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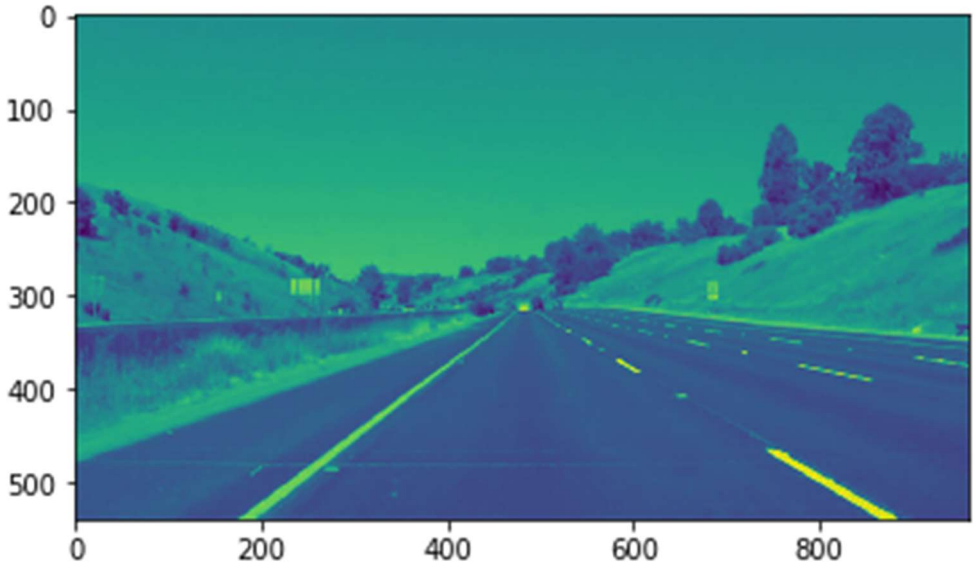
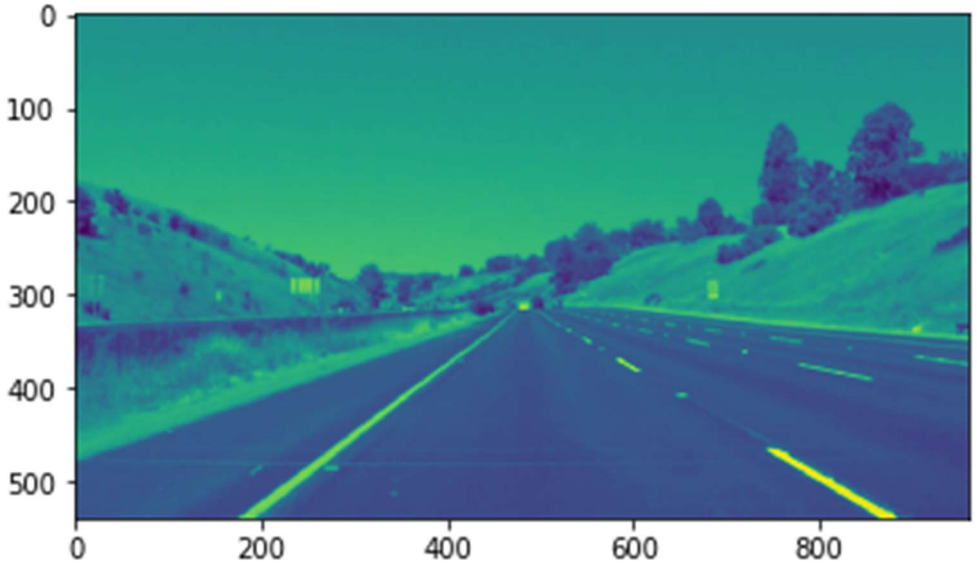
Finding Lane Lines on the Road

