Gesture Music Player

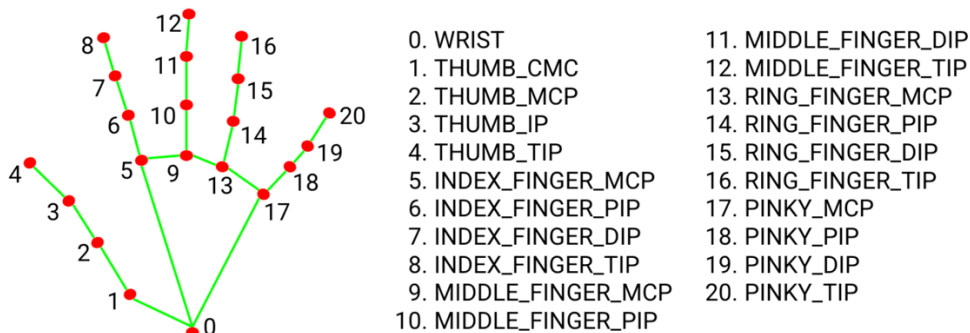**GitHub Link: https://github.com/Bryce138675/Mini-project-Gesture-Music-Player**

1. **Importing libraries**
   - **Import Pygame** --- Pygame is a cross-platform set of Python modules designed for writing video games. It includes computer graphics and sound libraries designed to be used with the Python programming language.
   - **Import os ---** The OS module in Python provides functions for creating and removing a directory (folder), fetching its contents, changing and identifying the current directory, etc.

2. **Hand keypoint detection**
   Reference to a project to present a PPT through gesture recognition
   (https://blog.csdn.net/dgvv4/article/details/12368273)

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	

   - Video capture (Get the computer camera, Width of the image, Height of the image)
   - Create music dataset (5 songs)
   - Draw a line on the camera and make a gesture with your hand above the line to trigger
   - Hand recognition module configuration (Up to 2 hands detected)
   - FlipType--- Flip the image so that the computer image is a mirror image of our own
   - Draw a line and make a gesture above the line to trigger
   - Draw a finger movement mapping area
   - Counts how many fingers are cocked and returns a list where 1 means the finger is cocked and 0 means bent
   - Get the xyz position of 21 key points
   - Setting the mapping area (x,y)

- Hand centre coordinates

3. Control music
The following code uses the pygame library to play music (https://blog.csdn.net/RNG_uzi_/article/details/98315639)

- Work on key finger points to determine which fingers are cocked--- returns a list where 1 means the finger is cocked and 0 means bent

```
1  from pygame import mixer
2  import time
3
4  mixer.init()
5  mixer.music.load('xx.mp3')
6  mixer.music.play()
7  time.sleep(5)
8  mixer.music.stop()
```

- Use fingers to play music
   a. thumb and forefinger--- Watermelon Sugar
   b. thumbs, forefinger and little finger--- I Knew You Were Trouble
   c. thumbs and little finger to play--- Adore You
   d. forefinger, middle finger, ring finger, little finger--- As It Was
   e. Use forefinger and middle finger to play--- Golden

- Use fingers to control music
The following codes refer to the music player. (https://blog.csdn.net/txr152111/article/details/119213827)

```
def pause_music():
    print("暂停播放\n")
    pygame.mixer.music.pause()

def unpause_music():
    print("继续播放\n")
    pygame.mixer.music.unpause()

def stop_music():
    print("停止播放\n")
    pygame.mixer.music.stop()
```

   a. forefinger and little finger--- pause music
   b. thumb, middle finger, ring finger and little finger---unpause music
   c. thumb, forefinger, middle finger, ring finger and little finger---stop music

4. Display and Release

5. Feedback

I have only used five gestures to play music. After that I will use more gestures to play music. I will also improve the music player by using gestures to play the previous and next song and to adjust the volume.