Finding Lane lines on the road writeup

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Goal: Finding Lane lines on the Road

Reflection:

My pipeline first gray scale the image, then blur the image using Gaussian kernel with kernel size 5. Next, I applied canny detection with low threshold 20 and high threshold 180 to detect edges. Then I covered the image using a mask with vertices [[(0, imgshape[0]), (imgshape[1], imgshape[0]), (400,330), (580,330)]] to define the region of interest. At last, I adopted Hough lines to detect real lines in edges. After all this standard procedure introduced in lesson, I tried to make the segmented lines to a connected line using linear regression. In detail, I separate the lines to left part and right part. And apply linear regression toward these two sets of lines. And draw the fitted line onto the original image.

2 Identify potential shortcomings with my current pipeline

First and the major problem with this method is the terrible robustness. All parameter obtained above by manually tuning greatly correlated with the condition of the road at the moment when image is taken. That means the parameter might makes no sense if we are driving in a different road in different weather even with different car. But machine cannot tune the parameter along the way. That's also why I stop tuning the parameter when the performance seems ok, since it's not meaningful to derive a seemingly perfect pipeline but with little use of generalization.

Of course, there is still some room to improve within this framework since I didn't make use of the all information in image, like color or continuity of lane lines.

3. Suggest possible improvement of pipeline.

My proposal solution of lack of robustness is using some other machine learning algorithm like SVM or deep learning to first classify the condition of the road when reading a coming image and then plug in the corresponding pre-tuned parameter into the computer vision model to start physical detection. In this way, we can to some extent avoid the bias of manually tuning.

When creating mask window, we can actually making better use of the special property of road lane and create more complex mask window to avoid noise.

I don't have enough time to work on challenge problem, otherwise this more difficult scenario could generate more ideas of how to robustly improve the performance of detection.