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

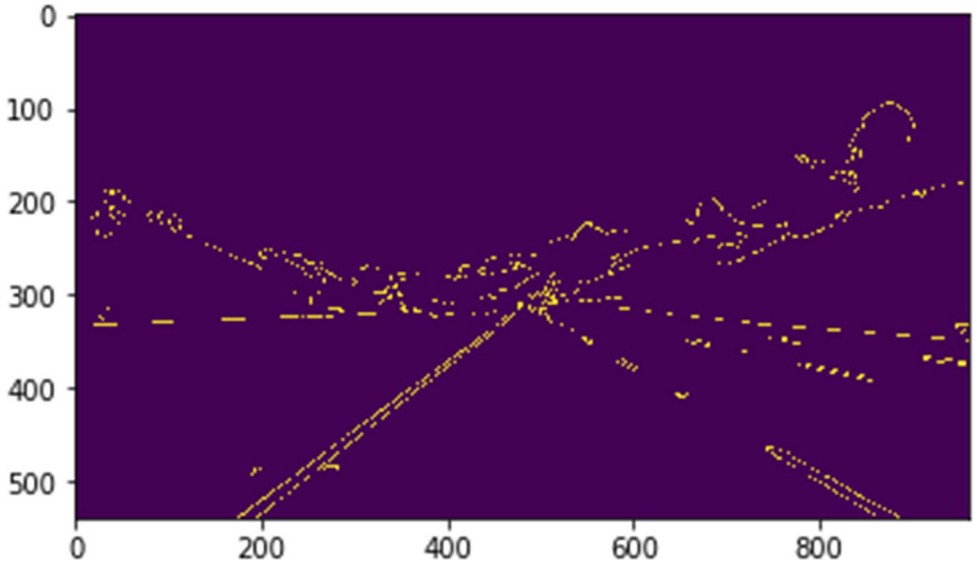
1. Describe your pipeline. As part of the description, explain how you modified the draw_lines() function.
   My pipeline consists of the following steps
   a. Create grayscale image



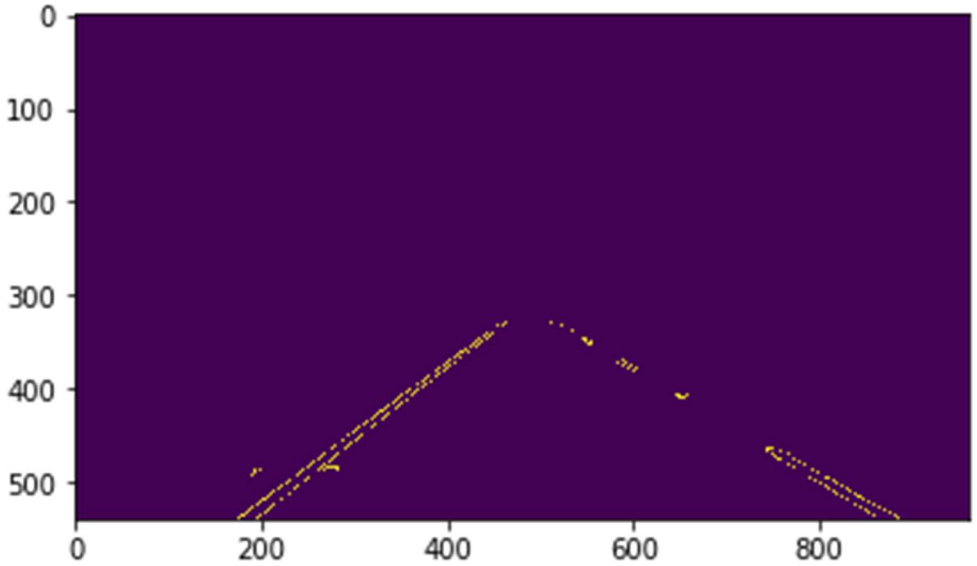
   b. Apply Gaussian Blur with kernel of size 5x5



