

CS4187 Computer Vision and Interactivity

Homework Assignment #3

Total Marks: 15 Points

Deadline: 2020.12.04, 23:59:59PM

Question 1: Face Detection in Video (3 Points)

Please write a program using OpenFrameworks, to detect the face in the given video ([faceDetection.mov](#)). As shown in the video [faceWithFalsePositive.mov](#), there are some places detected as faces, but actually they are not. You need to remove these false-positive detection.

For submission, please submit your code and a screen-captured video demo.

Demo video: [Refined face detection](#)

Grading Breakdown:

- Perform face detection for the given video (1 point)
- Eliminate the false-positive detection, meaning those that are detected as faces but actually not real faces (2 point)

Question 2: Drawing Interface using Color Tracking (6 points)

Create an interactive application using OpenFrameworks, use the method of color-based blob tracking, to fulfill the following interaction steps.

Step 1: Wear a green finger cap on the index finger.

Step 2: Adjust the sliding bars to track the green finger only in the webcam image. (1 points)

Step 3: Press key 's' to start/stop the drawing mode. Under the drawing mode, the user can move his/her finger in front of webcam, and draw the line sketch with the color of the finger cap on top of the webcam image. (2 points)

When the user stops the drawing mode, and presses 's' to start again, a new line sketch will be created. (3 points)

[Demo Video](#)

Question 3: Optical-Flow-based Face Tracking (6 Points)

Please write a program using OpenFrameworks, to get the real-time images from the webcam, and detect and track the keypoints within the face area using the method of optical flow.

Detect the face/head movement, and display the messages accordingly as below:

- When the user shakes his/her head left and right, show the text "Shaking"
- When the user nods his/her head up and down, show the text "Nodding"
- When the user doesn't move his/her head, show the text "Still"

Add a key-press interaction to your program, so that the program calculates the keypoints and starts tracking only when you press the key 'r'.

Tip: you can use the function `ofDrawBitmapString(String s, float x, float y)` to show the text. For example, `ofDrawBitmapString("hello world", 100, 100)`.

[Demo Video](#)

For submission, please submit your code and a screen-captured video demo

Grading Breakdown:

- Perform the tracking only within the face area (3 points)
- Face/head movement detection, and show correspondent texts (3 points)

Submission Method:

Please write a report, stating your name and student No., to explain briefly your solution for each question, and zip it with your code and demo video, and submit the zip file to the canvas.