Finding Lane Lines on the Road

1. My pipeline consisted of 6 steps.

Step1: First, I converted the images to grayscale

Step2: Then I used Gaussian Blur with kernel size of 5 to blur the image.

Step3: In this step, I used Canny filter with low threshold of 75 and high threshold of 150 to get the edges.

Step4: Now I masked the image and got the image with region of interest. For ROI, I used four vertices. The vertices were calculated according to image size and almost in the center of image.

Step5: Then Hough Transform was applied to ROI image to get the lines with threshold of 60. In Hough lines routine the draw lines function was modified to extrapolate lines. In this the lines with slope between 25deg and 65 degree were isolated. Then slopes less than -0.1 and greater than 0.1 were separated. Now average of right hand slopes and intercepts were calculated. Similar calculation for left hand was done. The red lines of mean slope were drawn to overlay the image. The y coordinates were taken according to ROI co-ordinates and x co-ordinates were calculated.

Step6: The pipeline was first applied to test images provided. Then it was applied to test video. The successive frames were taken and pipeline was applied on each frame and the final frames were stored to form the output video.

2. Potential shortcomings with current pipeline

- The Pipeline assumes that car is always in middle of lanes. It could fail while changing lanes.
- Different light conditions or shadows could fail the pipeline.
- The tuning parameters of Hough transform are hard coded and difficult to tune for different conditions.

3. Suggest possible improvements to your pipeline

- Machine learning should be used for tuning various parameters.