

DIP ASSIGNMENT 4

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1 Image Denoising:

Bilateral Filter

Denoise image by preserving edges.

Gaussian Filter

Reduce noise by smoothing entire images without preserving edges.

observation:

In Figure 1: Bilateral Image has reduced noise and also did not blur edge but in case of Gaussian image Image is completely blurred. After applying Laplacian Filter to the denoised Image we get edges. observation:

In case of bilateral images edges are thin and sharp but in case of Gaussian edges are thick and blurred.

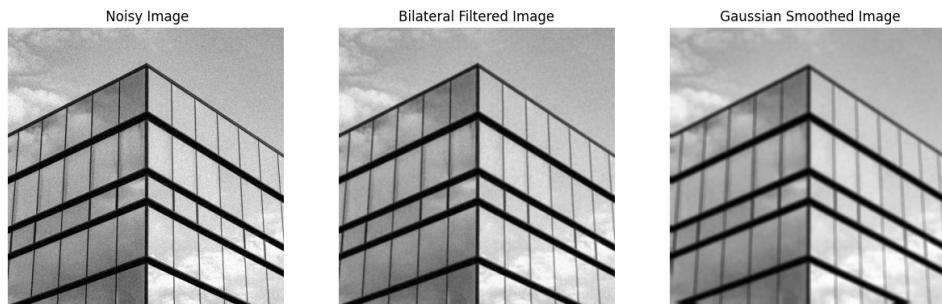


Figure 1:

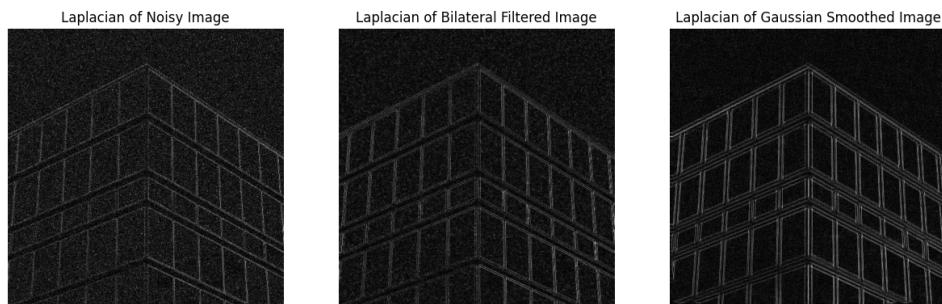


Figure 2:

2 Edge Detection:

Observation:

Gaussian smoothing: more smoothing reduce the high frequency noise hence blurring the edges as a result we get broader and fewer edges. When less smoothing applied, noise is not removed completely and we get thin and more edges due to noise.

Gradient Threshold: Lower threshold create more edges including weaker edges also but in case of higher threshold strong edges are only detected.



Figure 3:



Figure 4:



Figure 5:



Figure 6:

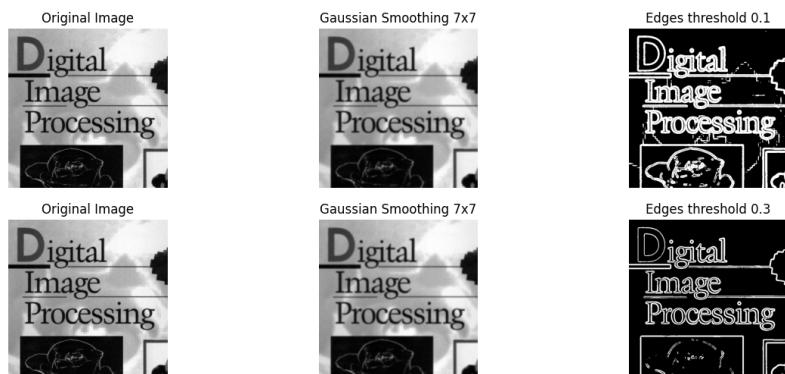


Figure 7:

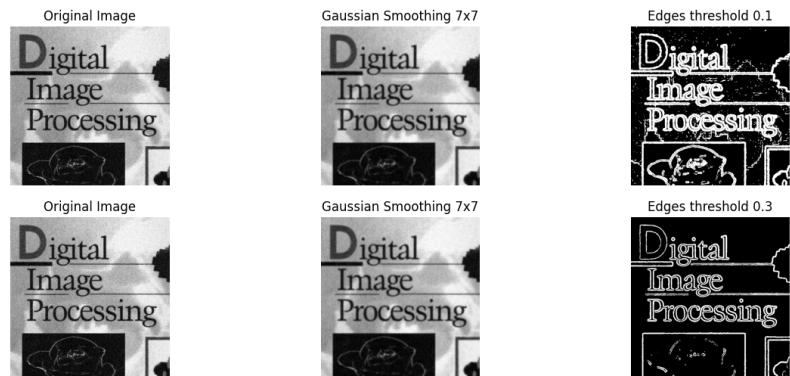


Figure 8:



Figure 9:



Figure 10:

3 Hough Transform:

In this I first created a synthetic image with 2 lines, a rectangle and a circle. And also added noise and occlusion to it, Figure 11. Canny edge detection was used for edge detection. I varied for different threshold of (50, 100, 150) and bins of (45, 90, 180).

Observation:

when no noise and occlusion added: best result where observed for threshold 100 and bin of both 90 and 180 was good. when Noise added: for lower threshold it gave very poor result try to fit line for all noise,best result was again at higher threshold 100 and bin 90, 180.

when Occlusion added: better lines where obtained for lower threshold 50 then in higher bin value around 90 was better.

when I used real image which had noise, better lines were formed for images with higher threshold and more bins.

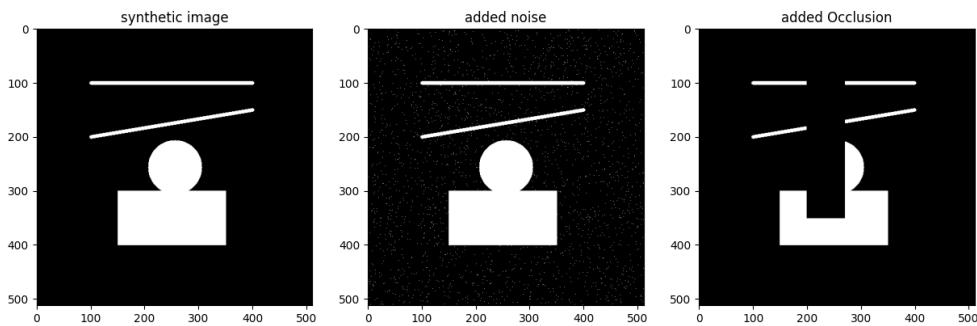


Figure 11:

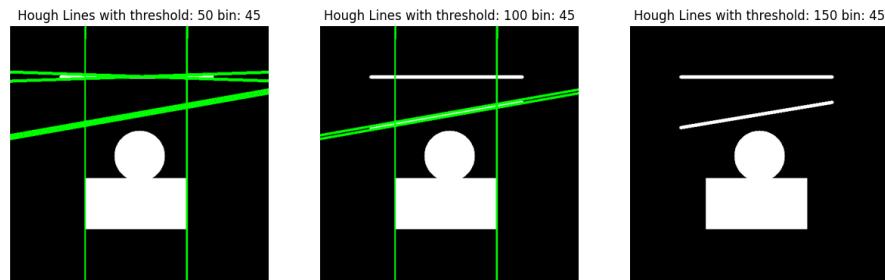


Figure 12:

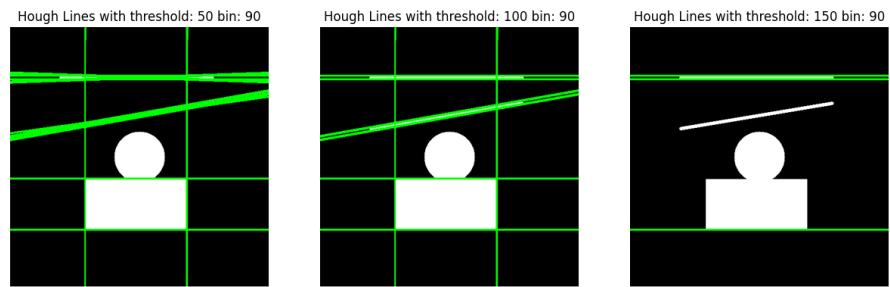


Figure 13:

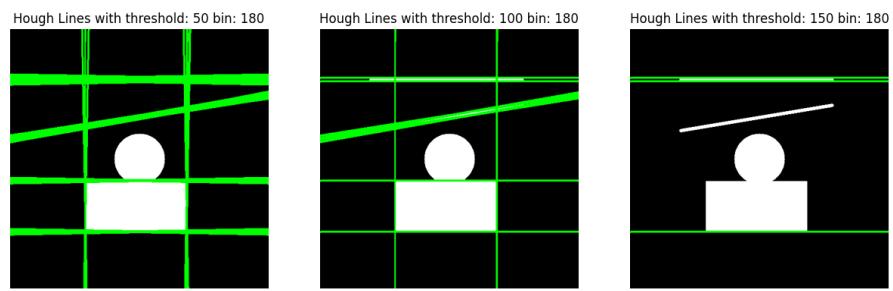


Figure 14:

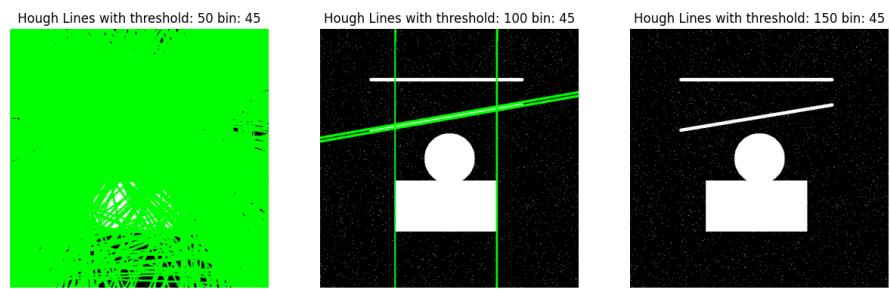


Figure 15:

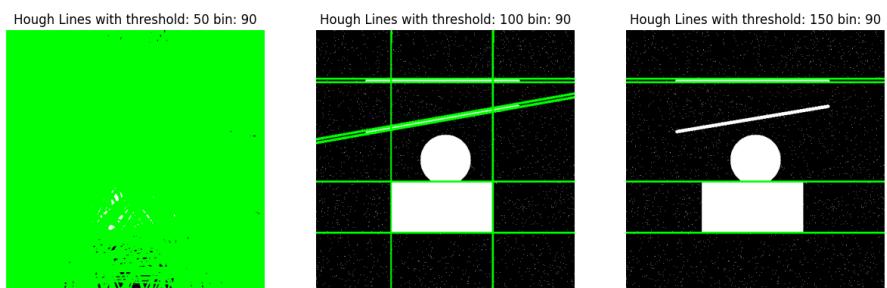


Figure 16:

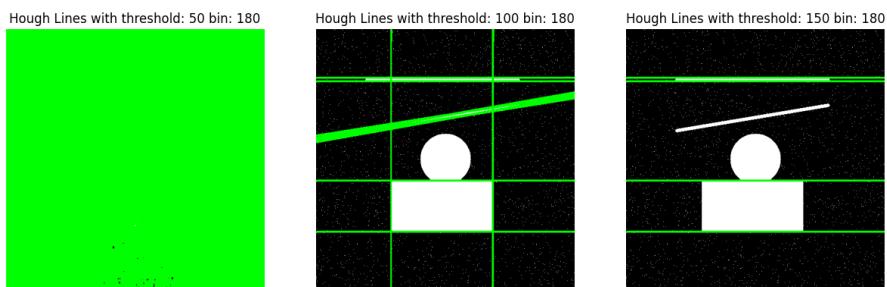


Figure 17:

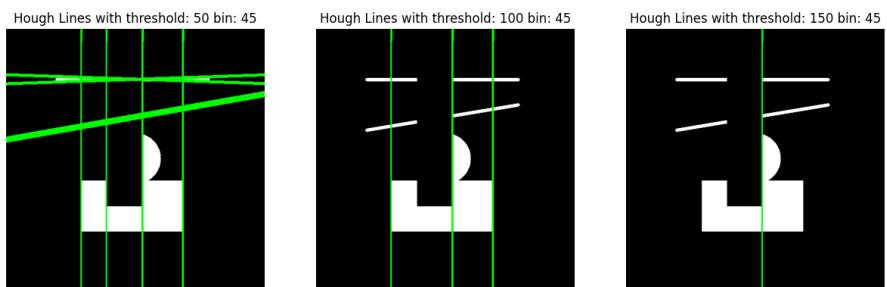


Figure 18:

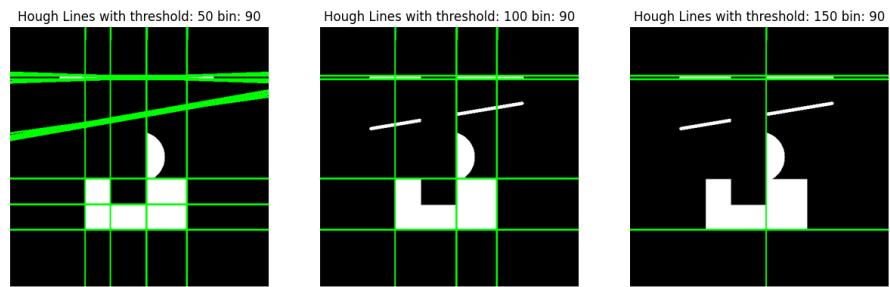


Figure 19:

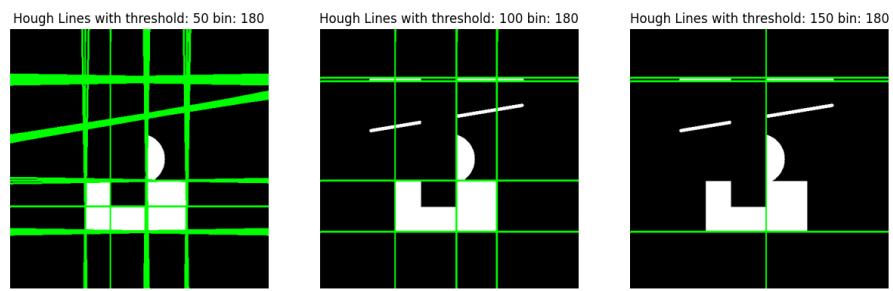


Figure 20:

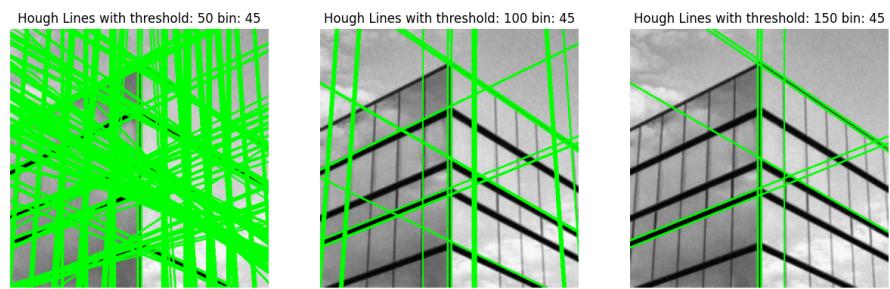


Figure 21:

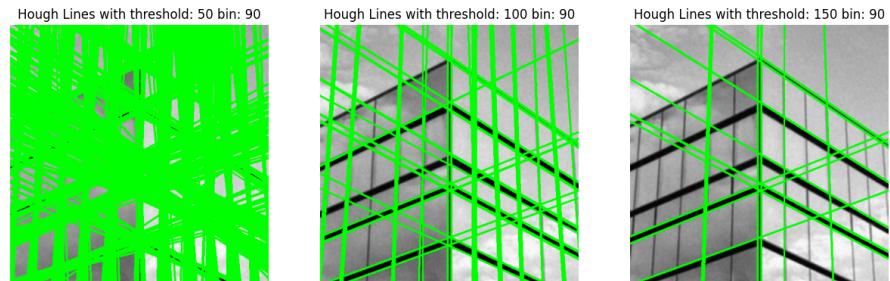


Figure 22:

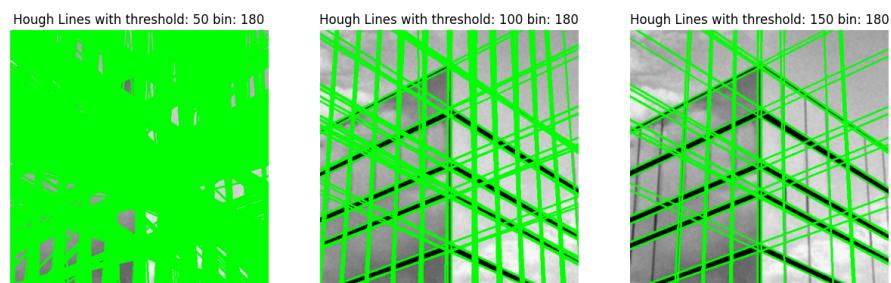


Figure 23: