

Exercise 07 for MA-INF 2201 Computer Vision WS22/23
08.12.2022
Submission on 16.12.2022

Notice. You are only allowed to use *OpenCV*, *Numpy*, and *matplotlib* libraries.

1 Iterative Closest Points

The goal of this task is to estimate the template model. Using the given image *hand.jpg* and set of landmark points *hand_landmarks.txt*:

- Estimate the transformation Ψ
- Visualize the transformed landmark points using the estimated transformation Ψ

(10 Points)

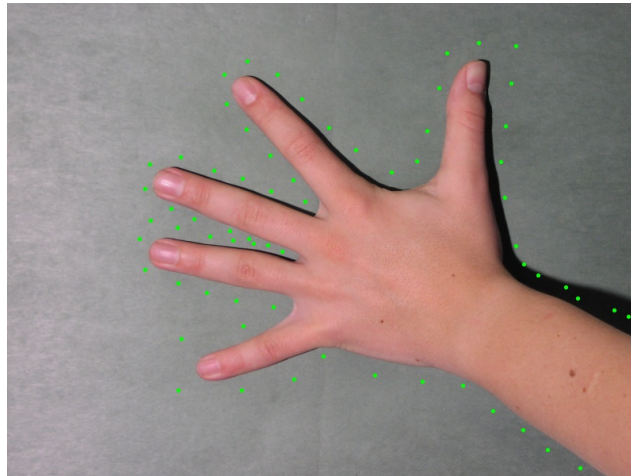


Figure 1: Visualization of the given landmark points on the image

2 Extended Kalman Filtering

You need to implement the Extended Kalman Filtering algorithm. You observe a set of 2D noisy observations (x_i, y_i) which are the coordinates of the 2D space as shown in Figure 2.

The data are the same as page 61-62 in the slide. You should write code for performing the Extended Kalman filtering. At the end visualize the filtered output.

(5 Points)

3 Unscented Kalman filter

You need to implement the Unscented Kalman Filtering algorithm with the above definition and data. At the end visualize the filtered output. (5 Points)

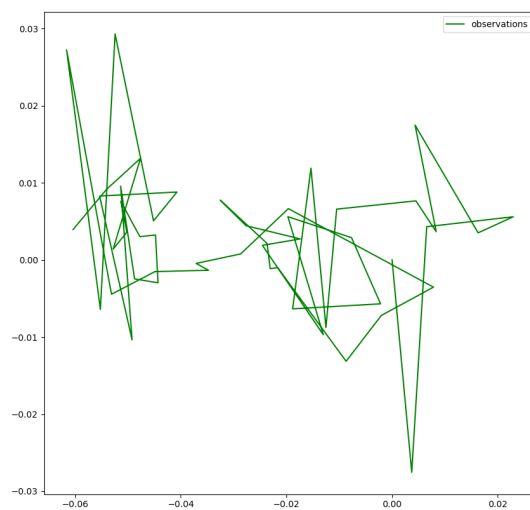


Figure 2: Observations.