COMPUTER VISION
ASSIGNMENT 5

Selection of filters

Corresponding to each uncorrupted image, three corrupted images are given. As they are corrupted with gaussian and laplacian noise, a good choice of the ordered statistics filter can be median filter and midpoint filter. We will analyze our choice with the help of the SSIM score of each image restored with these filters.

SSIM Values

For image 1, (all comparisons are with the original image)

	1B	1G	1L
Corrupted Image	0.90467	0.54117	0.47893
Restored Image using Median Filter	0.89063	0.69928	0.71404
Restored Image using Midpoint Filter	0.78156	0.63953	0.53290

Structural similarity of 1B image with original image is pretty high. In order to restore this image, when we apply a median filter, an adverse effect is seen. Instead of increasing, SSIM score falls to 0.89063. This may be because of the fact that the median filter smoothes sharp edges and some other image details are lost. So, on a blurred image, we further applied median filter (that enhances blurring), so SSIM score decreased. Midpoint filter also doesn't seem to give good results and the SSIM score is even worse for its output i.e. 0.78156 .

But for the image corrupted with gaussian and laplacian noise, median filter seems to restore better than midpoint filter. We can see that the structural similarity of the restored image (with the original) has increased compared to the corrupted image, so it justifies our choice of ordered statistics filter.

Similar patterns are seen for the 2nd and 3rd image.

For image 2, (all comparisons are with the original image)

	2B	2G	2L
Corrupted Image	0.91405	0.55852	0.51054
Restored Image using Median Filter	0.90465	0.71421	0.72644
Restored Image using Midpoint Filter	0.84683	0.67560	0.58821

For image 3, (all comparisons are with the original image)

	3B	3G	3L
Corrupted Image	0.92893	0.67180	0.60428
Restored Image using Median Filter	0.92508	0.82870	0.83565
Restored Image using Midpoint Filter	0.89160	0.79005	0.68501