

EXPLORATORY PROJECT

SEMESTER-IV 2021-2022

VOLUME CONTROL USING HAND GESTURE AND FINGER COUNTER IN HAND

Mentored by:

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AIM AND OBJECTIVES:

- This project aims to create an interaction between machine hardware and hand gestures using landmarks on hand to minimize the use of hardware.
- In the ongoing pandemic era, where prevention of contact is prioritized, this project accomplishes contactless technology services, which is the need of the hour.
- Hence, our objective is to create a application through which we can illustrate the use of our project.
- **This project includes:**
 - a. Volume control using hand movement
 - b. Counter using hand landmarks of fingers

Workflow to make hand module



Detecting land marks on hand (21)

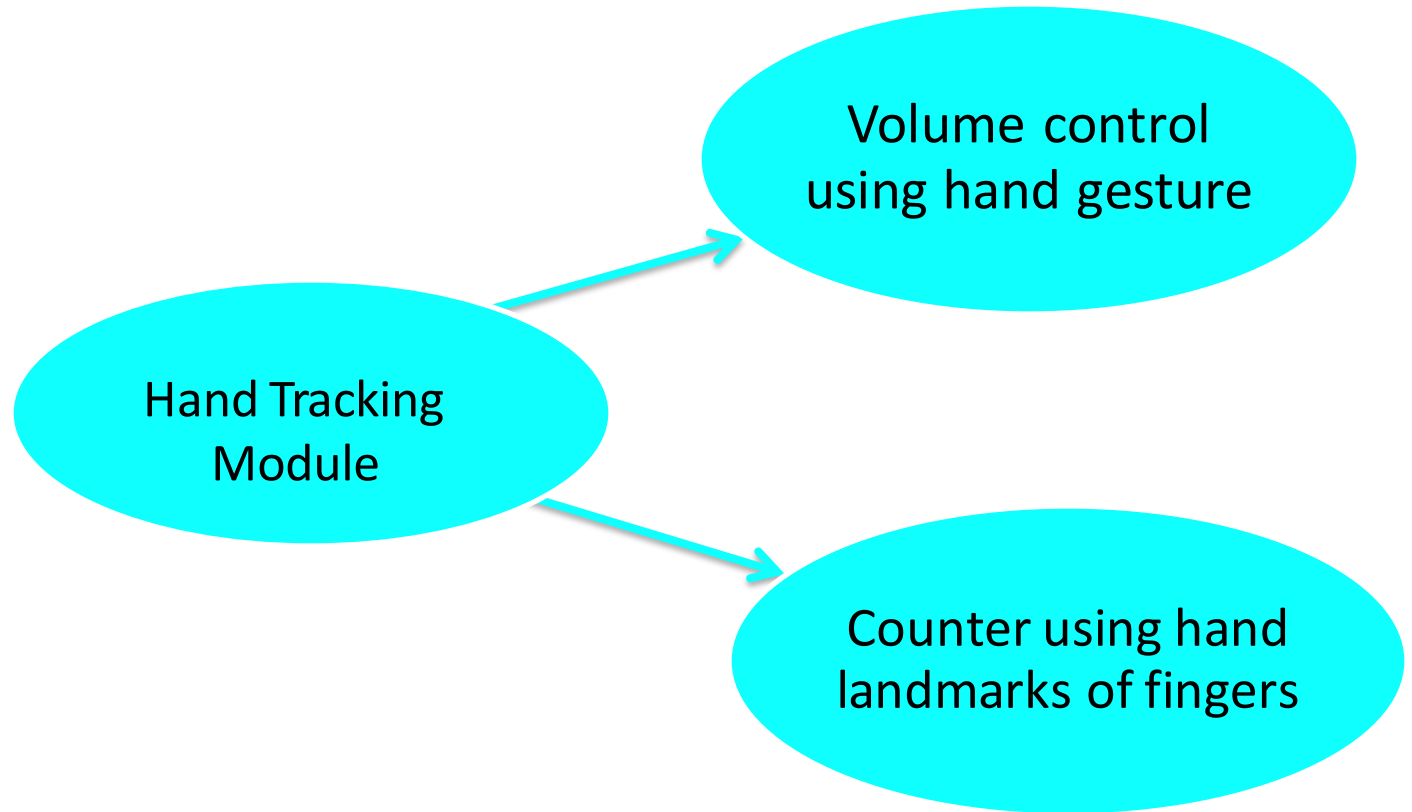


Storing the position of landmark



Creating a hand module which will give positions of landmarks in live camera feed.

Now we can use this hand module to make volume controller and counter.



HAND MODULE:

The work of hand module is divided into two parts as:

- **Palm detection model:**

It basically detect hand from feed and detects 21 points on palm as shown in the figure 1.

