ECE 661 Homework 2

Due: 09/18/2008 Thursday (before the class)

The goal of this homework is to do image rectification that removes projective and affine distortions using methods that are different from the Homework1 approach. As will be discussed in class, there are two methods for carrying out this rectification. To explain briefly, one is a two-step approach in which first the projective and subsequently the affine distortions are removed using two pairs of physically orthogonal lines. Another is a one-step approach in which the affine and the projective distortions are determined by specifying the dual conic C_∞^* using five pairs of physically orthogonal lines. Figure 2.18 (a) in the text shows an example image in which five pairs of physically orthogonal lines have been highlighted.

The homework requires you to rectify an image of a planar scene by removing projective and affine distortions using both methods mentioned above. You must also compare the results of the two methods and discuss their merits. The homework solution that you submit must show the 'before' and 'after' images as well as your code along with comments. Try your best to solve the problem in C. Feel free to look at the solution of the two-step approach posted at 'cobweb.ecn.purdue.edu/~kak/courses-i-teach/ECE661/index.html', but the code you turn in must be your own.

For removing the projective and the affine distortions, what the program needs to know from you are physically orthogonal lines. Your solution should show which lines you used by highlighting them in the input images.

Show your results on at least four images taken with your own camera. You should photograph planar scene in ways that enhance the projective and the affine distortions.

Notes.

- Clearly identify the steps you have taken to solve the problem with your own words.

- Your grade depends on the completeness and clarity of your work as well as the result.