

CSD 334

AI VIRTUAL PAINTING

GROUP NO:10

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22-07-2022

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INTRODUCTION

- As u know that artists create paintings on a canvas.
- But what if all can paint on air just by waving our hands.
- The project, named as **AI VIRTUAL PAINTING**
- using **OpenCV and Python**.
- **OpenCV** is an open-source computer vision library for performing various advanced image processing tasks

- use color detection and segmentation techniques to achieve this objective.
- **Color detection** is an image processing technique where we can detect any color in a given range of **HSV** color space.

EXISTING SYSTEMS

- The existing system contains of the generic mouse and trackpad system of monitor
- The remote accessing of monitor screen using the hand gesture is unavailable.
- The existing virtual mouse control system consists of the simple mouse operations
 - using the hand recognition system, where we could perform the basic mouse operation like
 - mouse pointer control, left click, right click, drag, etc.

Continuation...

- The further use of the hand recognition is not been made use of.
- Even-though there are a number of systems which are used for hand recognition,
the system they made use is the static hand recognition.

LITERATURE SURVEY

NO	PAPER NAME	PROBLEM	SOLUTION	DRAWBACK
1	Robust Hand Recognition with Kinect Sensor	Due to the difficulties in touching panel	A hand gesture recognition system with <u>Kinect sensor</u> ,	It detect only small objects So it is not applicable
2	LED fitted finger movements	Due to the difficulties in touching panel	An <u>LED</u> is mounted on the user's finger, and the web camera is used to track the finger.	It is not applicable for all the time

NO	PAPERNAME	PROBLEM	SOLUTION	DRAWBACK
3	Augmented Desk Interface	Due to the difficulties in the touching panel	Using a <u>2 hand</u> touching mode on the screen to detect One for - menu click Another for - selecting/drawing	It is apparently difficult to use two hands
4	Detection using Data gloves	Due to the difficulties in recognition of object	Using a <u>data gloves</u>	Data gloves is may not be available all the time. High costly

NO	PAPERNAME	PROBLEM	SOLUTION	DRAWBACK
5	Implementation Of A Low Power Motion Detection Camera Processor	Due to the difficulties of touching panel	<u>Cmos</u> image sensor	It cannot detect fast movement
6	Ball tracking	Due to the difficulties of touching panel and coloured marker as tools	Creating a glove with <u>ping pong ball</u>	It cannot available all the time

NO	PAPER NAME	PROBLEM	SOLUTION	DRAWBACK
7	Implementation of Color Filtering with a pen tool	Due to the difficulties of touching panel and one colour recognition	Adding Colour filters with <u>pen</u> as a tool	If there is nonavailability of pens it wont work
8	Virtual marker	Due to the difficulties of touching panel	Using a coloured <u>marker</u> as a tool	Unavailable of marker in hand

PROBLEM DEFINITION/IDENTIFICATION

The project focuses on solving some major social problems :-

- Teaching fields : it is very uncomfortable for teachers to take the classes during the online time period
- The wastage of paper
- Uncomfortable of using touching panel

NO	ISSUES	SOLUTIONS
1	<u>Teaching field</u> It is very difficult for the teachers To take classes through online	Using AI virtual painter They can take classes
2	<u>Wastage of paper</u>	Using AI virtual painter
3	<u>Un-comfortable</u> use of Touching panel in laptop	Using AI virtual painter

- Virtual Writing can quickly solve these issues. It will act as a communication tool for people with hearing impairment.
- One can quickly write in the air and continue with your work without much distraction.
- Additionally, writing in the air does not require paper. Everything is stored electronically.
- No any usages of marked object as a tool

