

Computer Vision

Exercise Sheet 5

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Exercise 1: Practice (14 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. Split the image into its 3 R, G, B channels and plot them. How do they look like with respect to the original image? Are these images colored or in grayscale? What are the differences among them? Why? How can you remove one channel from the original image? (7 points)
- b) Using the dataset previously downloaded and openCV apply to the gray scale left image the functions: Canny (low threshold 100, high threshold 200), Sobel ($dx = 2, dy = 2$) and Laplacian. Show the original and resulting images at the same time. What information do the functions extract? Just looking at the images which function works better? Motivate your answer. (7 points)

Exercise 2: Theory (6 points)

- a) Given the line's Plücker 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 .

(4 points)

- b) Given the following points:

$$x_1 = \begin{pmatrix} 1 \\ 2 \\ 3 \\ 4 \end{pmatrix} \quad x_2 = \begin{pmatrix} 4 \\ 3 \\ 2 \\ 1 \end{pmatrix}$$

Compute the Plücker matrix

(2 points)