DRAFT - 6. Assignment, Introduction to Robotics WS17/18 - Ver. 0.99

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Submission: online until Tuesday, 05 Dec 2017, 11:55 a.m.

Please summarize your results (images and descriptions) in a pdf-document and name it, e.g., "RO-06-<surnames of the students - group name>.pdf".
Submit your python code
Only one member of the group must submit the necessary files.
Do not copy solutions to other groups.
Every group must contain two people, unless granted differently.
Only submissions via KVV will be accepted.

1. Setting up the field

Use white tape to draw a straight lane on the carpet with the distances as shown in Fig. 1, L is the width of the carpet.
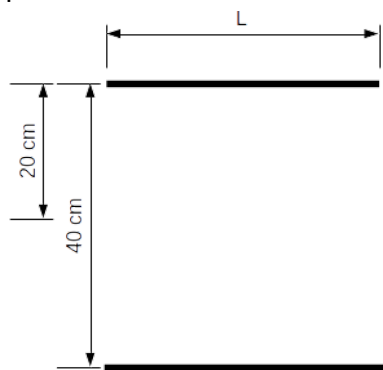

Fig. 1 Lane.

2. Lane segmentation (6 Points)
Place the car in the middle, use three different color spaces to extract lines on the road, publish the images to ROS and paste them into your Pdf. **(1.5 points each)**
You can use the `cv2.inRange` and `cv2.bitwise_and` function to find the colors of interest on the image:
(http://docs.opencv.org/3.0-beta/doc/py_tutorials/py_imgproc/py_colorspaces/py_colorspaces.html)
Or you can refer to the code:
https://github.com/richrdcm/catkin_ws_user/tree/master/src/py_image_processing
Which color space works better to segmentate the image and why? **(1.5 Points)**
Submit your python code, too.

3. Getting the line equation (4 Points)
Use RANSAC or other technique to estimate a linear model (y = mx+b) on the image and obtain the two equations of the lines on the road.

Use `cv2.line()` to plot the lines in the original image, publish the resulting image and the (m,b) parameters of each one and paste them into your Pdf to submit. Submit your python code, too.