Computer Vision, fall 2019

Exercise 2, 18.9.2019

Ex 2.1 Filtering.

- Implement a box filter and filter image *brick_wall.tiff* with it. How does the change in the box size affect the result?
- Implement a Gaussian filter and filter image *brick_wall.tiff* with it. How does the change of std affect? Try few different values.
- Search edges from all filtered images using Matlab's Canny edge detector. Which filter provides the best result? Why?

Ex 2.2 Detect and match features

- Detect SURF features and their descriptors from the two images *GOPR1515 03850* and *GOPR1515 03852*, you may use the Matlab function for this.
- Match the features from the two images by implementing the matching algorithm by yourself (you are allowed to use Matlab's matching method only to verify your result). How good is the result? How could you improve it?

Ex 2.3 Fourier Transform

The image *son3.gif* is showing a piece of text. Before using e.g. deep learning for recognizing written text, we must make sure the image is correctly oriented. Following the explanations found from https://homepages.inf.ed.ac.uk/rbf/HIPR2/fourier.htm, perform a Discrete Fourier Transform for the image using the following steps:

1) Perform Fourier transform. You might want to develop the fast Fourier Transform to speed your processing up
2) Form two representations of the result: a) logarithm of the magnitude and b) thresholded magnitude. You will find instructions for thresholding from Matlab's Fourier Transform help page.
3) Rotate the image four times 30 degrees each and compute 1 and 2 again for each and see how the Fourier transform (FT) images change. Discuss how you could here see the orientation of the text and why do you see all this using FT.