

Project: Finding Lane Lines on the Road

Akhil Waghmare

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Reflection

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

The pipeline follows the same steps as outlined in the module. We are given an input image. We convert the image to grayscale. Then, a Gaussian blur with kernel 5 is applied to blur out the image. Canny edge detection is then applied with thresholds 50 and 150.

A quadrilateral was used to describe the region of interest in the image. The Canny edges were limited to this region. From these, lines were extracted using the Hough transform.

The provided `draw_lines` function simply draws segments from the lines detected by the Hough transform. The method was re-implemented to provide one extrapolated line for each lane (left and right). To do this, the line segments were divided based on whether they belonged to the left or right lanes (based on slope). In this step, if the absolute value of the slopes was within a certain range of 0 (so close to horizontal), it was thrown out. Then, using the Polynomial module in numpy, a best fit line was calculated for each lane side. The resulting lines were drawn within the region of interest.

One additional feature was implemented. Sometimes, in the video feeds, I would notice that between frames there was a flicker when the lines changed greatly. To help ease this, I made the line parameters depend on both the previous frame and the current frame. This would ensure a more smooth tracking throughout the frames.

2. *Identify potential shortcomings with your current pipeline.*

The current region of interest used in the algorithm is very much dependent on the video/image being of a certain format (certain aspect ratio, certain angle, no car front bumper, etc). I also can imagine that when it is dark outside, the algorithm could run into some problems, or in contrast if the road is a much lighter color.

Both of these issues pop up in the challenge test video.

3. *Suggest possible improvements to your pipeline.*

One improvement would be to detect curved lane lines instead of just straight lines.

Another improvement would be to detect which kind of lane marking is present, e.g. solid vs dashed.