

Computer Vision

Assignment 1

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1. Code Explanation

1.1 Part one:

- Convert image to grayscale
- Apply median blur to the grayscale image
- Apply adaptive threshold to the blurred image
- Apply bilateral filter to the original image
- Combine the bilateral filtered image and the threshold image

1.2 Part two:

- Create mask to select ROI
- Apply median blur to the image
- Apply canny edge detection to the blurred image
- Selecting only the bottom half of the image (ROI selection)
- Apply Hough transform to the edge detected image
- Refine coordinates to get best lines by checking rho
- Draw Cartesian or polar lines on the image

2. Parameters Tested and Comments

2.1 Part one:

- The sigma color and sigma space of the bilateral did not noticeably affect the output.
- The median filter produced the best results at ksize = 7. Lower values resulted in a grainy noise in the image. Higher values did not show as much edges as required.
- The Laplacian filter produced the best results at ksize = 5. ksize = 3 did not produce much difference from original image. Higher values resulted in much more edges that desired.

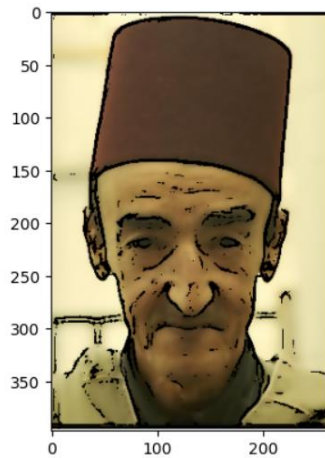
2.2 Part two:

- Increasing the aperture size of the Canny filter causes more local edges to be detected which leads to noise.
- We adjusted the threshold values of the Canny filter to detect the global edges for traffic lanes with as little noise as possible.
- The ROI mask is created using a rectangle which we can specify the size and location of.
- We tuned the parameters of the Hough Lines functions till we got the best results.
- We loop over the Hough Lines and use non-maximum suppression for lower values to filter the strongest lines. We use a threshold for rho and theta which we adjust in each image to reach the best results.