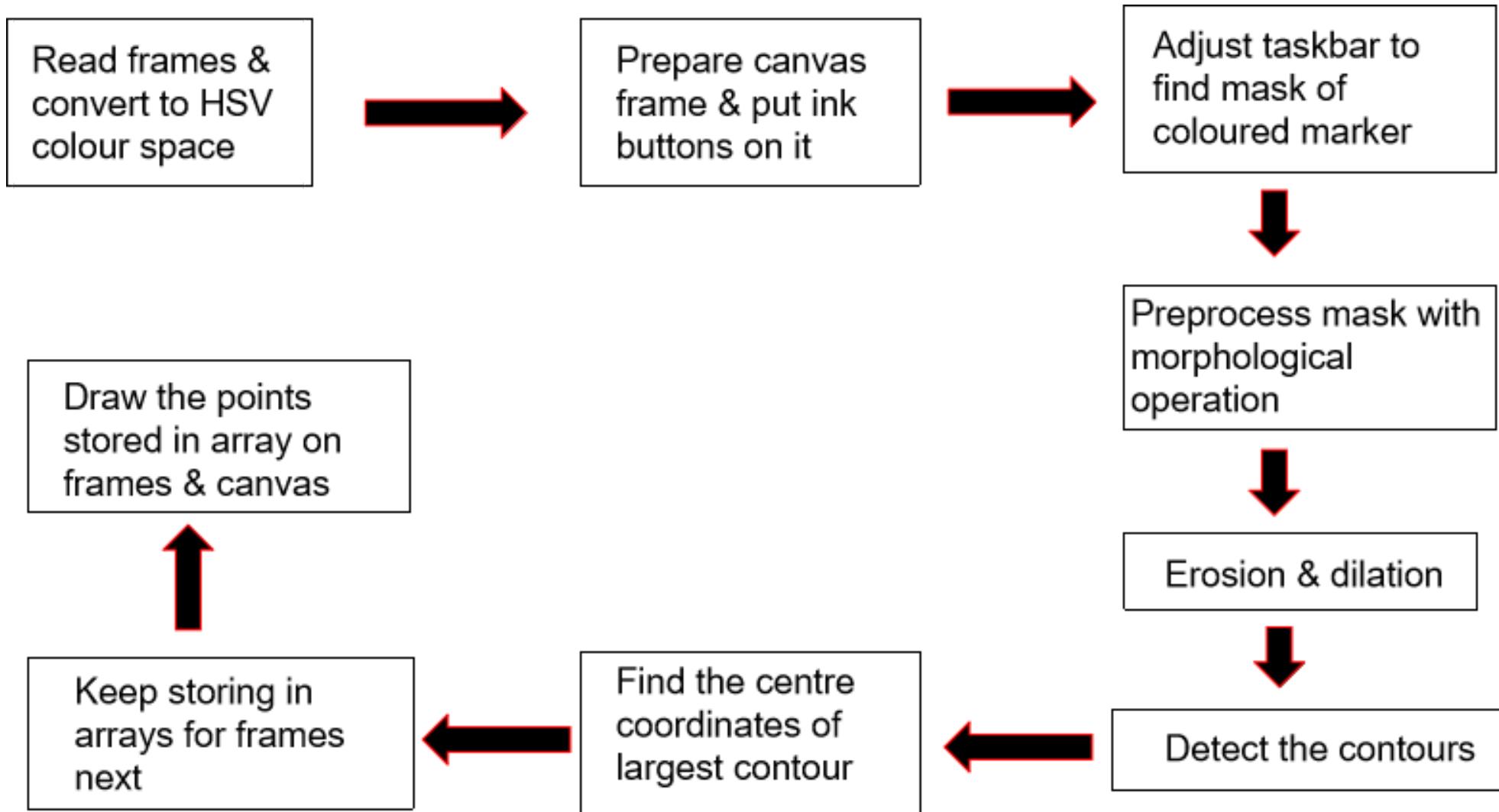
PROPOSED SYSTEM

- The camera to capture hand movements,
- Can draw anything using hand in the air painting and displayed on a monitor
- The whole process without using mouse or joystick like device.
- The main motivation :
 - To extract the gesture detection and
 - Color segmentation technique from camera sensor

