

VIRTUAL MOUSE

IDEA:

This project is about a gesture based cursor control system. This project allows users to use their fingers (using a tape) as a mouse , perform left click ,double click, right click.

TECHNOLOGY USED AND IMPLEMENTATION DETAILS:

HARDWARE:

- ✚ Webcam

SOFTWARE :

- ✚ The code is written in python using some existing modules .Opencv modules stands as the backbone of the code . Along with opencv the other modules that were used were numpy pynput, pyautogui .

Implementation details:

- ✚ After importing the above modules, we firstly get the screen size using `pyautogui.size()`
- ✚ Then coordinates are adjusted as shown in the image .

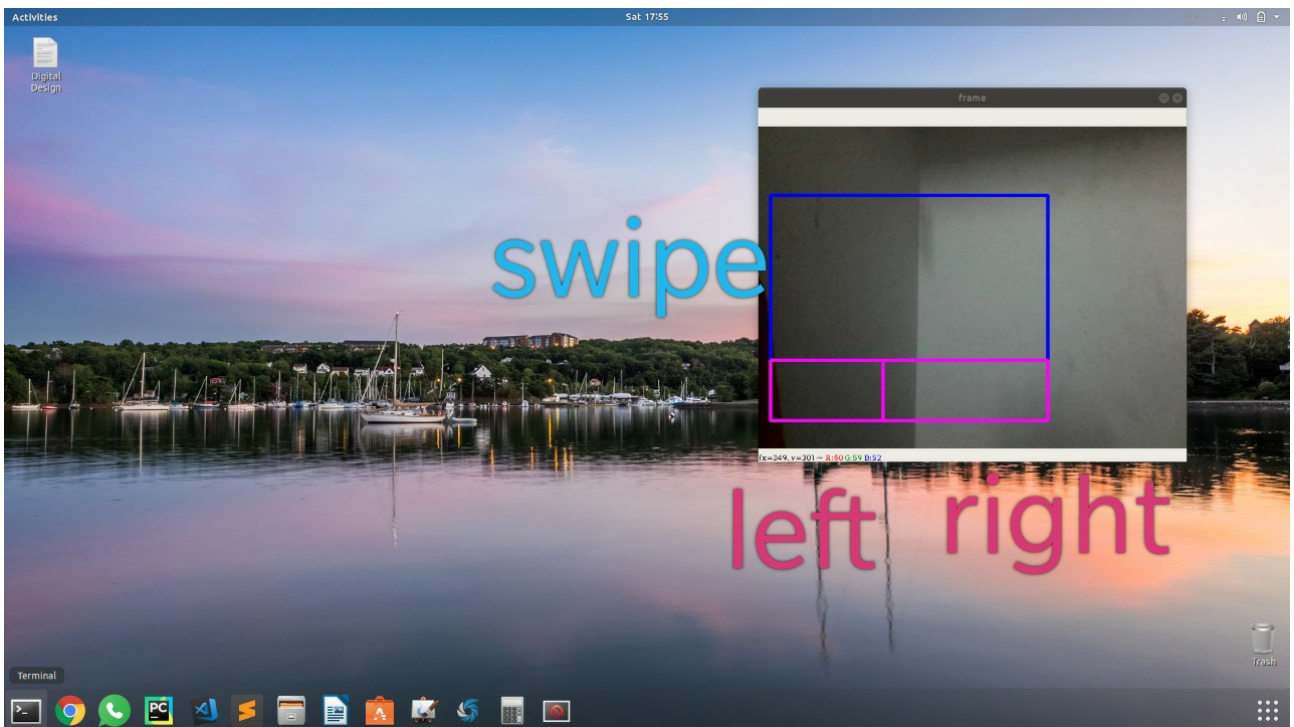
Dilation :

It is just opposite of erosion.

More about morphology

https://docs.opencv.org/3.4/d9/d61/tutorial_py_morphological_ops.html

- ✚ Then we define three rectangles in region of interest for swiping(moving cursor),right click ,left click .
- ✚ Then we define some conditions for moving the mouse, right click, left click and double click



Taped Finger:



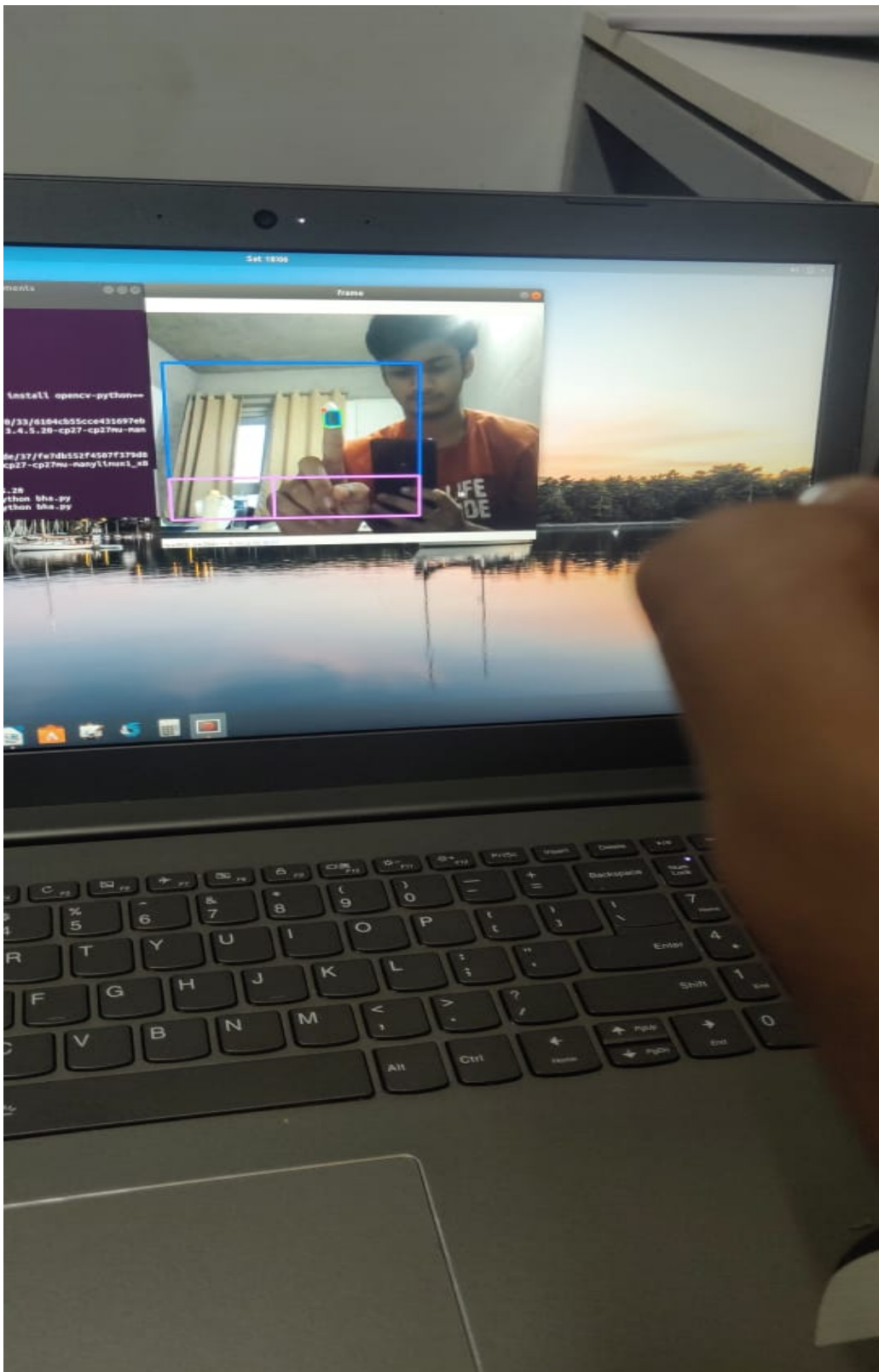
For Moving the cursor (SWIPE):

Instructions :

- ✚ If we move any dark green object, preferably a small piece of tape taped on fingers in the blue rectangle , mouse goes to that position(the top left vertex of the rectangle) .

Working :

- ✚ When we bring the taped finger in the blue rectangle ,first we find out the dimensions and coordinates using `cv2.boundingRect()`.
- ✚ Then we draw a rectangle around the dark green tape and adjust the position of the cursor to the top left vertex of the rectangle .



For Single click (LEFT CLICK):

Instructions :

- By holding our hand at the position where we want to right click(in the blue box) we shall also bring another finger(taped with dark green) on to left pink box

- ✚ Single click is not more reliable in this project as we humans are not too accurate or fast to remove the hand just after it is clicked , as our hand remains there(even if it is a millisecond) left click happens again which will turn out to be double click.

Working :

- ✚ Then position of cursor is set by using one of the taped finger .If any other taped finger is brought into the pink rectangle(left) ,we do this by using the command `mouse.press(button.left)`

For Double click :

Instruction:

- ✚ As said, even if we try to do single click double click happens, but double click also happens when you first place the mouse on the position where we want to double click using a taped finger , and then bring another taped finger in the blue rectangle .

Working :

When another taped finger is brought in the blue rectangle , we do double click using the command `mouse.click(Button.left,2)`

For Right Click :

Instructions:

- ✚ This also has its limitations. Right click is well defined only in windows .Though it doesn't works in ubuntu or mac , it can be achieved by doing the same as that of left click but the second taped finger shall be brought in the right box.

Working:

- ✚ After setting the position of cursor, If any other taped finger is brought into the pink rectangle(right) ,we do this by using the command `mouse.press(button.right)`

Future Scope of project

- ✚ The basic idea of the project came out of the thought ,Can computer understand our sign language ,hand signals?
- ✚ This project is a part which tries to reduces the distance between our physical world and digital world .
- ✚ We can also extend this in such a way that our computer opens a application or performs operations when we show some gestures .

- + With improved camera and sensitivity it can turn out to be a better option for laptops than using the touch pad.

Overall experience of the project :

- + The overall experience of the project was satisfying as it generated a positive experience .
- + This project gave me a chance to understand about the SIX SENSE TECHNOLOGY which I wouldn't know if this project never took board .
- + This project was also very tiring as the documentations for the new version of opencv were not clear and some functions were missing in the new version.
- + Thought the project is not user-friendly and sensitive , it gives a lot of hope that I can help physical world and digital world come close .