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Project : Finding Lane Lines

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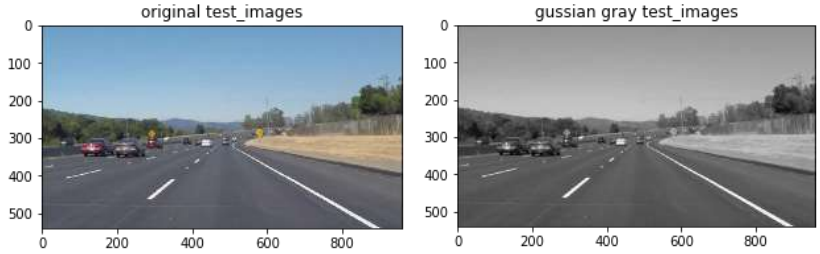
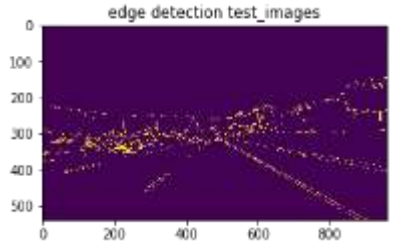
Course: Self Driving Car Engineer

1. Describe your pipeline. As part of the description, explain how you modified the draw_lines() function.

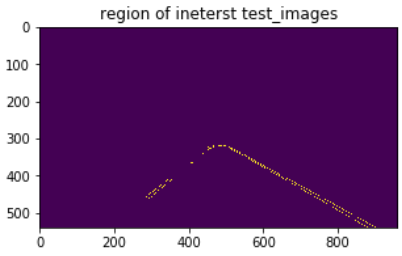
My pipeline consisted of 5 steps. First, I converted the images to grayscale, then I used Gaussian blur function for Gaussian smoothing. It can be seen in the figure below.



In the third step, I used Cany function with low and high threshold to detect the edges in the images.



The fourth step was, I defined a range for the vertices of the region of interest. It only keeps the region of the image defined by the polygon formed from vertices. The rest of the image is set to black. Now I have the edge of the lanes in the interest region.



In the fifth step, I applied the Hough transform function to run the Hough on the edge detected image. For this part I tuned the Hough transform parameters to give me the best result. So, in this final step, I detected the line segments in the image. The result would be in the image below:

In order to draw a single line on the left and right lanes, I modified the draw_lines() function by finding the slope and its intercept of the lines. Then I needed to define the left or right lanes based on them. So, I assumed if the slope of the lines are positive, the slope and its intercept of the lines are stored in the right lanes. Otherwise for the negative slopes, they will be stored in the left lanes. Now we can get the average of slop and intercept for each right and left lane by this formula.

m = sum(right_slope)/len(right_slope) #average of the right lane slope

b = sum(right_intercept)/len(right_intercept) # average of the right lane intercept

Now, we have the start and end point for Y and based on the gained m and b , we can calculate the start and end point of X by startX = (startY - b)/m. Now we can draw a single line on the left and right lanes.

2. Identify potential shortcomings with your current pipeline

One potential shortcoming would be the pipeline is not robust for different lighting. Another shortcoming could be when we have a signs and arrows in the road, it may cause a problem. The other problem is, when we have a double lane lines in a road.

3. Suggest possible improvements to your pipeline

A possible improvement would be to tune the parameters to detect the lane lines more accurate especially the curve lines.

Another potential improvement could be, instead of fitting a line, we can fit a nonlinear curves to the lanes.