Medical Image Analysis Exercises: Session 05

http://physics.medma.uni-heidelberg.de/cms/

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12: edge detection and orientation

input: `rice.png` from MATLAB

a: Sobel filter (using `imfilter()`, and NOT using `edge()`)

- write the Sobel filter kernels to approximate the gradient in x- and y- direction
- use the kernels to filter the image
- derive the approximated gradient magnitude and approximated gradient orientation in degrees from the filtered images

b: display

- display 3 axes in one figure, including the original image and 2 different output images
- display 4 axes in one figure, including the image of approximated gradient magnitude, the image of approximated gradient orientation in degrees and their histograms

21: denoising with the median filter

input: `eight.tif` from MATLAB

a: add noises

- add Gaussian noise with 2 different variances separately
- add salt-and-pepper noise with 2 different levels separately
- in total 4 different noisy images should be displayed

b: smoothing by the median filter with different options

- with 2 different sizes of the neighborhood
- with 2 different boundary options

c: compare the results

- display the results in 4 different figures, one figure for one noisy image
- display 6 axes in each figure, including the original image, the noisy image and 4 different outputs of the median filter