

Exercise Sheet Computer Vision 4

Submission: 27.05.14

(30 Points)

Exercise 1 Theory (8 Points)

a) Given the line's Pluecker matrix $L = \begin{bmatrix} 0 & 5 & 6 & 7 \\ -5 & 0 & 1 & 2 \\ -6 & -1 & 0 & 3 \\ -7 & -2 & -3 & 0 \end{bmatrix}$, compute the:

- intersection point x of the line L and the generic plane π .
- plane defined by the line and the generic point x .

(5 Points)

b) What is the Direct Linear Transformation Algorithm? What are its 4 most important tasks? (3 Points)

Exercise 2 Practice (22 Points)

a) "RGB" is a color space commonly used to define colors in images, briefly describe it. Given one colored image of the KITTI dataset load it and store it in the Open CV "Mat" class. How can you extract the value of one pixel? Find the corresponding method and interpret its output. Split the image into its 3 R,G,B channels plotting them. How do they look like with respect to the original image? Are these images colored or in greyscale? What are the differences among them? Why? How can you remove one channel from the original image? (12 Points)

b) Using open CV and the dataset previously downloaded apply to the gray scale left image the functions Canny (low threshold 100, high threshold 200) and Sobel ($dx = 2, dy = 2$). Show the original and resulting images at the same time (as you did for the previous exercise sheet). What information extract the functions? Just looking at the images which function works better? Motivate your answer. Can you hypothesize why?(Hints: Use the Mat class to store the matrices) (10 Points)