

Computer Vision
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Robotics Engineering *Master Degree*

Lab Session n. 3

Edge detection and Hough Transform

The following items are the steps that you have to do in this lab session:

1. Write a MATLAB function that implements the Laplacian of Gaussian Operator:
 - sample and display the Laplacian of Gaussian filter with different spatial supports and standard deviations (e.g. $sd=1$ and $sd=3.5$).
 - Convolve the test image *boccadasse.jpg* with the previous LoG filters and display the results.
 - Test the edge detection algorithm based on LoG with the image *boccadasse.jpg* by varying the standard deviation of the kernel and the threshold (e.g. 0 and a significant value).
 - First, to detect zerocrossings and display it. To detect zerocrossings:
 - scan along each row, record an edge point at the location of the zerocrossing;
 - then, do the same for each column.
 - Then to apply a threshold on the slope of the zerocrossings and to display it.
 - Compare your results with the ones obtained by using the MATLAB function *edge('log',...)*.
2. Detect straight lines in the test images (*highway1.jpg* and *highway2.jpg*). Suggestions: (i) you can use and modify the M-file we used during the lecture; (ii) for *highway1.jpg* to set 4 peaks in *houghpeaks()*; for *highway2.jpg* to set 5 peaks and 'NHoodSize', [21 21] in *houghpeaks()*.