CS 485/685 – Computer Vision

Programming Assignment 4

(Due May 5)

1. (100 pts) Camera Calibration

   Test and evaluate the camera calibration procedure, by using the OpenCV function `calibrateCamera` to compute the intrinsic and extrinsic camera parameters. Data for your experiments and instructions on using it are available from the class webpage.

   Accuracy test: To evaluate the calibration method, perform the following experiment. Project all world points used for calibration to the image plane by computing the pixel coordinates (r, c) of each world point, by using the estimated projection matrix. Then, compute the error between the computed image points (r, c) and the observed image points (r_o, c_o):

   $$Error = \sqrt{(r - r_o)^2 + (c - c_o)^2}$$

   Note: The calibration procedure implemented in OpenCV uses a different method than the ones discussed in class. Since multiple images of a calibration pattern are used, the procedure estimates a separate set of extrinsic parameters for each image, but only one set of intrinsic parameters (as the same camera is used for all images).

   Submit the following:
   - (hardcopy) a report showing and discussing your results
   - (email) one ZIP file containing:
     - the source code files
     - a README file with instructions on how to compile and run the program