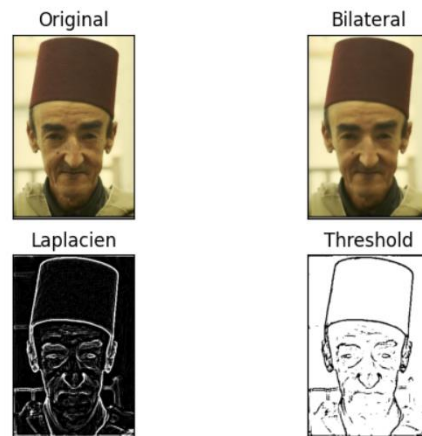
3. Sample Runs

3.1 Part one:

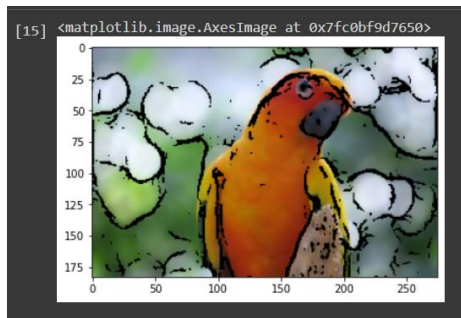
Caroonified Image



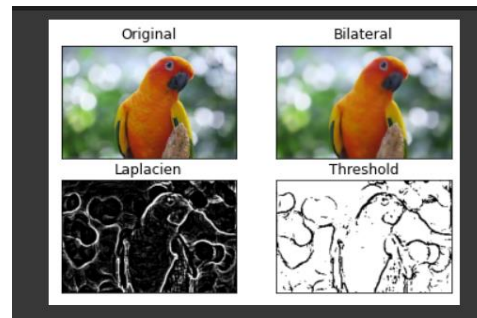
Applied Filters



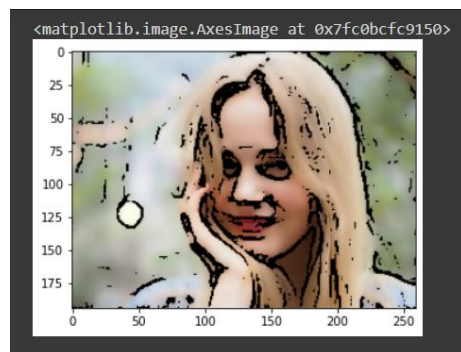
Caroonified Image



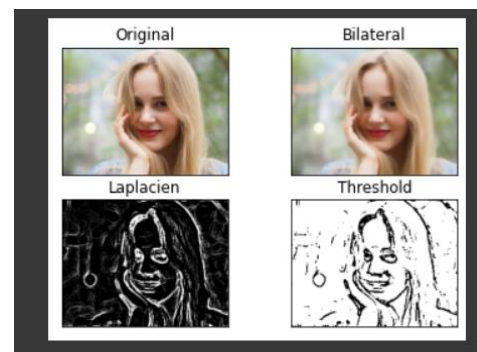
Applied Filters



Caroonified Image

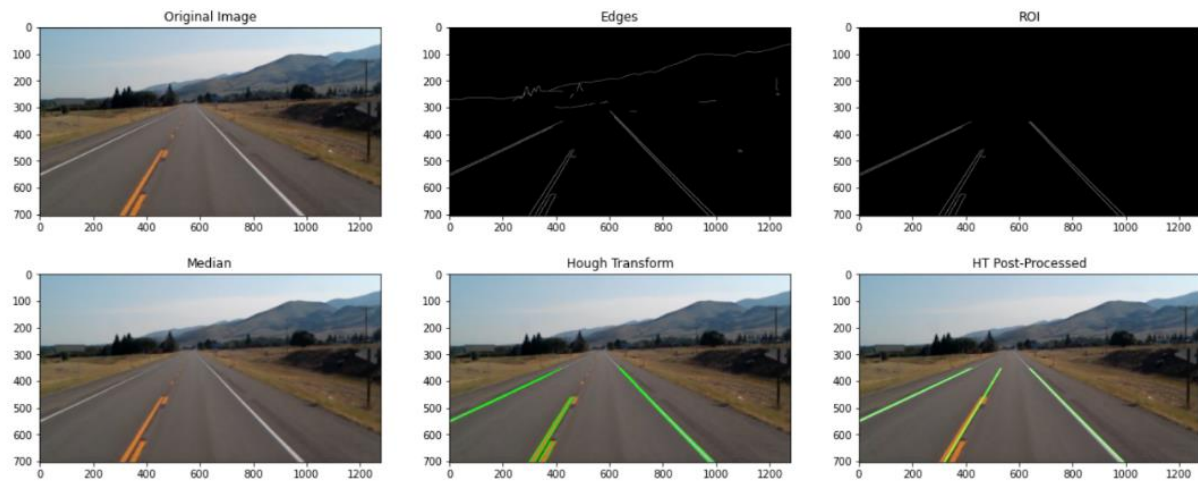


Applied Filters

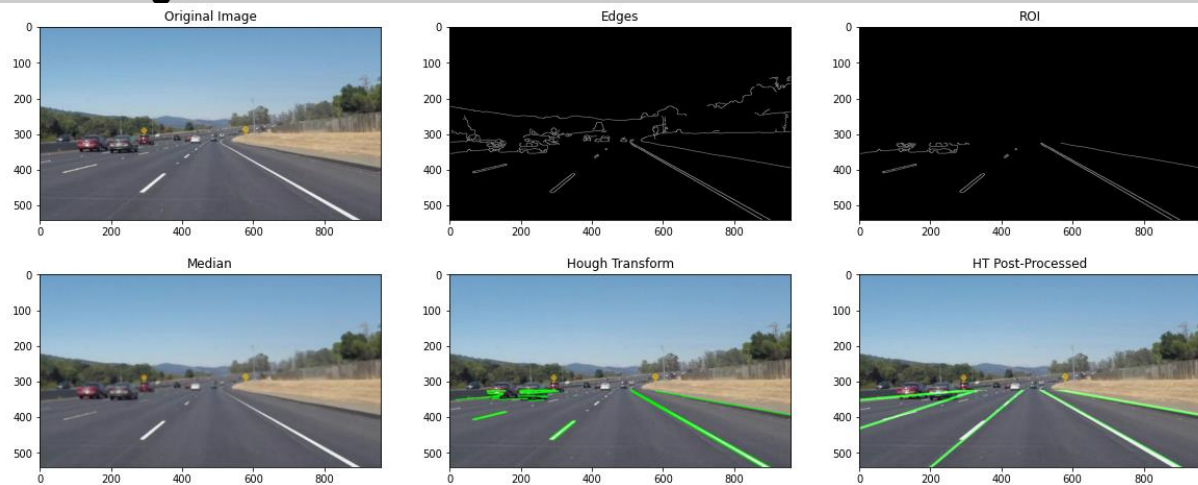


3.2 Part two:

Test Image 1



Test Image 2



Test Image 3