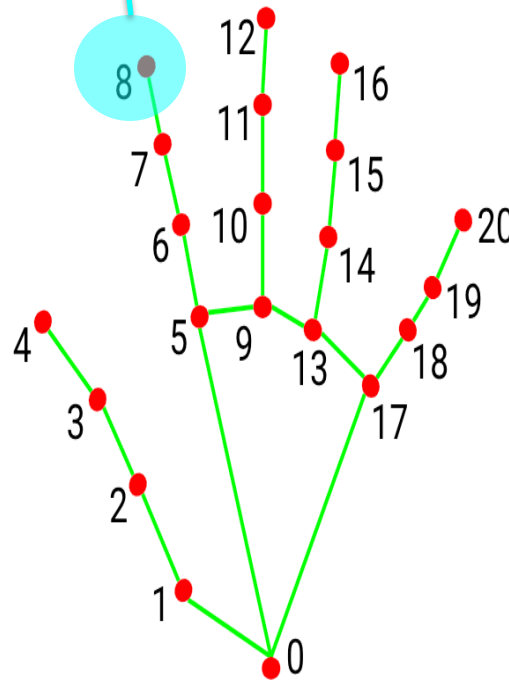
- **Hand tracking model:**

It finds co-ordinates of those 21 points on the detected palm with their corresponding ID's
For example: ID corresponding to top of index finger is 8.



Chart showing relation of points with respect to their ID's

ID Corresponding to top of index finger is 8

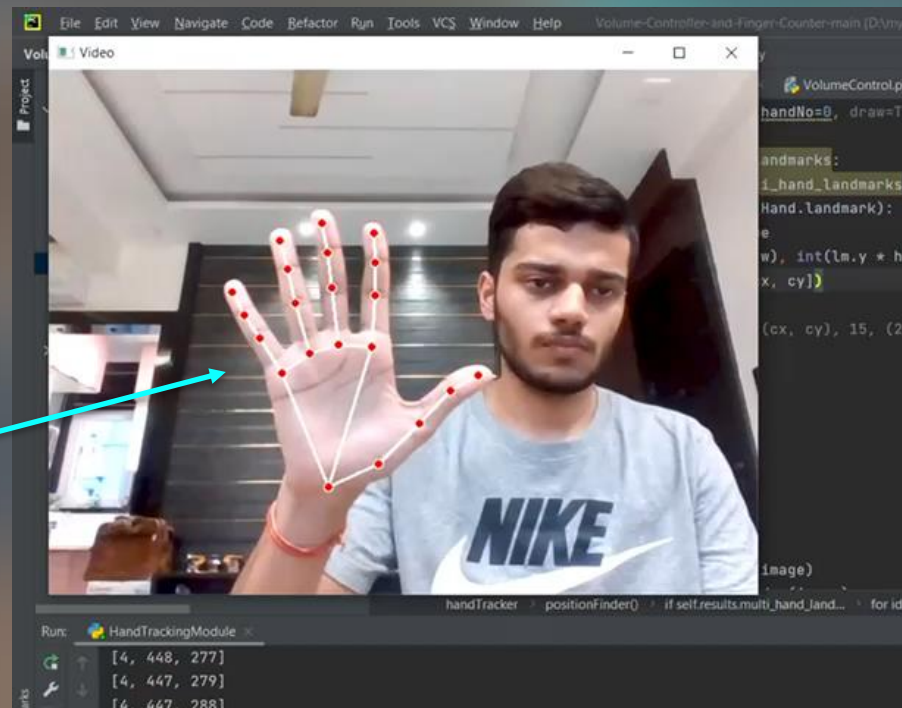


- | | |
|-----------------------|-----------------------|
| 0. WRIST | 11. MIDDLE_FINGER_DIP |
| 1. THUMB_CMC | 12. MIDDLE_FINGER_TIP |
| 2. THUMB_MCP | 13. RING_FINGER_MCP |
| 3. THUMB_IP | 14. RING_FINGER_PIP |
| 4. THUMB_TIP | 15. RING_FINGER_DIP |
| 5. INDEX_FINGER_MCP | 16. RING_FINGER_TIP |
| 6.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

