CS6550 Computer Vision
Homework #3
Due: 11:59pm, 12/05/2011

1. (a) Write a program to compute the projection matrix from a given set of 2D-3D point correspondences by using the least-squares (eigenvector) method. The 2D-3D correspondence data is available from the course homepage**.**

    (b) Decompose the computed projection matrix from (a) into the camera calibration matrix, rotation matrix and translation vector to obtain the camera intrinsic parameters (calibration matrix K) and extrinsic parameters (rotation matrix R and translation vector t) by using the QR decomposition(use the function qr in matlab).

    (c) Compute the average point re-projection error by using (i) the computed projection matrix, and (ii) the calibration matrix, rotation matrix and translation vector. Discuss your results.

2. Compute the 3X3 homography matrix to rectify the following image of an HTC phone. The rectification is to make the new image plane parallel to the wall as best as possible. You can select the four corner points by computing the intersections of the four boundary straight lines and the target corner locations to compute the homograph matrix. Show the four correspondence point pairs, the estimated homograph, and the rectified image.