

# Computer Vision

## Exercise Sheet 4

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May 3, 2017  
Submission until May 9, 14.00 via learnweb

### Exercise 1: Practice (12 points)

- a)
- Download from [http://www.cvlibs.net/datasets/kitti/raw\\_data.php](http://www.cvlibs.net/datasets/kitti/raw_data.php) the smallest dataset 2011\_09\_26\_drive\_0048, [synced+rectified data].
  - What data are you provided with? What are the data used to localization and mapping? Which one instead are used to verify the goodness of your approach? (4 points)
  - Install the python version of openCV
  - Implement a method that reads and stores the images in sequence; give them back in a sort of video. Images collected at the same time showed at the same time.  
How can you extract the value of one pixel? Print a pixel value. How can you modify its value? (4 points)
  - Using openCV applies to one colored image of the dataset: (4 points)
    - Shifting it in  $(x = 50, y = 50)$
    - Rotating it by 180 degrees anticlockwise.
    - Scaling the image by half and rotating it by 90 degrees clockwiseShow the original and resulting images at the same time.

Deliver your code without data in a zip file together with your answers to the questions, clearly indicating in which folder to put the data and which file to execute.

### Exercise 2: Theory (8 points)

- a) What means rectification? What is its purpose? Why is it important for stereo vision and mapping? (4 points)
- b) Halve the dimensions of the following curve indicating the correct project transformation:

$$x^T \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix} x.$$

Which is the curve shape?

(4 points)