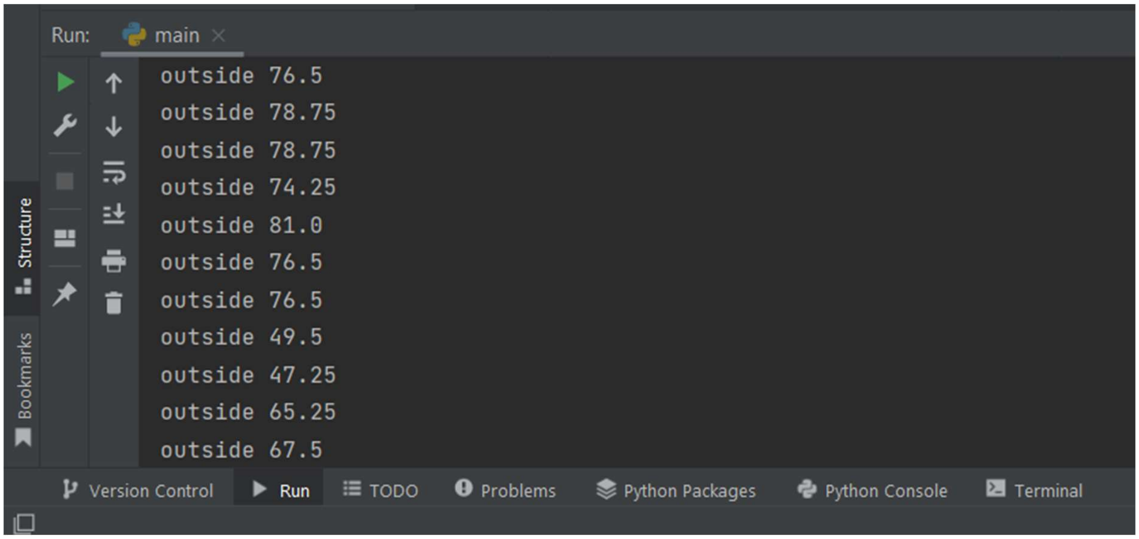


```python
import cv2
import mediapipe as mp
import pyautogui
cap = cv2.VideoCapture(0)
hand_detector = mp .solutions.hands.Hands()
drawing_utils = mp.solutions.drawing_utils
screen_width, screen_height = pyautogui.size()
index_y = 0
while True:
    _, frame = cap.read()
    frame = cv2.flip(frame, 1)
    frame_height, frame_width, _ = frame.shape
    rgb_frame = cv2.cvtColor(frame, cv2.COLOR_BGR2RGB)
    output = hand_detector.process(rgb_frame)
    hands = output.multi_hand_landmarks
    if hands:
        for hand in hands:
            drawing_utils.draw_landmarks(frame, hand)
            landmarks = hand.landmark
            for id, landmark in enumerate(landmarks):
                x = int(landmark.x*frame_width)
                y = int(landmark.y*frame_height)
                if id == 8:
                    cv2.circle(img=frame, center=(x,y), radius=10, color=(0, 255, 255))
                    index_x = screen_width/frame_width*x
                    index_y = screen_height/frame_height*y
                    pyautogui.moveTo(index_x, index_y)
                if id == 4:
                    cv2.circle(img=frame, center=(x,y), radius=10, color=(0, 255, 255))
                    thumb_x = screen_width/frame_width*x
```

