

CS6550 Computer Vision
Homework # 1: Feature Extraction
Due: 6pm, 10/14/2011

- I. (50%) Perform the following steps sequentially to the two images below for edge and straight line detection. Write each of the following steps as a separate function and show the step-by-step results.
- A. Perform the Gaussian smoothing of different scales ($\sigma=1, 3$)
 - B. Apply the Sobel operators to the above Gaussian smoothed images
 - C. Compute the gradient magnitude images from the previous steps
 - D. Perform non-maximal suppression with appropriate gradient thresholding for edge detection



- II. (50%) Detect the corners of the above two images by using the Harris corner detector. Perform the following step-by-step procedure:
- A. From your results in problem I.B, i.e. Sobel gradient images, compute the Harris matrices A of two different scales. Show the images of the smaller eigenvalue for the two scales, respectively.
 - B. Compute the corner response function R at all pixels and show the results for the two scales.
 - C. Perform non-maximal suppression with appropriate thresholding for corner detection
 - D. Apply the above two variants of Harris corner detection to the rotated and zoomed versions of the two images.
 - E. Try to compare the consistency of the detected corners on these two pairs of images.