Figure 1

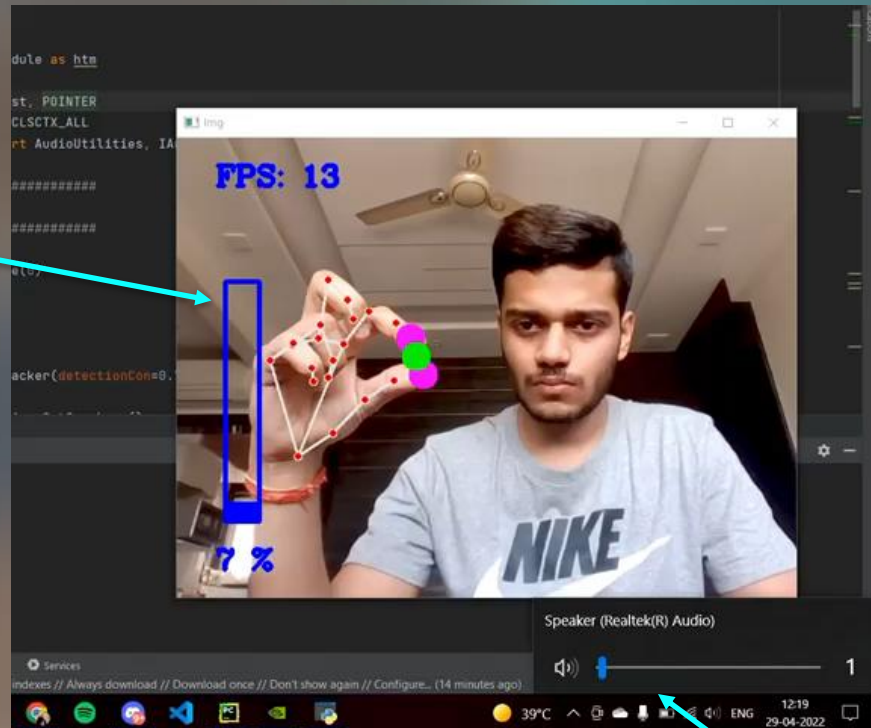
WORKING OF HAND TRACKING MODULE

The Hand detecting module performs precise key point localization of 21 3D palm coordinates in the detected hand region.



VOLUME CONTROLLER USING HAND MOVEMENT

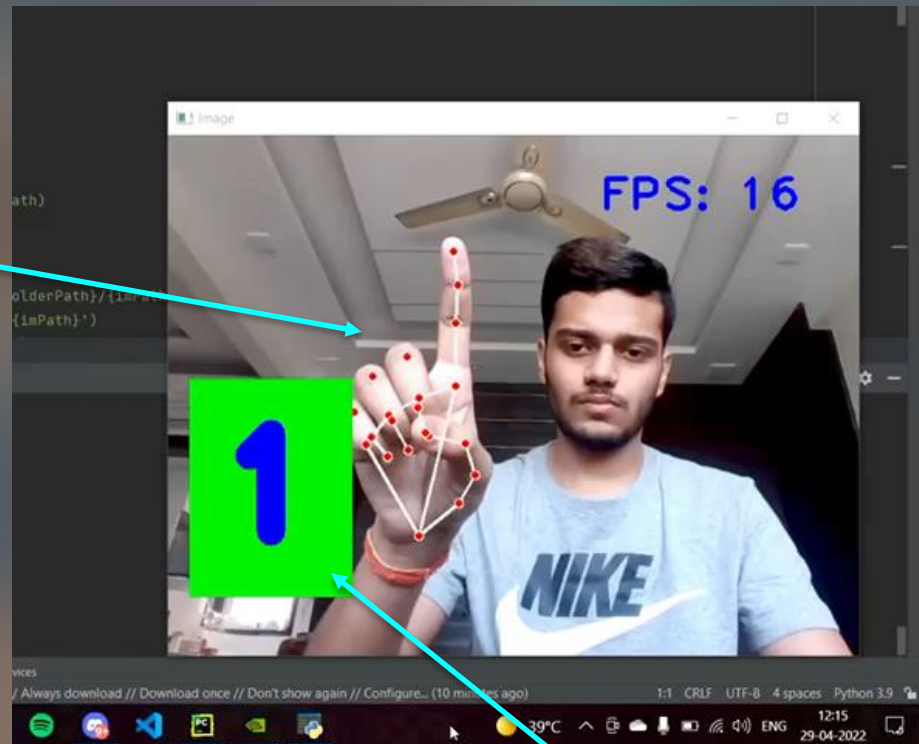
Here we can see the volume is changing corresponding to the distance between index finger and thumb finger



Here we can see computer volume being changed

COUNTER USING HAND LANDMARK OF FINGER

Using the relative positions of 21 points this counter counts number of finger we are showing to camera



Here we can see the number of fingers shown



CONCLUSION AND FUTURE:

- We can conclude that our exploration on this project can be good be use in various fields in daily life. This will reduce the human dependency on hardware.
- In this time of pandemic we are avoiding touch to any surface. By our project we can make smart control systems which minimizes human touch.
- This have tremendous future use like - smart homes, high security systems etc.

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THANK YOU