

Report of Laboratory 4 (Computer Vision)

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The following report talks about Hough transform and Edge detection.

To avoid some problems with the path of the images to be tested, the program requires them as input from the terminal

1) Canny Edge Detector

To achieve the required objective, the Canny Edge Detector was first applied to detect the edges of the road and the signal through two tracebars that change the value of the first threshold and second threshold for the hysteresis procedure.

Multiple tracebar was used to set the *ratio* and *FirstThreshold* values, it can be seen that the right values of these thresholds can be:

- *First threshold* = [131-133]
- *Second threshold* = *First threshold* * *ratio* (*ratio* = 5); in this way a ratio of lower:upper threshold of 1:5 was established.
- *Kernel size* for Sobel filter is fixed to 3

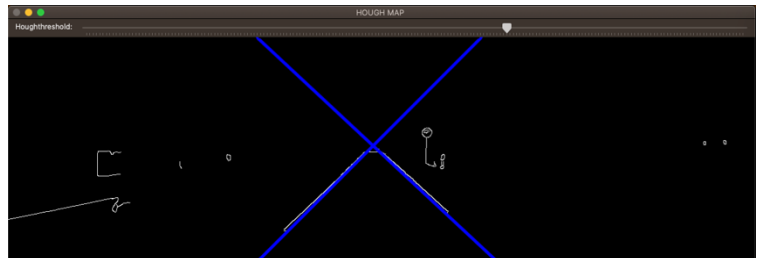


2) Hough Line Transform

With this edge detected image, to perform the Hough Line Transform a single tracebar was used to set the right value of the *threshold* variable, that is the minimum number of intersections to "detect" a line.

In this case the range of values that identified the lines of the road edges was [107- 129].

- *Threshold* value = 128

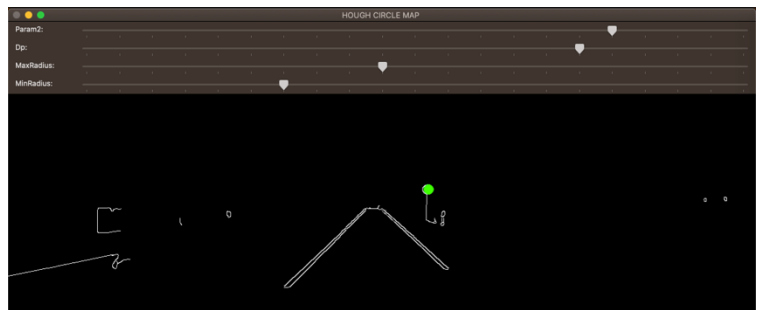


3) Hough Circle Transform

With the same edge detected image, the Hough Circle Transform was performed, in which a multiple tracebar was used to set the values of *dp* (The inverse ratio of resolution), *param2* (Threshold for center detection), *minRadius* (Minimum radius to be detected) and *maxRadius* (Maximum radius to be detected), while values of *min_dist* (Minimum distance between detected centers) e *param1* (Upper threshold for the internal Canny edge detector) were set at the number of lines of the image and 200, respectively.

You can see the parameters used to identify the road signal:

- *Dp*: 13
- *Param2*: 20
- *MinRadius*: 7
- *MaxRadius*: 9



Final Result

