

# Assignment 1: CS 663, Fall 2024

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## Q7) Report

We are given the barbara256 file. After applying the  $\sigma = 5$  and  $\sigma = 10$  noises to the image, we get barbara256\_noisy\_5 and barbara256\_noisy\_10 respectively.



barbara256



barbara256\_noisy\_5



barbara256\_noisy\_10



barbara256\_filtered\_5\_1



barbara256\_filtered\_5\_2



barbara256\_filtered\_5\_3

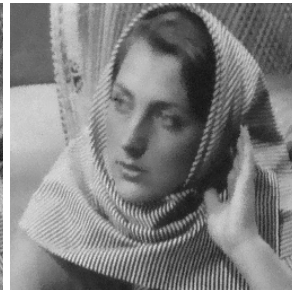
On using the Bilateral Filter on barbara256\_noisy\_5 with  $(\sigma_s = 2, \sigma_r = 2)$ ,  $(\sigma_s = 0.1, \sigma_r = 0.1)$ ,  $(\sigma_s = 3, \sigma_r = 15)$ , we get barbara256\_filtered\_5\_1, barbara256\_filtered\_5\_2 and barbara256\_filtered\_5\_3 respectively. We see that the noise is significantly removed in the barbara256\_filtered\_5\_3 case, while the other two images appear quite noisy.



barbara256\_filtered\_10\_1



barbara256\_filtered\_10\_2



barbara256\_filtered\_10\_3

On using the Bilateral Filter on barbara256\_noisy\_10 with  $(\sigma_s = 2, \sigma_r = 2)$ ,  $(\sigma_s = 0.1, \sigma_r = 0.1)$ ,  $(\sigma_s = 3, \sigma_r = 15)$ , we get barbara256\_filtered\_10\_1, barbara256\_filtered\_10\_2 and barbara256\_filtered\_10\_3 respectively. We see that the noise is significantly removed in the barbara256\_filtered\_10\_3 case, while the other two images appear quite noisy.

We are also given the kodak24 file. After applying the  $\sigma = 5$  and  $\sigma = 10$  noises to the image, we get kodak24\_noisy\_5 and kodak24\_noisy\_10 respectively.



kodak24



kodak24\_noisy\_5



kodak24\_noisy\_10



kodak24\_filtered\_5\_1



barbara256\_filtered\_5\_2



barbara256\_filtered\_5\_3

On using the Bilateral Filter on kodak24\_noisy\_5 with  $(\sigma_s = 2, \sigma_r = 2)$ ,  $(\sigma_s = 0.1, \sigma_r = 0.1)$ ,  $(\sigma_s = 3, \sigma_r = 15)$ , we get kodak24\_filtered\_5\_1, kodak24\_filtered\_5\_2 and kodak24\_filtered\_5\_3 respectively. We see that the noise is significantly removed in the kodak24\_filtered\_5\_3 case, while the other two images appear quite noisy, similar to what was observed in the barbara256 case.



kodak24\_filtered\_10\_1



kodak24\_filtered\_10\_2



kodak24\_filtered\_10\_3

On using the Bilateral Filter on kodak24\_noisy\_10 with  $(\sigma_s = 2, \sigma_r = 2)$ ,  $(\sigma_s = 0.1, \sigma_r = 0.1)$ ,  $(\sigma_s = 3, \sigma_r = 15)$ , we get kodak24\_filtered\_10\_1, kodak24\_filtered\_10\_2 and kodak24\_filtered\_10\_3 respectively. We see that the noise is significantly removed in the kodak24\_filtered\_10\_3 case, while the other two images appear quite noisy, similar to what was observed in the barbara256 case.