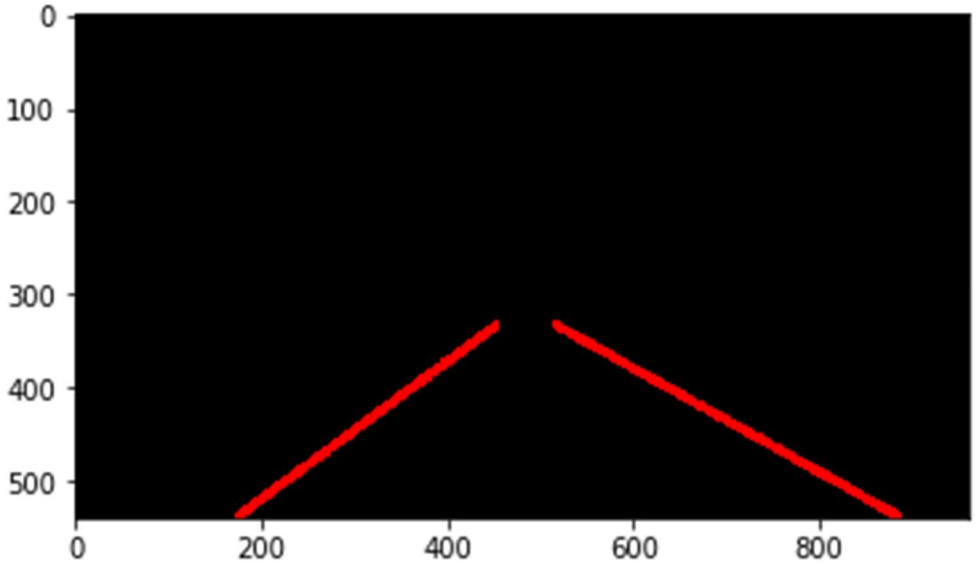
   c. Apply Canny edge detection



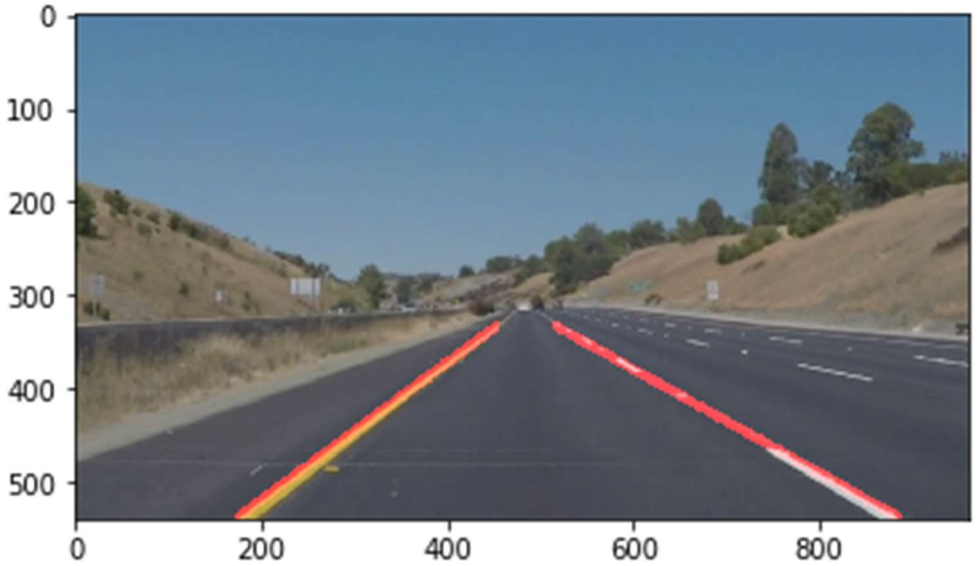
d. Mask everything other than the region of interest



e. Use Hough transform to find out straight lines. Extrapolate to find left line and right line



f. Superimpose on top of original image



I have uses the lines that are output by the cv2.HoughLinesP function to get the left and the right lines

- I iterate through each line, check if its slope is positive or negative
- If slope is negative this line belong to left side of the road otherwise it belongs to the right side of the road
- For left side line I maintain a topmost right point and a bottommost left point.
- Any point that is higher and to the right replaces the topmost right point
- Any point that is lower and to the left replaces the bottommost left point
- For right side line I maintain a topmost left point and a bottommost right point.
- Any point that is higher and to the left replaces the topmost left point
- Any point that is lower and to the right replaces the bottommost right point
- My left line is defined by [bottmost_left_pt_x, bottmost_left_pt_y, topmost_right_x, topmost_right_y] determined from lines with negative slope
- My right line is defined by

[bottmost_right_pt_x, bottmost_right_pt_y, topmost_left_x, topmost_left_y] determined from lines with positive slope

2. Identify potential shortcomings with your current pipeline
    - My solution requires the area of interest to be identified with high accuracy.
      If not correctly identified the left and right line generation algorithm can have errors.
    - Varying light conditions (e.g. shadows followed by bright spots) can cause the Hough transform to detect spurious lines
    - The algorithm will not work well for curved roads

3. Suggest possible improvements to your pipeline
    - I plan to try using the poly1d method (I wasn't aware of this while doing the project)
    - I will explore further lessons to find out how I can eliminate problem related to changing light condition,
      curvature of road etc.