

**Computer Vision  
CSE 252A, Winter 2005**

**Assignment 3  
Corner Detection**

(Due date: 2/24/2005)

In this assignment, you will implement a corner detector as described in class, and briefly outlined in Section 8.3.3 of the text. Your detector will first filter the input image with a 2-D Gaussian of width  $\sigma$ , and then detect the corner using the Eigenvalues of the sum over a window of the outer product of the gradients.

Part 1: Filter the image with a 2-D Gaussian. For this step, you should implement 2-D Gaussian filtering using the fact that a Gaussian is separable, and therefore perform filtering using 1-D Gaussians. That is, you can use the Matlab function *conv* but not *conv2*. You cannot use built in routines for smoothing. Your code must create your own Gaussian Kernel by sampling a Gaussian function. The width of the kernel got out to  $\pm 3\sigma$ . The is, if  $\sigma=2$ pixels, then the kernel should be 13 pixels wide.

Part 2: Compute the Gradient of the smoothed image.

Part 3: Detect the corners. Select two “reasonable” values for the threshold, and use these values for all test images.

**What to Hand in**

1. Print out of your code.
2. For each input image:
  - a. Show the result of filtering the image with  $\sigma=1$ pixel,  $\sigma=2$ pixels,  $\sigma=4$ pixels.
  - b. For each  $\sigma$ , show the two components of the gradient
  - c. For each  $\sigma$ , show the detected corners for the two values of the threshold. Use the same threshold for each input image.

For input images, use the two images on the web page as well as an image of person’s face (you can use anybody. Yourself?)