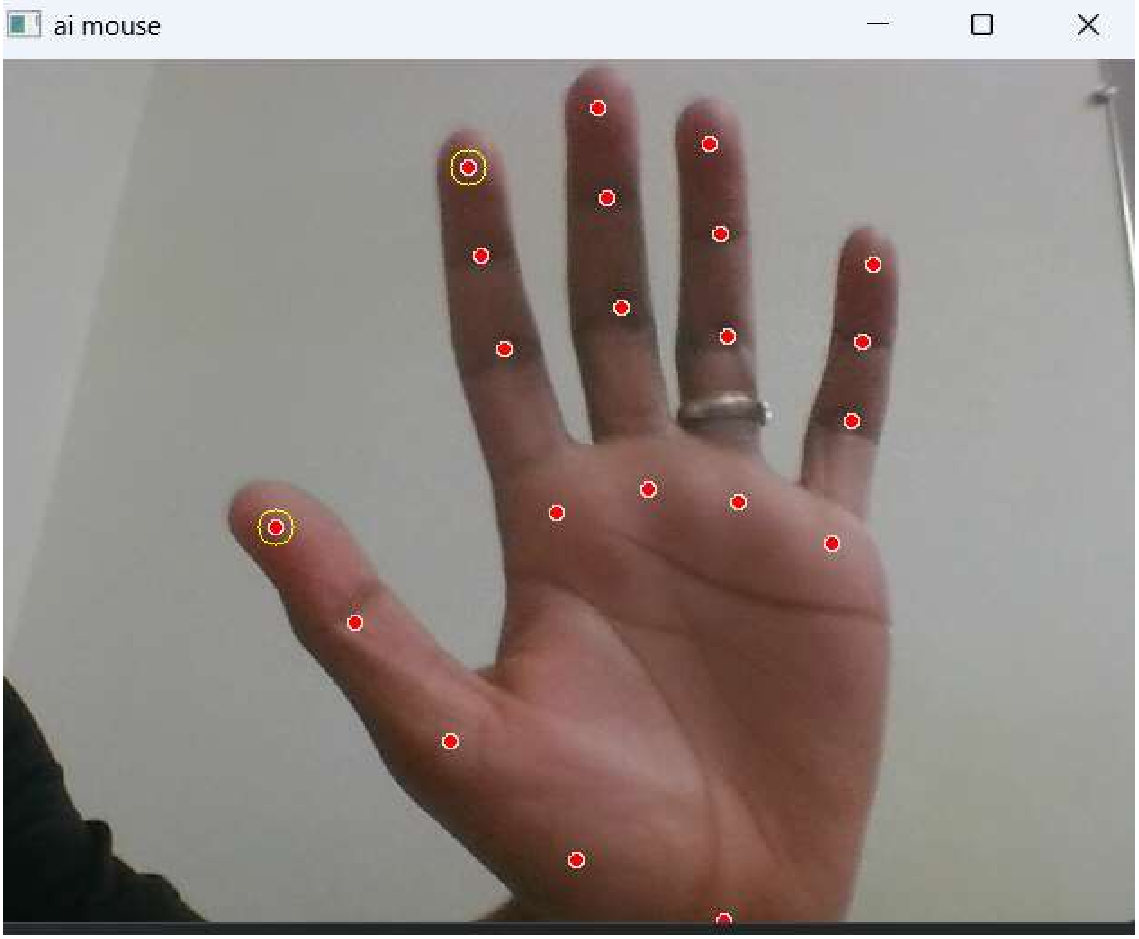


```python
                if id == 4:
                    cv2.circle(img=frame, center=(x,y), radius=10, color=(0, 255, 255))
                    thumb_x = screen_width/frame_width*x
                    thumb_y = screen_height/frame_height*y
                    print('outside',abs(index_y - thumb_y))
                    if abs(index_y - thumb_y) < 20:
                        pyautogui.click()
                        pyautogui.sleep(1)
    cv2.imshow('ai mouse', frame)
    cv2.waitKey(1)
```

6.RESULTS:



```
outside 76.5
outside 78.75
outside 78.75
outside 74.25
outside 81.0
outside 76.5
outside 76.5
outside 49.5
outside 47.25
outside 65.25
outside 67.5
```



7.CONCLUSION:

Motion acknowledgment method gives the positive indications for performing different mouse functions. The utilization of YCbCr shading model in research removes the reliance on light power during experiment. This strategy is extremely valuable for disabled individuals, at the hour of show utilizing IP cameras, controlling TV channels and so forth and can be applied to cell phones for quite a long time. Future works will incorporate better techniques for carrying out mouse occasions and diminishing the slack to nearly zero during cursor.