

COS429 Homework 4

Due: 11:59pm, Tuesday, November 6, 2007

This Matlab programming assignment is concerned with the estimation of the fundamental matrix from point correspondences (weak calibration). Implement both the linear least-squares version of the eight-point algorithm and its normalized version as proposed by Hartley. In both cases, after the least-squares estimation of F , enforce the rank-two constraint for the fundamental matrix via singular value decomposition, as explained at the top of page 221 of the book.

The data for this assignment can be found in the directories:

<http://www.cs.princeton.edu/courses/archive/fall07/cos429/hw/hw4data/data1>

and

<http://www.cs.princeton.edu/courses/archive/fall07/cos429/hw/hw4data/data2>

corresponding to two datasets. For each dataset, you will find in the corresponding directory the files

pt_2d_1.txt

pt_2d_2.txt

image1.pgm

image2.pgm

The first two of these files contain matching image points (in the following format: number n of points followed by n pairs of floating-point coordinates). The two remaining files are the pgm versions of the images where the points were found.

Submission.

Please submit the following items to moodle (<http://moodle.cs.princeton.edu>) :

1. Your code and (if necessary) instructions to run your code.
2. For both methods and both datasets, the average distance between the points and the corresponding epipolar lines for each image, as well as a drawing similar to Figure 10.4 in the book showing the epipolar lines and the feature points for each image pair.