

Exercices (2nd Day)

(The Hough Transformation)

Exercise 1: Open the images “Day2/geom.png” and “Day2/geomNoise.png” and apply the following edge filters to them:

- Sobel
- Laplacian of Gaussian
- Canny

Now apply Gaussian smoothing to the image “Day2/geomNoise.png”. Look at the edge images again. What is the result of the smoothing? Which edge filter does perform best?

useful functions:

`edge, fspecial, imfilter`

Exercise 2: Write a MATLAB-function (m-File) that implements the Hough-Transformation for rectilinearly bounded objects. Take care to use reasonable value boundaries for your Hough parameter space. Visualize the parameter space for the image “Day2/geom.png”. Try different quantizations of the parameter space and observe the effects.

Now, apply the same steps as before to the image “Day2/geomNoise.png”. Does the parameter space representation change significantly? What conclusions can you draw for the properties of the Hough transformation?

useful functions:

`mat2grey, find`

Exercise 3: (optional) Implement the inverse Hough Transformation. Select appropriate parameters for the transformations from Exercise 2 and extract a reasonable number of maxima from the parameter spaces. Plot the resulting lines in the original images. Observe how the positions of the lines change in the second (noisy) image.

Finally, examine the image “Day2/Udo.png” and draw in the Hough lines.