Project Report

Drawing project

Tech Used :

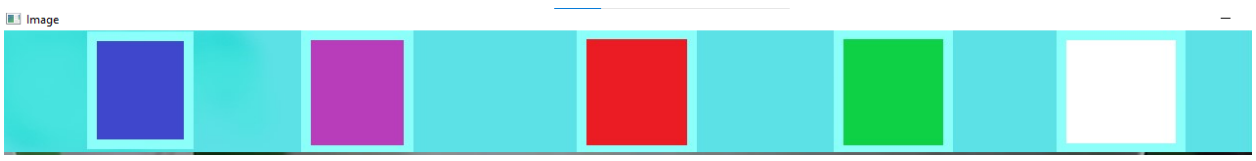
1 Open-Cv
2 Media-Pipe
3 Numpy

Build an application that will detect and track the user's hand using their primary webcam and then allowing them to use finger gestures to paint on screen index finger for drawing mode and two fingers (index fingers and middle finger) to select colors at the top from color options for drawing on screen virtually. Used google's **media-pipe** to get the hand landmarks.

Nowadays Touchscreen devices are being used extensively for all purposes, especially for education. After the covid outbreak there is only online medium available for study teachers, students are using tablets, ipad and touchscreen monitors for lectures, artists are using for drawing purposes. But in non touchscreen devices it is very difficult to draw something by mouse only but fields like Artificial Intelligence, machine learning and computer vision are developing very useful solutions for this problem.

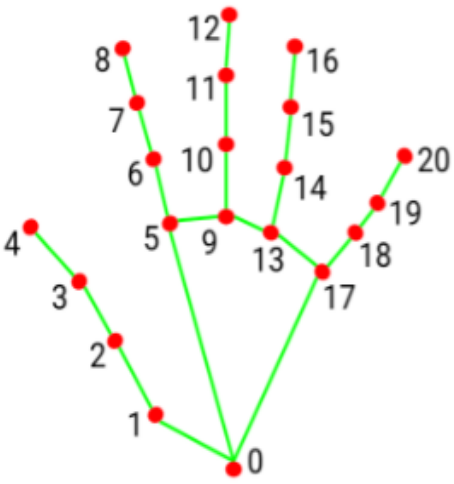
HEADER COLOR PALETTE

List of colors and eraser to choose from the image

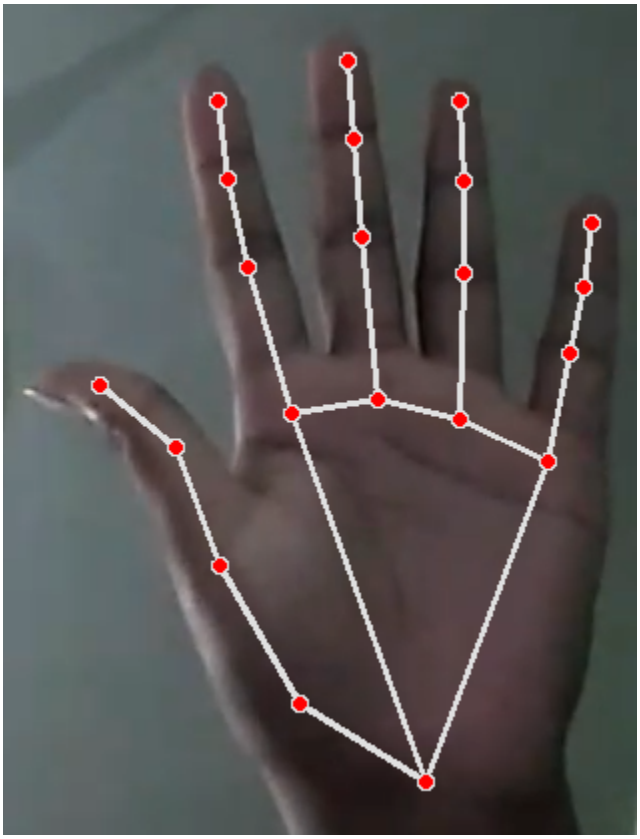


MEDIEPIPE

MediaPipe is a palm detection model that operates on the full image and returns an oriented hand bounding box. It returns 3d hand keypoints.



