CS 485/685 – Computer Vision

Programming Assignment 4 - Instructions

The Data folder contains the following sets of files:

- capXX.bmp

These are the calibration images: 15 pictures of the same chessboard taken with the same camera at different angles.

- pixelXX.txt

These text files contain the pixel coordinates of each of the 96 corners of the chessboard that should be used to calibrate the camera. The file pixel12.txt corresponds to the image cap12.bmp.

As there are 96 points per image, each of the pixelXX.txt files contains 96 2D pixel coordinates, so there are 192 double numbers in the text file. The first number is the x coordinate of the first point, the second number is the y coordinate of the first point, the third number is the x coordinate of the second number, etc.

- worldXX.txt

These text files contain the world coordinates of each of the 96 corners of the chessboard that should be used to calibrate the camera. The file world12.txt corresponds to the image cap12.bmp.

There is no restriction on how we choose the world coordinate system, so in order to make things easier, we chose it with its origin at one of the corners of the chessboard, with the X and Y axis parallel to the edges of the board and the Z axis perpendicular to the chessboard plane. Therefore, all points will have the coordinate Z = 0 and this Z coordinate is not given in the file. That is why we again have 192 points in each of the worldXX.txt files. More importantly, the points will be ordered as in the correspondent pixelXX.txt (for example, the pixel coordinates of the projection of the seventh point in world12.txt correspond to the coordinates of the seventh point in pixel12.txt.

Although the Z coordinate is 0 for all the points of the chessboard in the world coordinate system, the function cvCalibrateCamera2 still expects them as 3D points. This is resolved by using the X and Y coordinates from the file and setting Z = 0.