Project Development Phase

Project Manual

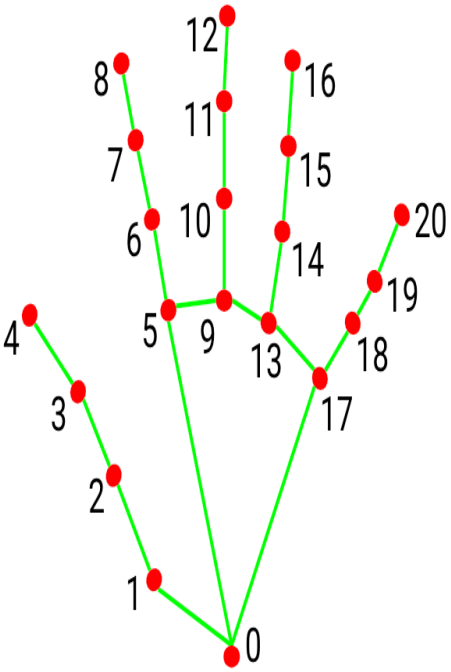
Date	18 November 2023
Team ID	Team-591898
Project Name	Hand Gesture Recognition

Overview

The project is on hand gesture recognition. It employs CNN to distinguish ten distinct hand movements. It also makes use of Mediapipe, TensorFlow, and OpenCV. The project may be used to initiate basic conversations between people who do not speak the same language and to assist tourists in navigating or asking for assistance in an unfamiliar region.

Working Principle

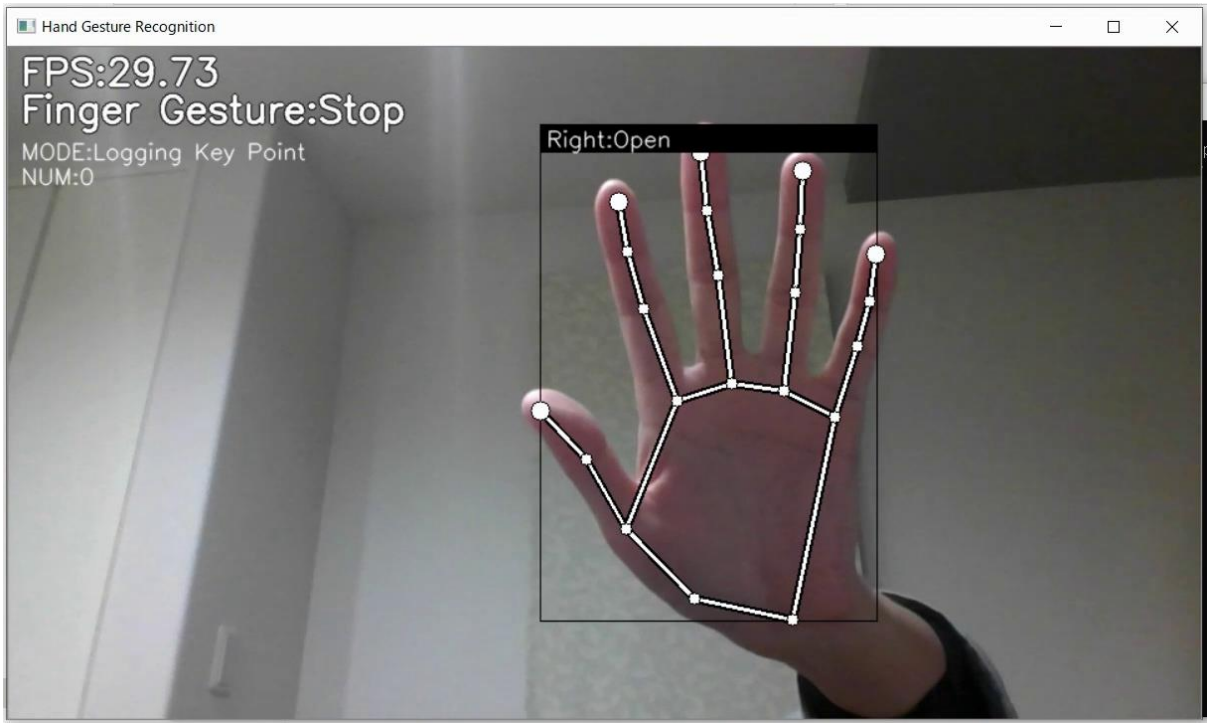
The code assigns key points to different points of the hand and for each hand gesture, it records the positions of the key points for each label (registered hand gesture). The code then reads the key point positions to recognize which hand gesture is being shown.



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

Training

Press "k" to enter the mode to save key points（displayed as 「MODE: Logging Key Point」）



If you press "0" to "9", the key points will be added to "**model/keypoint_classifier/keypoint.csv**"

Model training

Open "**keypoint_classification.ipynb**" in Jupyter Notebook and execute from top to bottom.

To change the number of training data classes, change the value of "NUM_CLASSES = 3"

and modify the label of "**model/keypoint_classifier/keypoint_classifier_label.csv**" as appropriate.

Results