Project 1 – Lane Detection

Lane detection for curved and straight lanes on a highway was attempted in this project.

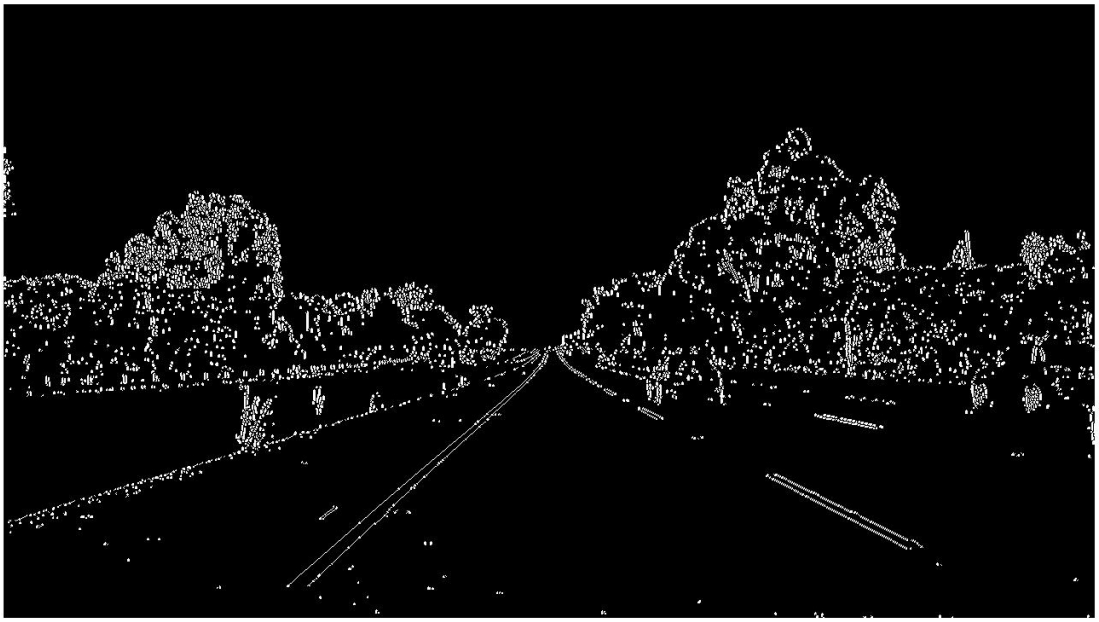
Methodology

- Images were read frame-by-frame

- The image was converted to grayscale

- Edges were detected using Sobel transform

- Morphological operations “clean” and “thicken” were applied to make the edges more prominent and remove stray dots



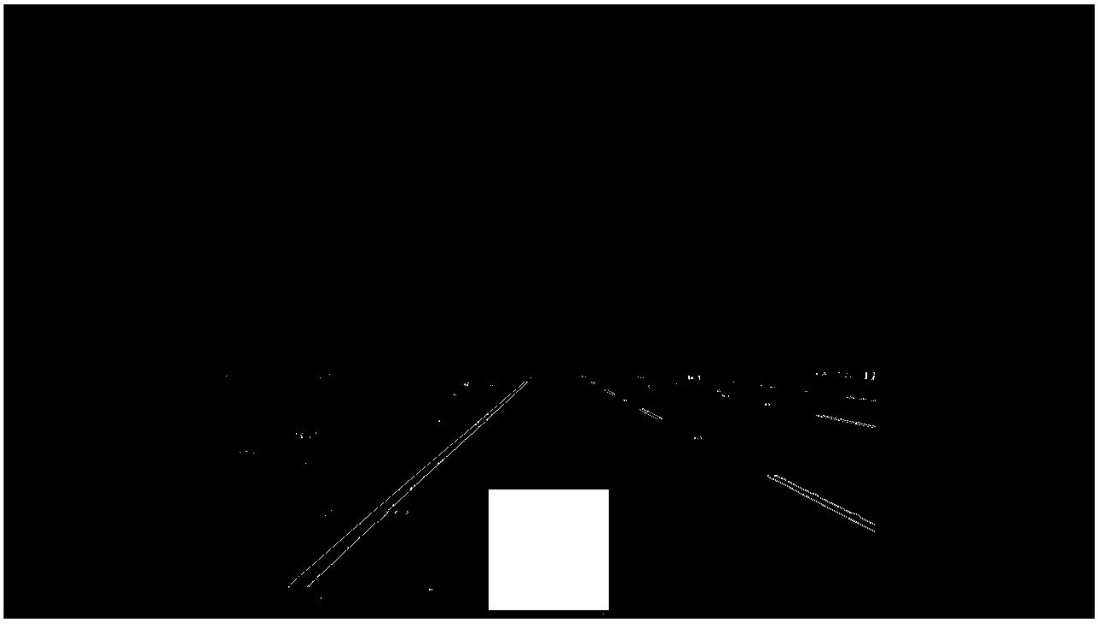
- A color detection algorithm was applied on the RGB image to detect the yellow and white lines.
  The yellow and white lines are the regions with maximum red or green values. This concept was used to get a binary matrix to highlight pixels where the lines were present. This matrix was multiplied by the output from the edge detector.

The resulting image is:

- The following regions in the resulting image were masked to extract the region of interest
    - 60 % of top – to remove the sky

    - 20% of left side – to remove adjacent lanes
    - 20% of right side – to remove adjacent lanes

- A square of 140x140 pixels in the middle of the frame – to remove cracks and other irregularities that might occur in the middle of the lane



The final image is

- Hough transform was applied to the processed image with the following specifications:
  - Rho Resolution - 0.5
  - Theta 40-60 degrees for left lane

    - Theta (-70) – (-50) degrees for right lane
    - Fill Gap - 5
    - Min Length – 10
- The three most prominent lines are used to perform curve fitting for obtaining a quadratic equation of the lanes on each side