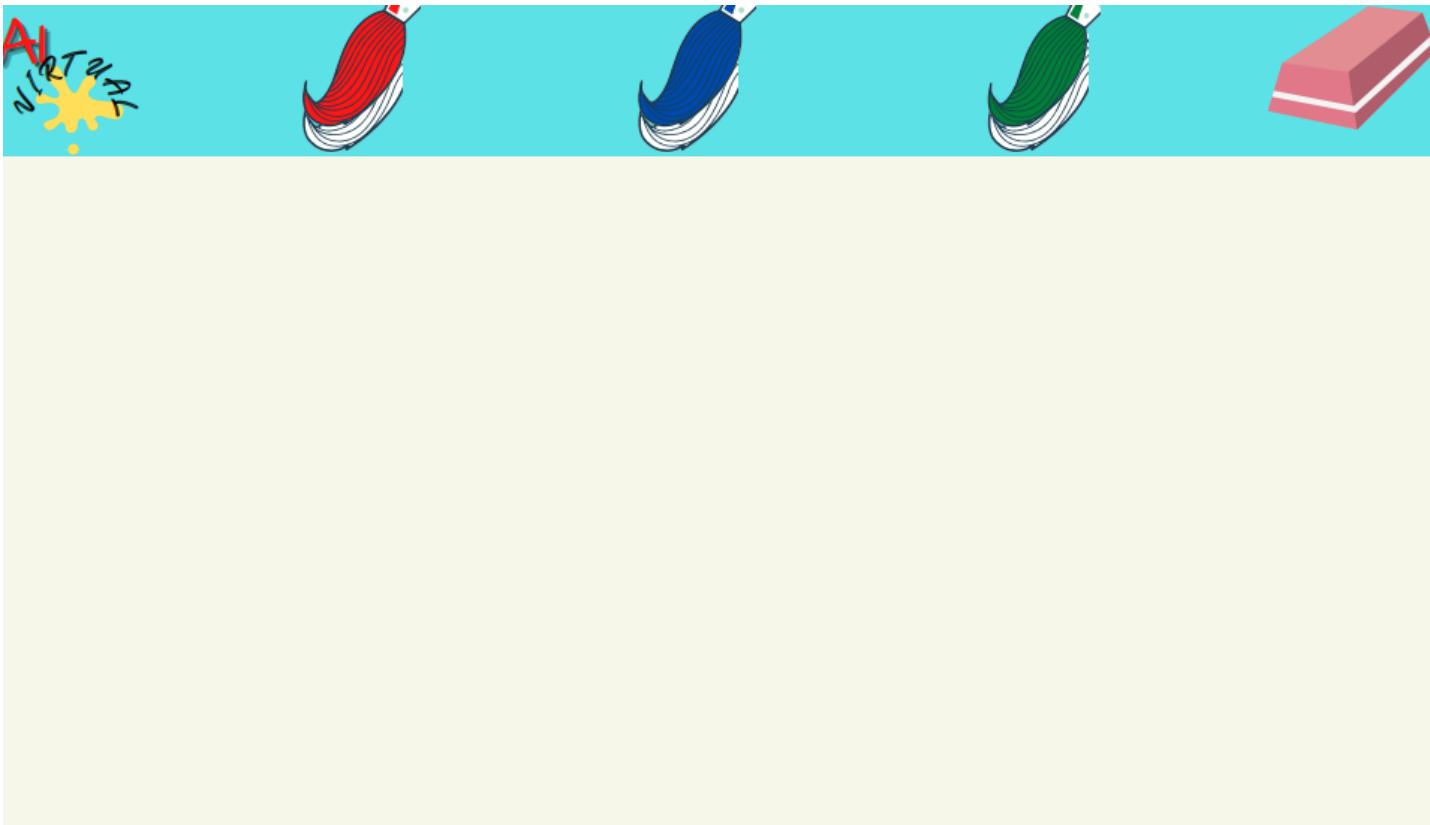
continuation.....

