

Image Analysis, Handin 4

These are distributed during the lecture 4 October, 2013 and has to be finished by 11 October, 2013. Written solutions are handed in either (i) at the lectures or (ii) to the box entitled 'inlämningsuppgift bildanalys' in the corridor on the third floor of the math building.

Note: Write your solutions neatly and explain your calculations. All exercises should be done *individually*.

1. Line fit

On the course homepage there is a link to the file `linjepunkter.mat`. Download this file and load it into matlab. Write two matlab routines. One for fitting a line to the points according to the least squares approach and one for minimising the squared distance to the line (the so called total least squares method, see lecture notes). What is the difference between the two methods. How big difference is there in the result?

2. Classification

Use your matlab functions from handins 1 and 2 to generate a set of training data

$$T = \{(x_1, y_1), \dots, (x_n, y_n)\}.$$

possibly represented as the matrices

$$X = (x_1 \ \cdots \ x_n)$$

and

$$Y = (y_1 \ \cdots \ y_n).$$

Choose your favorite classification method (e.g. Bayes, Nearest Neighbour, or Support vector machine) and implement a routine for training

```
function [class_data] = class_train(X,Y);
```

and a routine for classification

```
function y = classify(x,class_data)
```

How well does this work?

In the written solution to the segmentation problem, supply both code (e.g. matlab code) and a printout the results of using your algorithm, i.e. supply examples of input data (e.g. as images) and result after applying your classification algorithm (e.g. as a table).