

## CSE252B – Computer Vision II – Assignment #4

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<http://cseweb.ucsd.edu/classes/wi12/cse252B-a>

Target Due Date: Monday, March 5, 2012.

1. Use normalized cross correlation (`normxcorr2.m`) to find correspondences in `desk1.gif` for five selected points in `desk0.gif`. Do some experimenting to choose an appropriate window size. For each point in the first image, indicate the top three best matches in the second image using different pointmarkers and/or the digits {1, 2, 3}. Choose your pointmarkers and image size so that the results are easy to see in your printout.
2. MaSKS Exercise 4.6 (Eigenvalues of the sum of outer products), p. 98.
3. Modify the derivation of the Förstner corner detector to solve for the least-squares subpixel centers of circular features.
4. Interest point detection.
  - (a) Implement MaSKS Algorithm 4.2 (Corner detector), p. 91.
  - (b) Demonstrate your code on `house.bmp`. Include in your writeup a zoomed-in figure detailing the results in a selected interesting neighborhood.
5. RANSAC for Homography Estimation.
  - (a) Devise and implement a RANSAC-based method for automatically estimating the homography  $H$  between two images.
  - (b) Apply your algorithm to the image pair `desk{0,1}.gif`, which was acquired by a camera rotating about its optical center.
  - (c) Display the initial set of putative correspondences, the inliers, and the outliers consistent with the estimated  $H$ .
  - (d) Use the estimated  $H$  to create a mosaic out of the two images.