Classical Image Processing – Hands On 3

Lectures 3 +4:

Task 1: The Bilateral Filter

Write a function that gets as input: an image, and the size, spatial variance and gray scale variance of a bilateral filter. At each pixel the bilateral filter coefficients will be calculated and convolved with the region of interest. The output would be the image after bilateral filtering.

Run the program with several different values of the input parameters.

Try to see how this works for extreme cases: no filtering in the spatial domain and no filtering in the gray scale domain.

Task 2: Edge Detection

Write functions that perform edge detection of an image:

Sobel Filter – show the derivative images in X and Y directions, as well as an image of the gradients and an image of the direction of the gradients

Laplacian – show the zero crossings of the Laplacian

Laplacian of Gaussian

Gaussian Derivative

Task 3: Play around with Hough

In this task I am not asking you to write the Hough Transform. It is too much work.

But, please take a ready to use function of Hough and play around with it on some images that contain lines.

Task 4: Otsu Method

Write a function that implements the Otsu method. Use it to find the threshold value for images that you want to segment.