LANE DETECTION PIPELINE WRITEUP

PIPELINE DESCRIPTION

My pipeline consisted mainly of 7 steps:-

1. Firstly I converted my input image to grayscale.
2. Then I used the Gaussian blurring technique to blur the image.
3. Then for detecting the edges of lane lines I used canny edge detection technique.
4. Now we do not need lines drawn on the whole image so I applied a mask to create a region of interest where the drawing of lines takes place.
5. Now using Hough transformation I converted the image from image space to Hough space (essentially converting from points detected in canny edge detection to lines in Hough space).
6. Then using the draw_lines function I connected the points on a BLANK IMAGE having same dimensions as our original image.
7. Finally I combined the image with lines drawn on it with the original image to give us the output image.

Modification of the draw_lines function:-

To create extrapolated lines in order to get solid and uniform lines.

I first separated the left lane from the right lane by calculating their slopes. Now since in images the origin lies at top left instead of the traditional bottom left, the right lane lines will have positive slopes and left lane lines will have negative slopes.

Now with both the lines separated we can find the best fit line for the group of points using the polyfit command. (By means of linear regression).

Once this is done we draw our extrapolated line on our image and get the required result.

SHORTCOMINGS

1. One of the shortcoming could be when different shades and lighting effect of the environment come into play.
2. Another mistake can happen when the road starts to take a tight turn.
3. Similar thing could happen when there is gradient in the road.
4. The lane lines should have a good contrast with the surrounding road region.

IMPROVEMENTS

1. Currently in our program we are using static thresholds, so a possible improvement can be using dynamic thresholds.
2. Similarly adaptive masking.
3. Adaptive transformations.
4. Use of quadratic function instead to liner functions to draw lane lines.