Computer Vision

Assignment - 1

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Part 1:

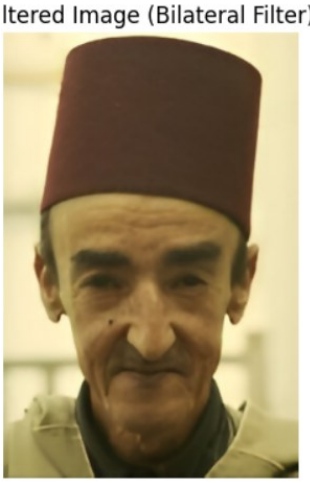


Image Processing Techniques Used

Original Image

The first image is the unedited version of the input image.

Grayscale Conversion

The second image is a grayscale version of the original image.

Median Blur Filtering

A median blur filter is applied to the grayscale image to remove noise while keeping the edges intact.

Laplacian Edge Detection

The Laplacian filter is used to identify edges in the image. It highlights areas where there is a sharp change in intensity, making the outlines and contours more prominent.

Bilateral Filtering

Bilateral filtering is applied to smooth the color variations in the image while preserving edges.

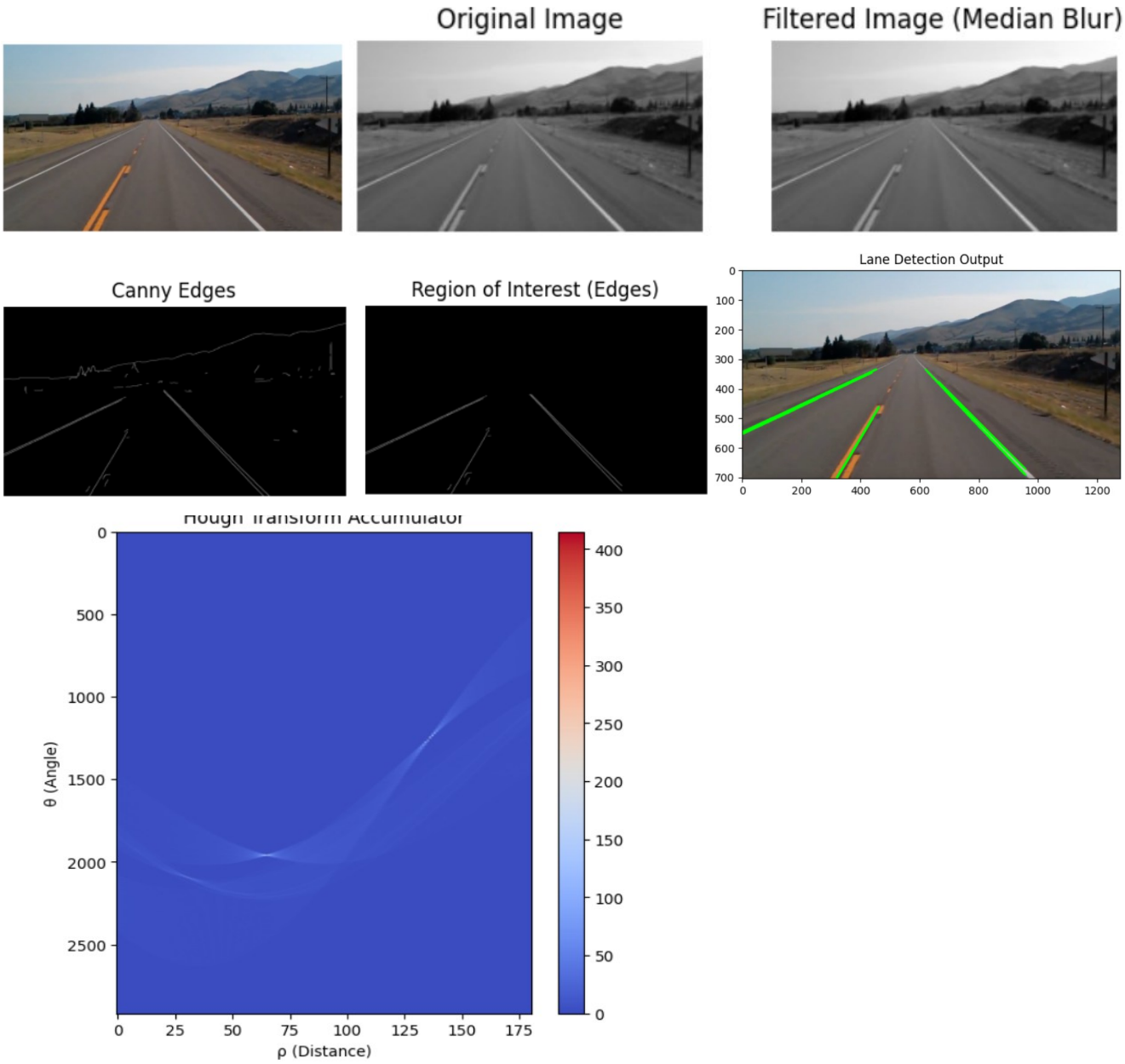
Thresholding

Thresholding is used to convert the edge-detected image into a binary format, keeping only the most significant edges.

Cartoon Effect

The final carbonized image is created by combining the smoothed bilateral-filtered image with the thresholder edge-detected image.

Part 2:



Lane Detection Using Image Processing

Original Image

The first image shows the unprocessed road scene.

Grayscale and Median Blur Filtering

The second image is a grayscale version of the original, which simplifies processing by reducing the color channels. A median blur filter is then applied to remove noise while preserving edges, making lane markings more distinguishable.

Canny Edge Detection

Canny edge detection is used to highlight the edges in the image, specifically focusing on the lane markings. This step helps identify strong edges while reducing noise from the surroundings.

Region of Interest Selection

A region of interest (ROI) is defined to focus on the road area where lane lines are expected. This eliminates unnecessary details from the background and improves detection accuracy.

Hough Transform for Line Detection

The Hough Transform is applied to detect straight lines in the edge-detected image.

Lane Detection Output

The final image displays the detected lane lines overlaid on the original road scene. The detected lanes are marked in green, effectively guiding vehicles within their designated path.