Finding Lane Lines on the Road

Finding Lane Lines on the Road
The goals / steps of this project are the following:
• Make a pipeline that finds lane lines on the road
• Reflect on your work in a written report

Reflection
1. Description of the pipeline.

My pipeline contains 2 new functions (*draw_lanes* and *lane_detec*t) and a modified *draw_lines* funtions.

- Lane_detect : Applys th gray scale conversion, Gaussian_blur, edge_detection. Then applies region of interest. After the hough transform line generated by the function sent the modified line_detect to draw the lines. Than draw_lanes function to draw a lane boundry.
- Line_detect : the only change in the function to draw the detected lanes with a slope filter. This function is used to display the detected lines mainly for debugging purposes.
- Lane_detect: This function uses the detected line to draw lane boundaries for both right and left lanes.
  - For each line a slope is calculated depending on the slope polarity left and right candidate lines are separated.
  - For both left and right lines average slope is calculated along with the minimum y and maximum x for the left lane and maximum y and minimum x for the right lane.
  - Using the slope and calculated right and left a lane boundary is calculated.
- A second Lane_detect is coded to be able to cope with the challenge.mp4 which requires different ROI and threshold. Normally lane detect can be parametric for a better programming practice.
- To process the images and videos the code segments the project description is used. An additional debugging function is implemented to be able to see errors on the process frame by frame.

2. Potential shortcomings

- The problem with the pipeline is success mainly depends on the ROI and the thresholds. Most of the values are constants in real life this will not work.
- When extra lines come from hough transform algorithm is affected.

3. Possible improvement

- An automatic determination for the ROI could be implemented by detecting road surface.
- Instead of drawing lines from the line segments. A prediction according to the camera position can be done and can be updated with the data coming from each frame. Lines coming from the detection can be used as sensor readings and the error with the predicted lane minimised. Prediction can be done according to the frame rate and vehicle speed.