

Computer Vision, fall 2020

Exercise 5, return latest on Sunday 11.10.2020 at 23.59 via Moodle

Ex 5.1. Camera matrix

Using the calibration file Calib_Results.m, and equations given in Lecture 7, slide 20 (Forsyth, Ponce p. 18) form the camera matrix P and compute image coordinates (x,y) for an object point X $(0, 0, 1, 1)$ when the origin of the world coordinate frame is

- exactly 3 meters away from the camera center, i.e. $t = (0, 0, 3)$, and the camera is completely aligned with the world coordinate axis
- exactly 5 meters away from the camera center, i.e. $t = (0, 0, 5)$, and the camera is completely aligned with the world coordinate axis
- $t = (0.5, 1, 3)$ and the camera otherwise aligned with the world coordinate axis but it has only turned 20 degrees to the left
- $t = (15, 1, 3)$ and the camera otherwise aligned with the world coordinate axis but it has only turned 20 degrees to the left

Discuss the phenomena behind the results.

Ex 5.2 Fundamental matrix

Compute the fundamental matrix F for the images image1.jpg and image2.jpg using the normalized 8-point algorithm. You may use Matlab's functions for detecting and matching the features, but develop the algorithm for deriving matrix F by yourself. Where are the epipoles for both images? Report both F and the two epipoles.

Ex 5.3 Reading the publication allocated to your group

Group divisions for the Lecture 14 group work and the corresponding publications are given in Moodle at "Exercise 6" area. Read the paper allocated to you. Find 3 terms or principles from the paper that have been discussed during the course and explain what they mean.

It is a good idea to start working with your group already now. The goal is to prepare a presentation for the lecture 14 (attending the lecture is mandatory to pass the course as was communicated during the first lecture). You may divide the task how you wish, either all group members will be talking or you may select one representative. All forms for presenting are welcome. The only limit is the timing 10 minutes for presenting and 5 minutes for questions. Last exercise section is also reserved for the group work.