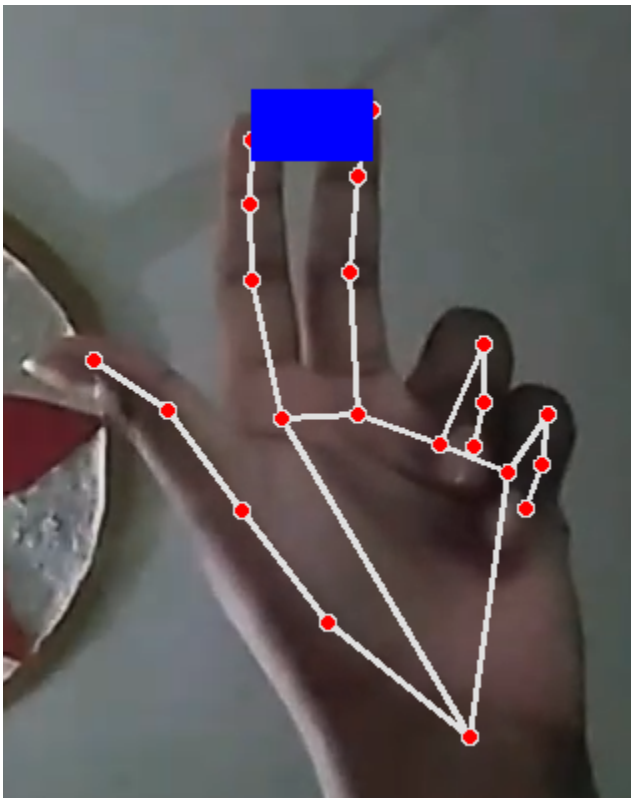
0. WRIST
1. THUMB_CMC
2. THUMB_MCP
3. THUMB_IP
4. THUMB_TIP
5. INDEX_FINGER_MCP
6. INDEX_FINGER_PIP
7. INDEX_FINGER_DIP
8. INDEX_FINGER_TIP
9. MIDDLE_FINGER_MCP
10. MIDDLE_FINGER_PIP
11. MIDDLE_FINGER_DIP
12. MIDDLE_FINGER_TIP
13. RING_FINGER_MCP
14. RING_FINGER_PIP
15. RING_FINGER_DIP
16. RING_FINGER_TIP
17. PINKY_MCP
18. PINKY_PIP
19. PINKY_DIP
20. PINKY_TIP



Selection Mode

If index finger and middle finger both fingers are up then its selection mode, in selection mode there will be a rectangle shown up between index finger and middle finger of color which is selected Now. you can change color in this mode with the colors shown in color palette there is an eraser also shown in right side color palette.

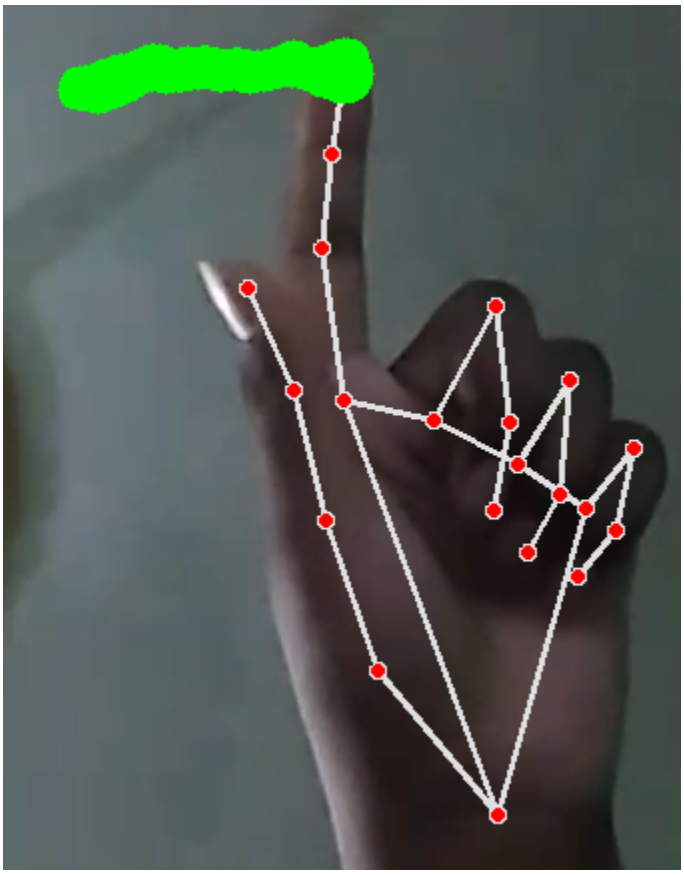
At the start of the application there will be a blue color selected by default. And it will be looking something like shown in image below.



