

OpenCV lab 4

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Abstract

The aims of this laboratory was to become familiar with

- Canny edge detector.
- Hough transform and Hough circular transform.

1 Task 1

In the first task we had to apply Canny edge detector to Fig. 1 using trackbars to control the parameters.

In my solution I decided to use one trackbar for the threshold tuning and the other one for the kernel size (3×3 , 5×5 or 7×7). The output images are in Fig. 2.



Figure 1: Referred image

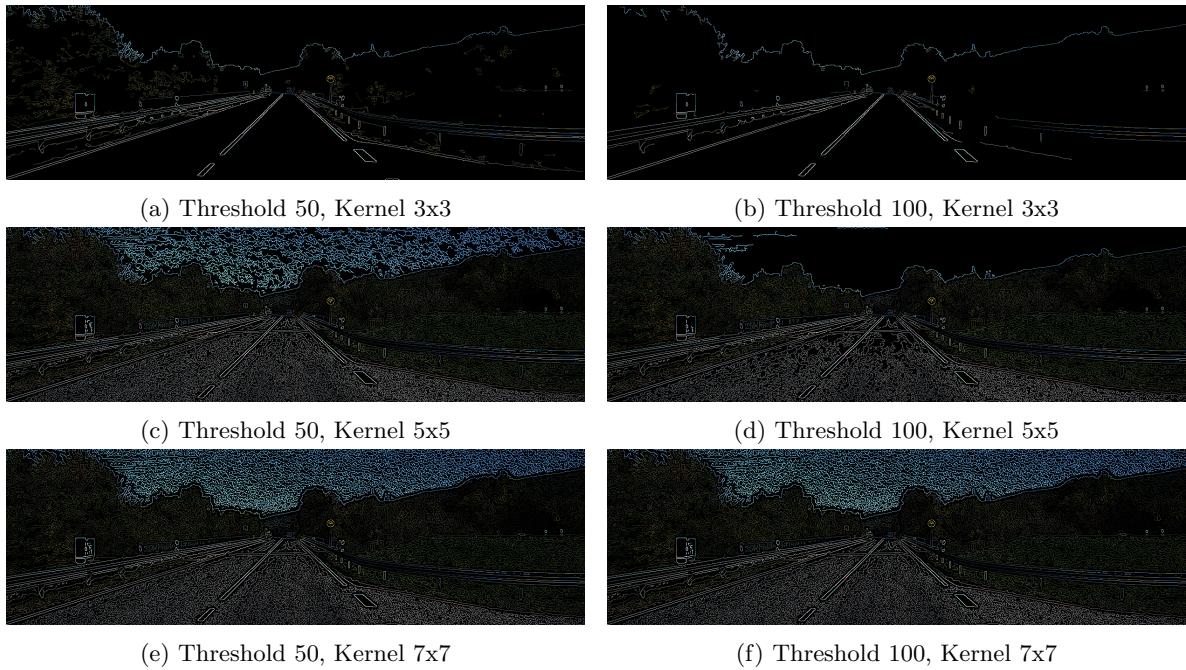


Figure 2: Canny edge detector images



Figure 3: Hough lines

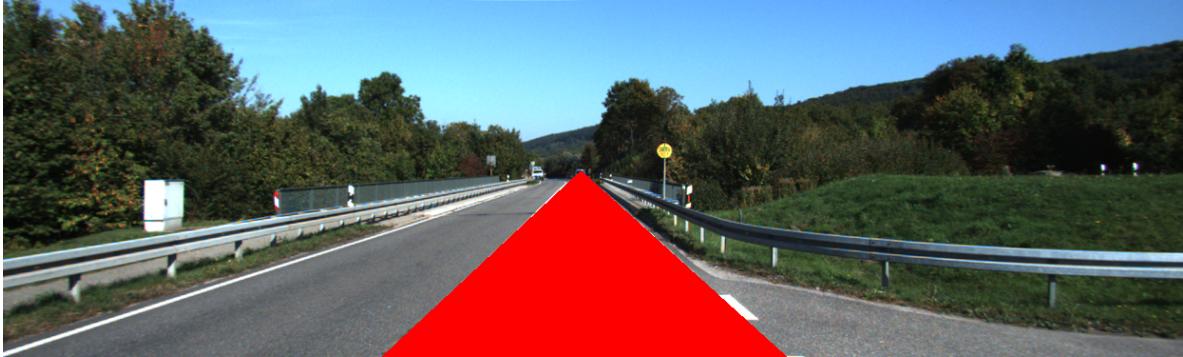


Figure 4: Street coloring

2 Task 2

To detect the white markings on the road I could implement a method like *task 4 of OpenCV lab 3*, so select the white marks and in output I'll have an image with pixels, inside given threshold, highlighted. This solution is not the optimal one because there will be noises.

Another solution could be combine the solution above with the Canny filter, and than select only the edges between certain angles.

3 Task 3

In the third task we had to detect white markings on Fig. 1 using the Hough transform. Tuning the parameters of the function was the trickiest part, since in during my experience I had two lines in the middle of the road with very tiny angle difference, so I had to filter the output lines. As filter I initially calculated the arctangent of the lines to determine the angles, then I select only the lines between -45° and 45° .

```
double angle = std::atan2((pt2.y-pt1.y), (pt2.x-pt1.x)) * 180 / CV_PI;
if(angle > -45 && angle < 45) {
    cv::line(cdst, pt1, pt2, cv::Scalar(0,0,255), 3, cv::LINE_AA);

    m[j] = (pt1.y-pt2.y)/(double)(pt1.x-pt2.x);
    q[j] = (pt1.x*pt2.y-pt2.x*pt1.y)/(double)(pt1.x-pt2.x);
    j++;
}
```

The output image is Fig. 3. The m and q arrays are used to save the coordinates of the lines and it are used for coloring the street, as in Fig. 4.



Figure 5: Road sign detector

4 Task 4

In the forth task we had to detect the road sign on Fig. 1 using the Hough circular transform.