- Using hand as a tool
- No any hand tool is obtained or used

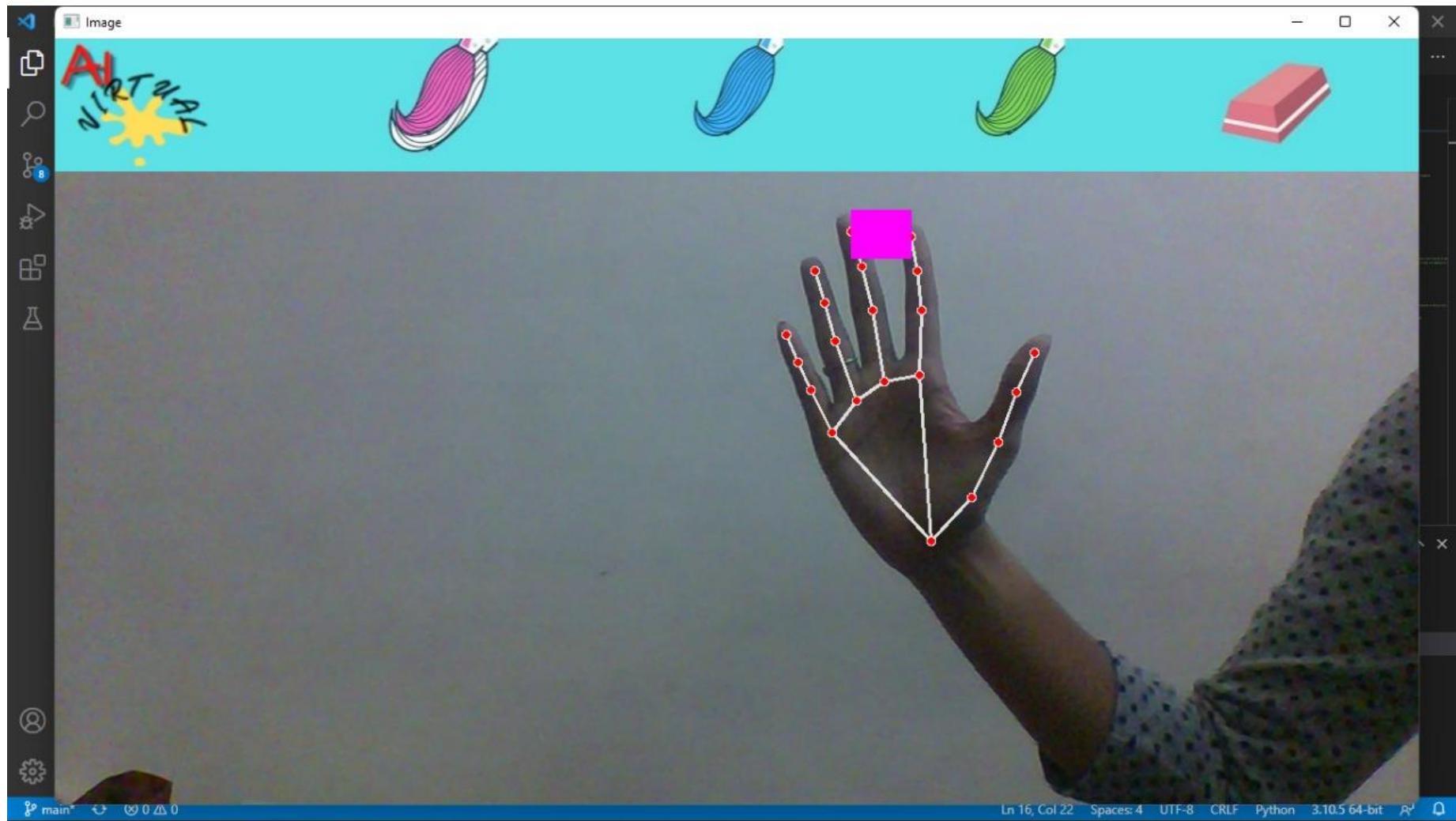
SYSTEM DIAGRAM



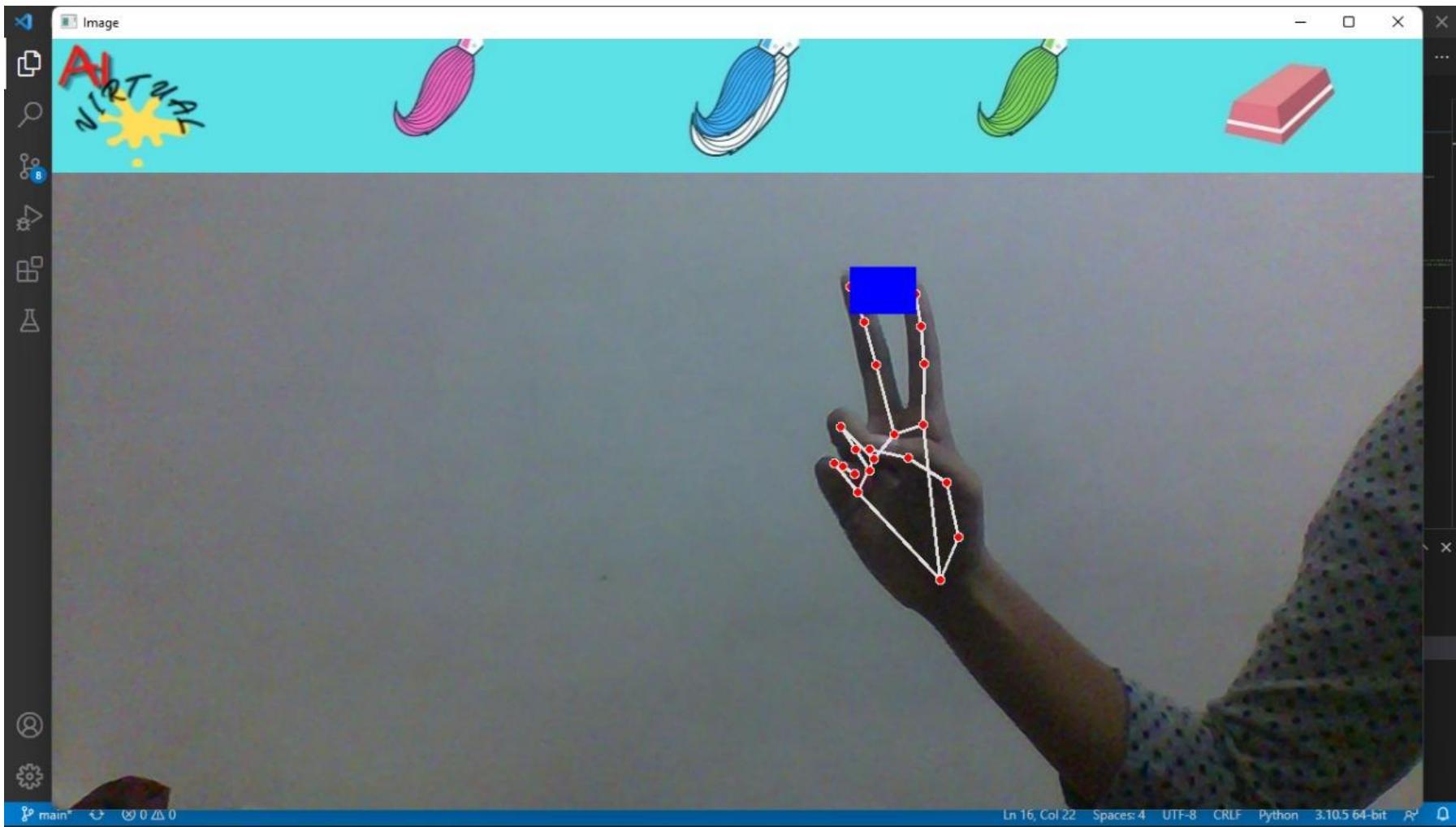
OUTCOME SAMPLE



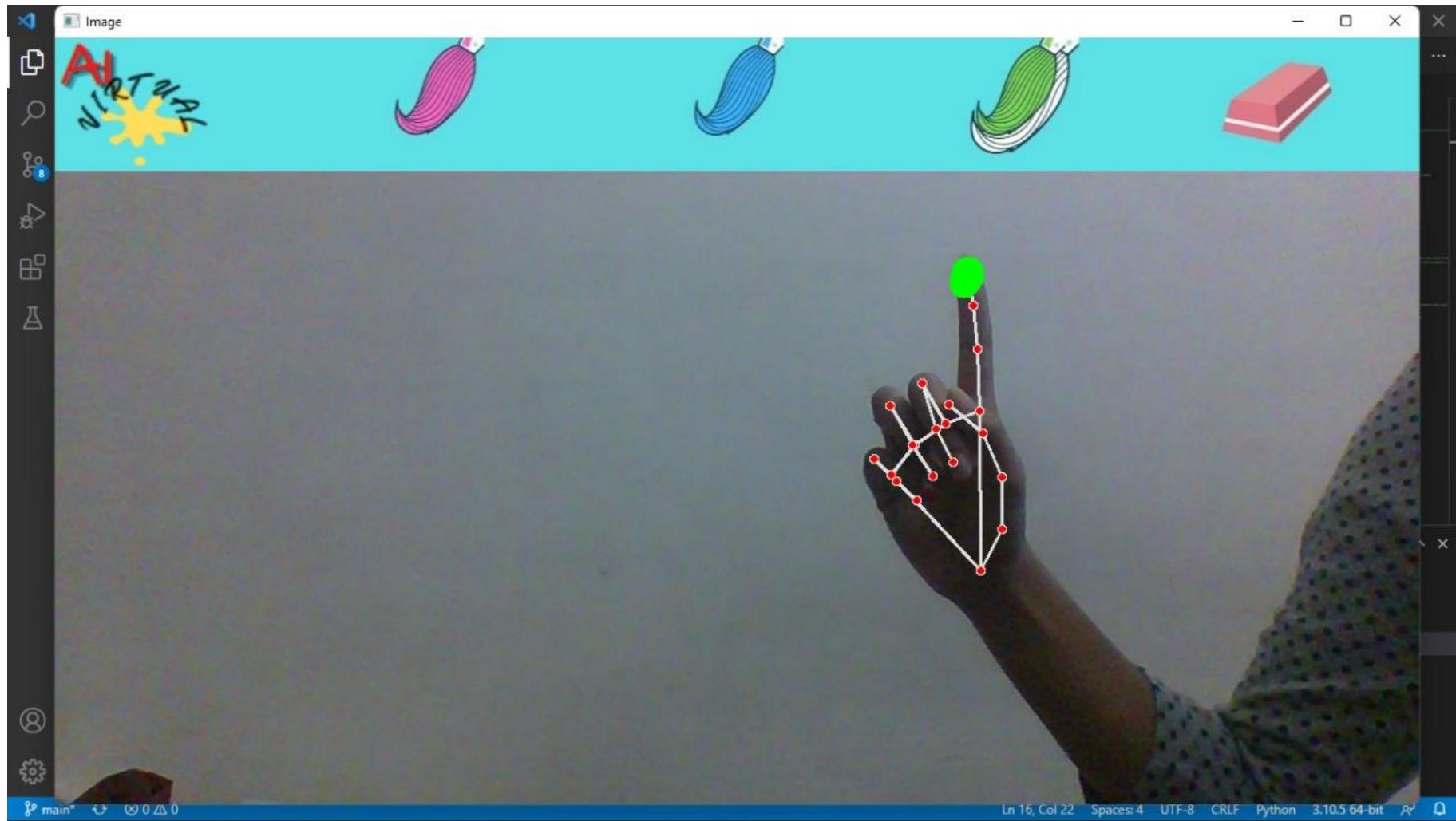
While selecting pink brush:



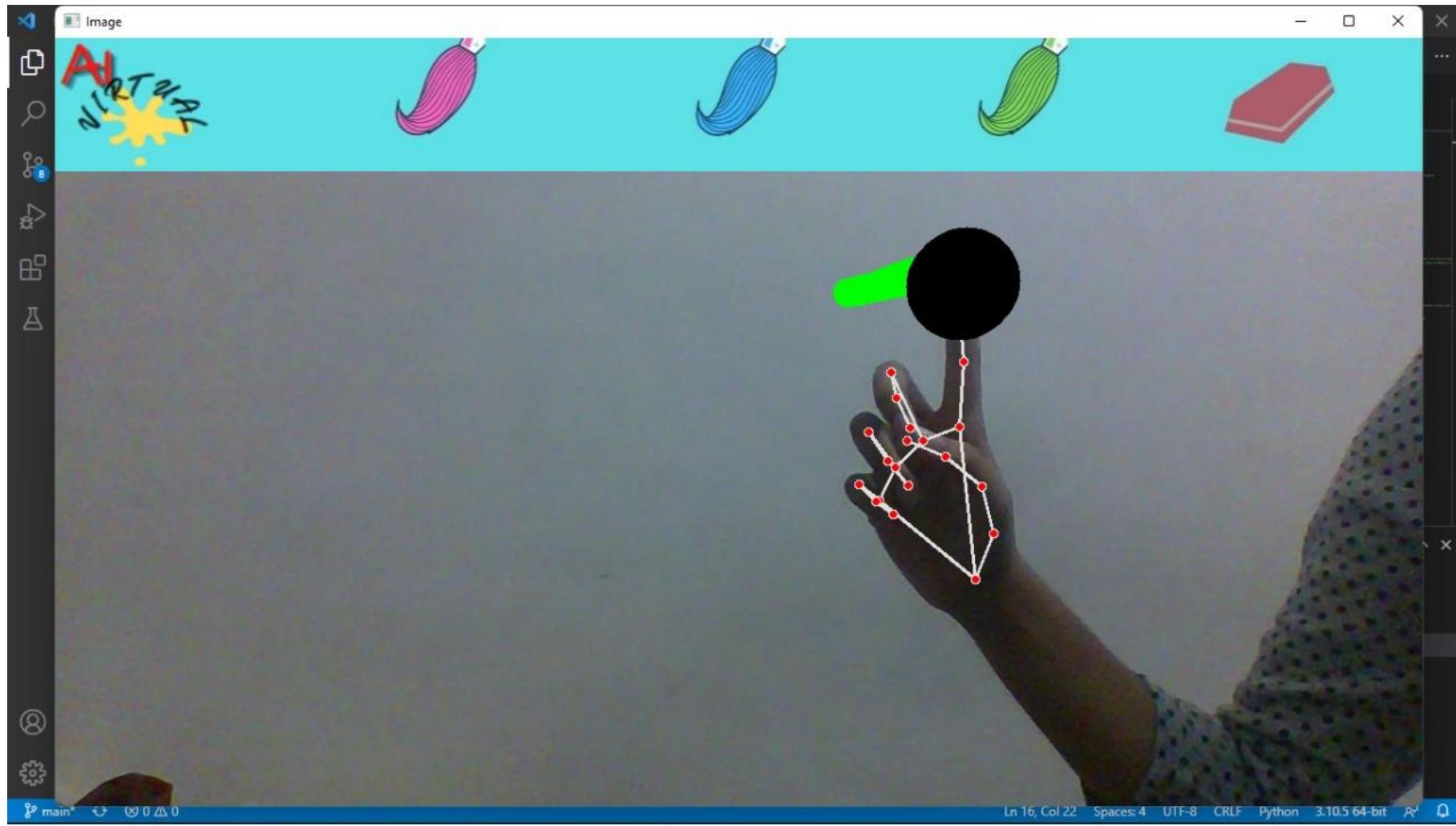
While selecting blue brush:



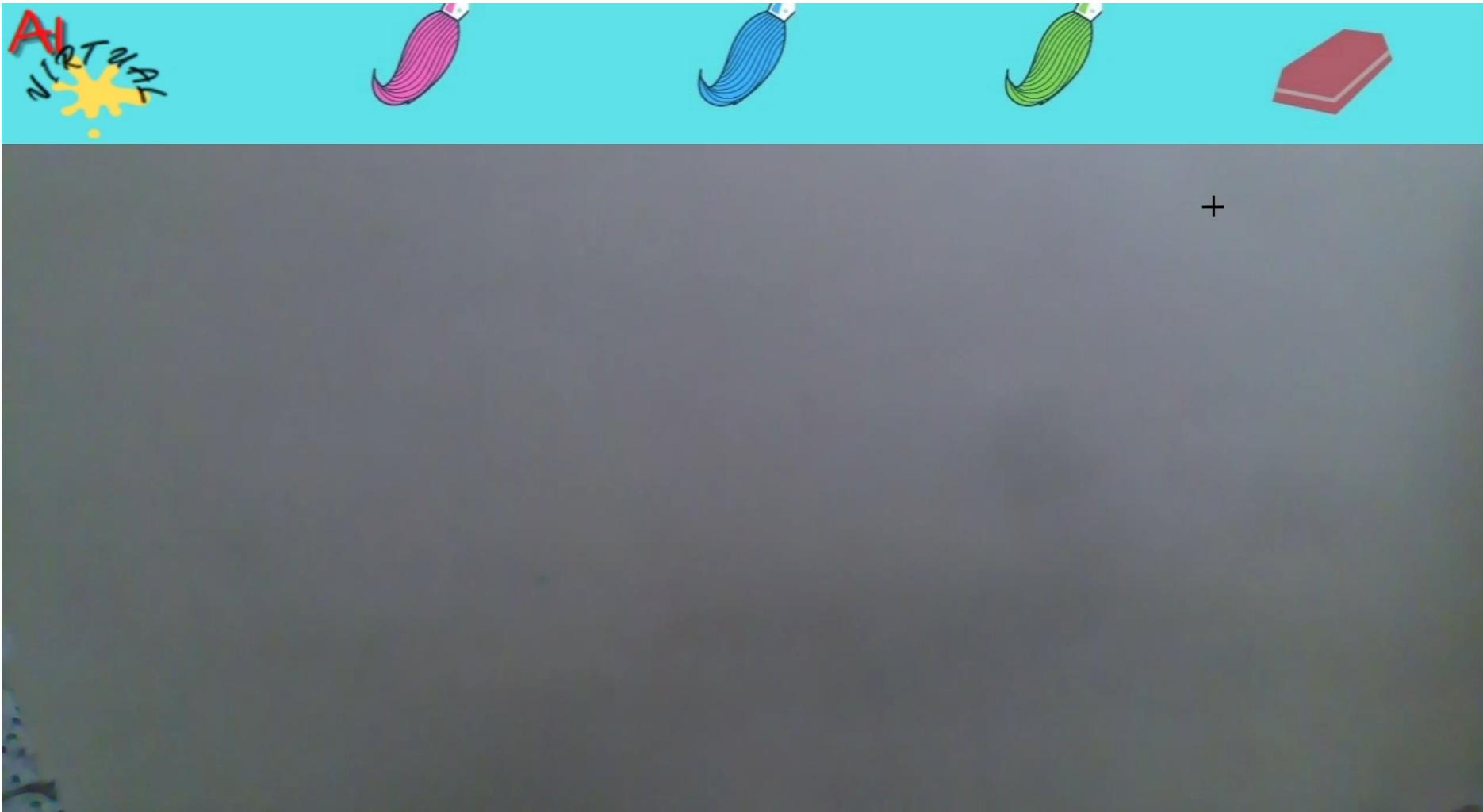
While selecting green brush:



While selecting eraser:



Video Demo



SYSTEM SPECIFICATION

- Implementation plan on software
 - OpenCV (Open Source Computer Vision Library)
 - : it is a library of programming Functions
- mainly aimed at real-time computer vision.
- Originally developed by Intel

- Implementation plan on hardware device :
 - The DE2 board will act as a microcontroller
 - To control and communicate with the external component
 - 5 Mega Pixel camera and Monitor.

- Frame grabber

Frame grabbers includes a 1.5 megapixel image sensor.

Camera for capturing an image,

The image directly display on the screen by web camera.

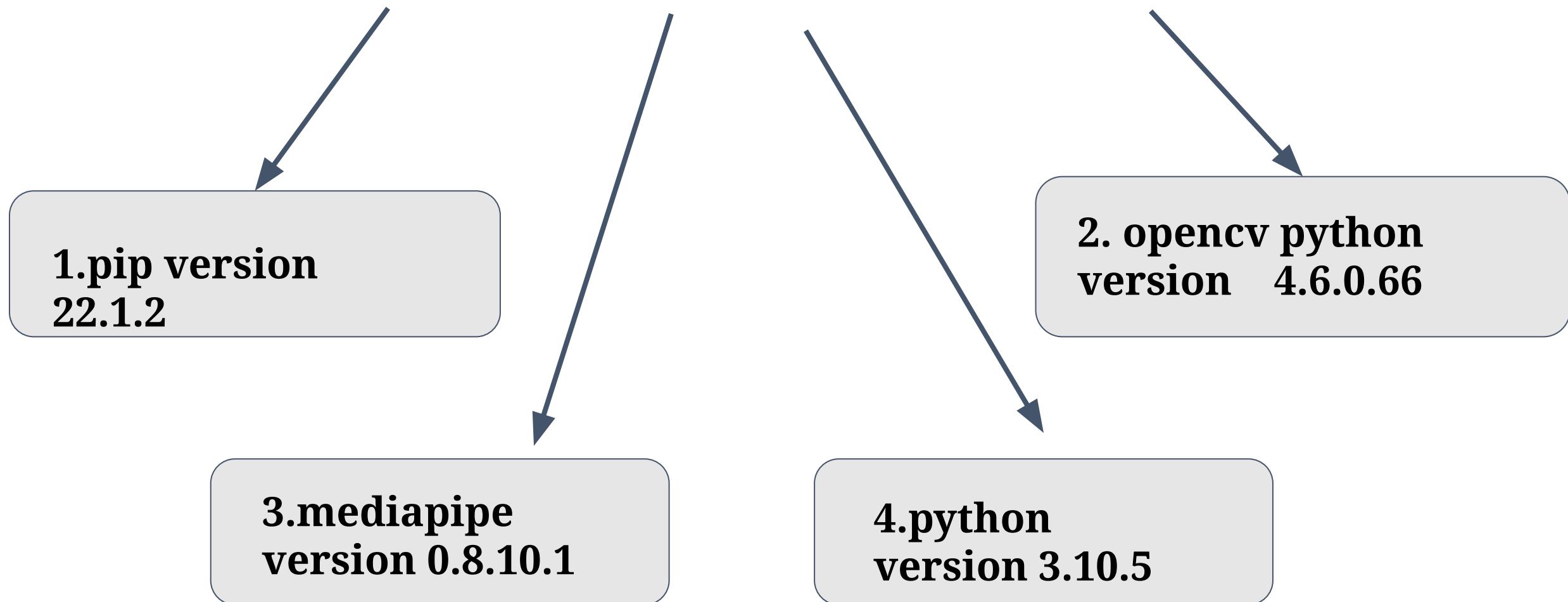
2 MODULES



1. HAND TRACKING
CODE

2. AI VIRTUAL PAINTING

PACKAGE VERSIONS USED



IMPLEMENTATION

```
brushThickness = 25
```

```
eraserThickness = 100
```

```
FolderPath = "Header"
```

```
myList = os.
```

```
listdir(FolderPath)
```

```
print(myList)
```

```
overlayList = []
```

Importing images
from the file
Header



```
for imPath in myList:  
    image = cv2.imread(f'{FolderPath}/{imPath}')  
    overlayList.append(image)  
print(len(overlayList))  
header = overlayList[0]  
drawColor = (255, 0, 255)
```

SIZE OF CAPTURING VIDEO

```
cap = cv2.VideoCapture(1)
```

```
cap.set(3, 1280)
```

```
cap.set(4, 720)
```

```
x1, y1 = lmList[8][1:]  
x2, y2 = lmList[12][1:]
```



Tip of the index finger and
middle finger

```
if fingers[1] and fingers[2]:  
    print("Selection Mode")
```



If two fingers are up
(selection mode)

```
fingers = detector.  
fingersUp()
```



Check which fingers are
up

AFTER TESTING:

- It will detect a distance upto 283 cm from the camera
- Web cam maximum resolution must have 480p(640*480) otherwise resize the images
- If using windows:
Value need to be 0
- If using macos
Value need to be 1

cap=cv2.videocapture()

CONCLUSION

- The system has the potential to challenge traditional writing methods.
- It is a great purpose in helping differently abled people communicate easily.
- senior citizens or people who find it difficult to use keyboards will able to use
- It will be an excellent software which people interact with the digital world.

DRAWBACKS OF AI-VIRTUAL PAINTING

- Camera resolution
- Detecting other persons hand (one person at a time)
- Hand want to detect it from the canvas not from far away
- Intel core i5 or above

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- Akshay L Chandra” Mouse Cursor Control Using Facial Movements
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THANK YOU

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