Blue color selected

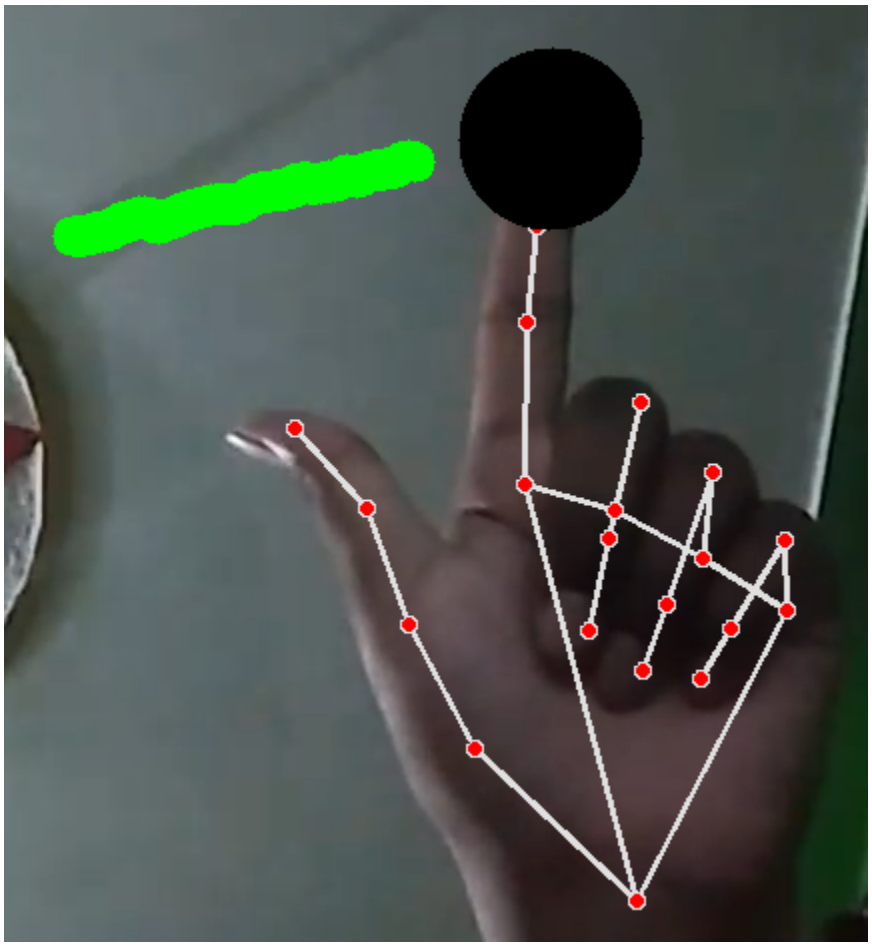
DRAWING MODE

When index finger and middle finger both are not up at same time then it is drawing mode on in drawing mode there will be a small circle will be shown on the tip of index finger to the color which is selected up.



ERASING MODE

When index finger and middle finger both are not up at same time then it is the ERASING MODE on in ERASING MODE there will be a large circle will be shown on the tip of index finger to the color black which is selected up.



Project consists of two python file module.py for handlandmarks and paint.py

ALGORITHMS :

1. START.
2. Importing opencv, numpy and module.py into the paint.py file.
3. Setting brush thickness, eraser thickness, default drawing color, canvas to draw on, header to show color palette at top of screen and xp,yp coordinates.
4. Calling webcam i am calling primary webcam by passing value 0 then we setting the frame size as (1280,720).
5. Create a detector object of Class handlandmarksDetector passing value (detectionConfidence, maxhands) value.
6. While loop starts now :
7. Read image in img variable and calling Adrawhands function on img.
8. Lets Now call find position function it will return us coordinates value of hand landmarks.
9. Call fingers function that will return a list of 0s and 1s 1 means finger is up and 0 means finger is down.
10. If both index and middle figures are up:
    a. It's Now in the selection mode to select color from header image y1 should be less than 125.
    b. As 90 < x1 < 180 it will be blue.
    c. 307 - 415 purple..
    d. After that red..
    e. Then Green color will be
    f. At last there is eraser 1081 to 1200px.
    g. A Rectangle btn index and middle finger represent selection modE
11. If drawing mode up:
    a. Drawing mode is represented as a circle.
    b. We will use eraser thickness to draw if draw color (0,0,0)
    c. Case else : when drawcolor is not (0,0,0) and we will use different thickness to draw which is eraser thickness.
    d. Update xp and yp.
12. Lets Convert image to gray.

13. Lets Now convert gray image into binary image and then inverting binary image. Now convert it to bgr.
14. Take an original image with imageINVERSE.
15. Let's Now take or with ImageCANVAS.
16. Let's Set the header image at top and CALL imshow on Image.
17. Set waitkey 1 milliseconds, updating the image every millisecond will not give lag.
18. STOP.