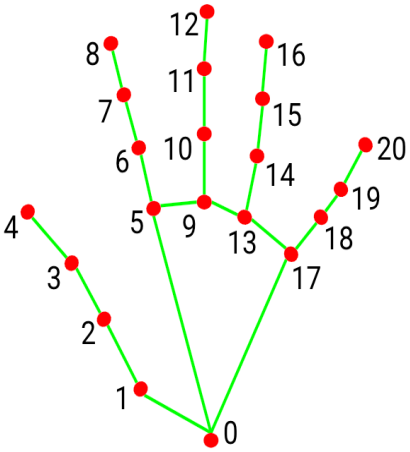
PROJECT REPORT

CS100/CS101 - Class Projects - 2021-2022

TOPIC: Hand tracking / Hand sign detection

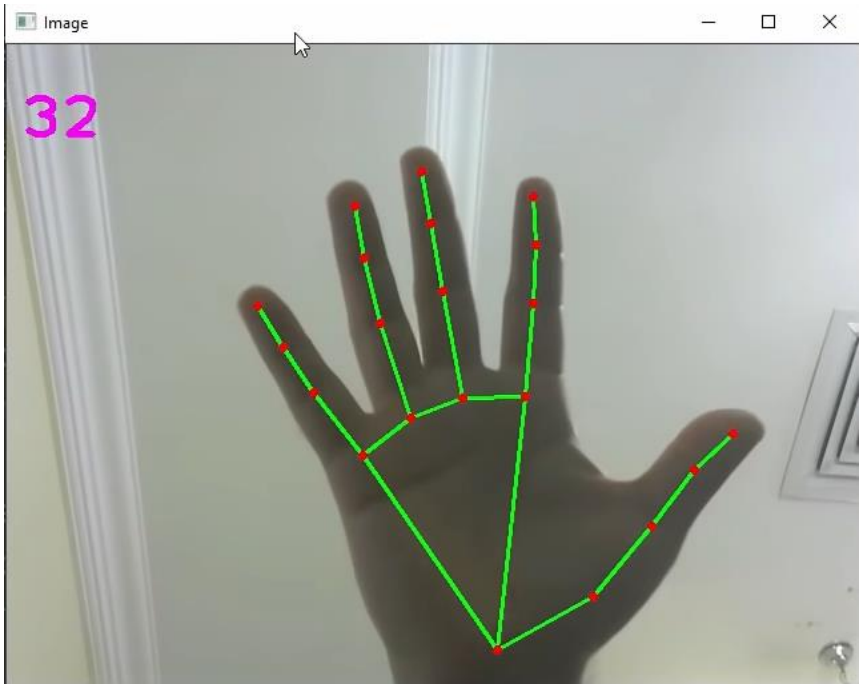
Sub Topics: Hand Tracking Module, Finger Counter, Sign Language detection.

- Hand Tracking Module: In this hand tracking program I have created the program to track your hands in real time using your laptop/PC webcam and it locates hand landmarks and connects it using mediapipe and opencv and provides you the (X, Y) coordinates of each hand landmark and its corresponding hand landmark number with reference to mediapipe solution_base.Then this program has been converted into a module so it can be used in future projects.



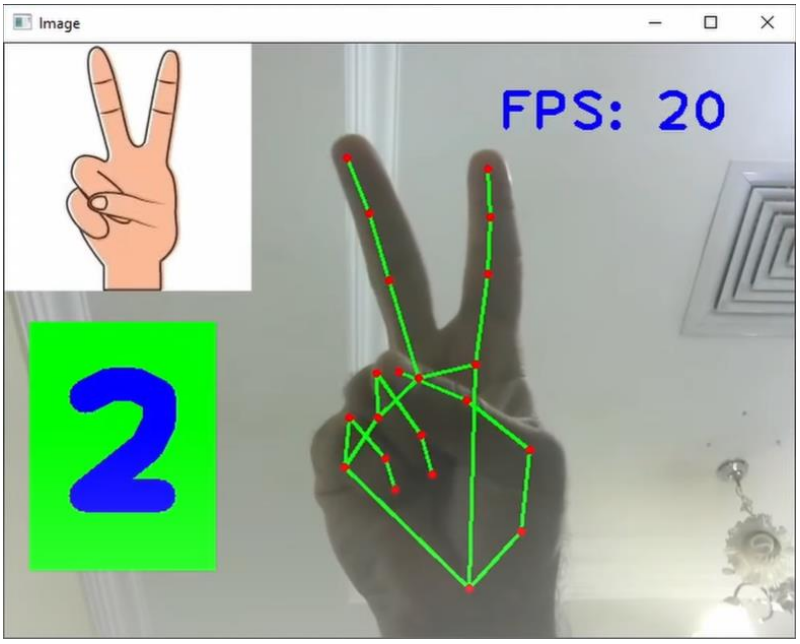
0. WRIST
1. THUMB_CMC
2. THUMB_MCP
3. THUMB_IP
4. THUMB_TIP
5. INDEX_FINGER_MCP
6. INDEX_FINGER_PIP
7. INDEX_FINGER_DIP
8. INDEX_FINGER_TIP
9. MIDDLE_FINGER_MCP
10. MIDDLE_FINGER_PIP
11. MIDDLE_FINGER_DIP
12. MIDDLE_FINGER_TIP
13. RING_FINGER_MCP
14. RING_FINGER_PIP
15. RING_FINGER_DIP
16. RING_FINGER_TIP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

Hand Landmarks



Tracked Hands

- Finger Counter: This program uses the above-mentioned hand tracking module to detect hands and uses the relative coordinates of the hand landmarks to detect which fingers are closed and open and based on this it counts the number of fingers open and displays the number based on the number of fingers open. The program along with number displays the real time FPS (Frames per second) with respect to your webcam quality and resolution using Time module in python. The program also displays an animated image with respect to detected hands.



Finger Counter

❖ Sign Language detection: This program uses the above-mentioned hand tracking module to detect hands and uses the relative coordinates of the hand landmarks to detect sign language alphabets from (A-Z) and sign language numbers from 0-9. The program along with alphabets displays the real time FPS (Frames per second) with respect to your webcam quality and resolution using Time module in python. The program also displays an animated image with respect to detected hands.

Sign Language

Modules Used: Opencv, Mediapipe, Time, OS.

So, as of now the project has been completed till the finger counter program and the sign language detection program is under improvement.The working model of both hand tracking module and finger counter can be accessed at my Github repository (link given below).

Github link:

References: https://www.youtube.com/channel/UCYUjYU5FveRAscQ8V21w81A