

## Exercise 04: Palm Print Identification

### *Short notice*

For this exercise your task will be very similar to what students often have to do during their Bachelor/Master/PhD thesis: program a method presented in a research paper. This is a task typically quite complicated because papers are limited in size (often 6-8 pages only!), and thus methods are only summarized. This paper is longer, and thus provides details which will be extremely helpful to solve this exercise. Its length is therefore not a difficulty, but a great help ;-)

### *Shorter notice*

Read the whole exercise sheet before starting, especially the important hints on page 2.

### Exercise 1 Implement a Palm Print Identification System

In this task, you are supposed to implement a palm print identification tool according to the paper of Li et al [1], provided on StudOn. It mainly consists of three major steps:

- (a) The first step is the pre-processing step (Chapter 2).
- (b) The second step is the feature extraction (Chapter 3).
- (c) The third step is the feature matching and identification of the palm print (Chapter 4).

Three palm print images are provided, but, you are allowed (and even encouraged) to enlarge this database by your own palm prints<sup>1</sup>.

For making your task a little easier, a code skeleton is provided consisting of the four following Python modules:

- 'Main.py': Main module to call the sub-methods and visualize the results (DO NOT MODIFY IT!).
- 'PalmprintAlignment.py': Module pre-processing the original image and returning it (See Chapter 2).
- 'FourierTransform.py': Module calculating the Fourier Transform of the pre-processed image. (See Ch. 3).
- 'DistanceMeasure.py': Module calculating the final energies (See Ch. 4).

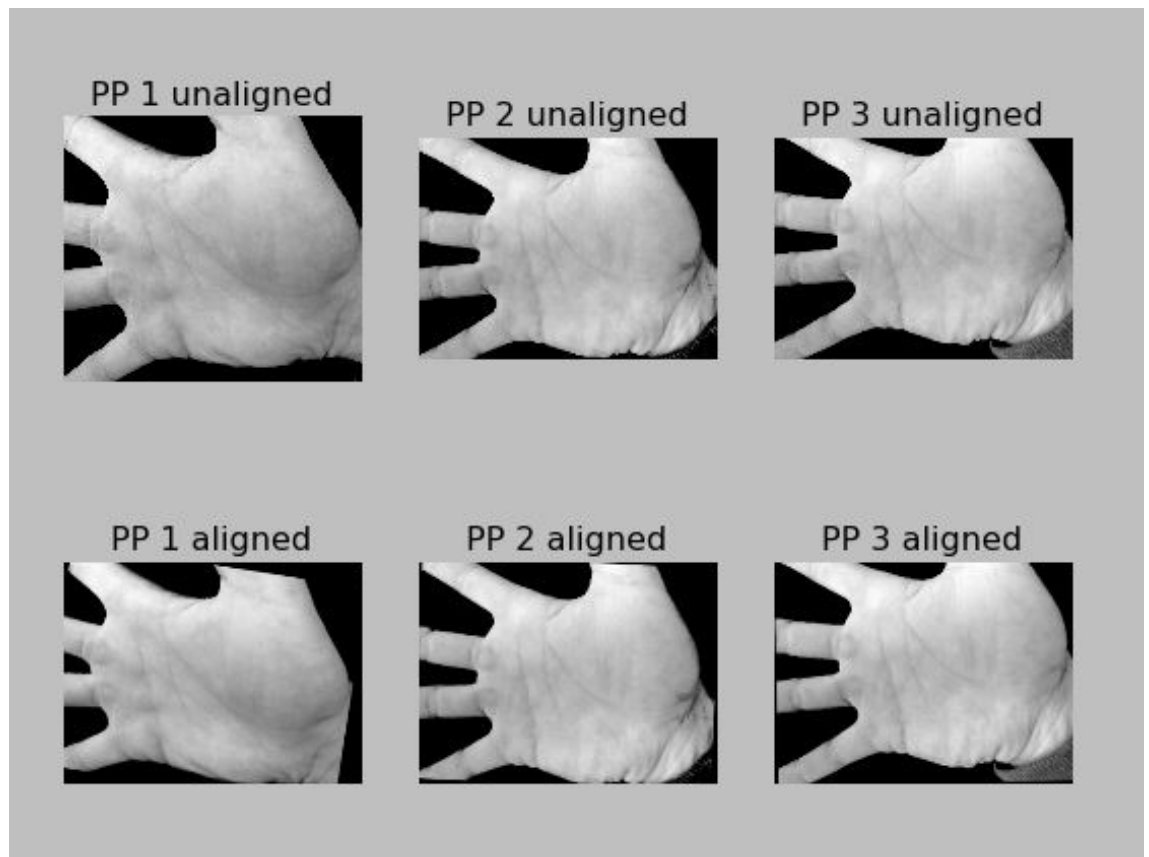
---

<sup>1</sup>This might make the exercise even more interesting for you. Make sure the photos look much like the provided ones, and have the same resolution. Please do not share them publicly (i.e., on the forum).

**Important Hint 1:** In Chapter 2 – Page 5/6 – it is mentioned to crop the image to an subimage with a fixed size. You are not supposed to do so! We can also work on the complete image! However, if you want to crop the image, you can, but this will not be evaluated during your submission.

**Important Hint 2:** You must not modify Main.py, so if you want to try some variations of it, copy it to a new file and modify this new file.

**Important Hint 3:** Here's how the aligned palm print images should look like:



---

[1] Li, Wenxin, David Zhang, and Zhuoqun Xu. "Palmprint identification by Fourier transform." International Journal of Pattern Recognition and Artificial Intelligence 16.04 (2002): 417-432.