CS663 Assignment 2 Question 3

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This document describes the findings regarding question 3 of assignment 2. For each section in the question, we have added the relevant comments and output images.
For all the images

- We have considered windows of 25 X 25 around each pixel.
- We have used patches of 9 X 9 for comparisons.
- For barbara.mat for reducing time taken for filtering we shrinked by a factor of 2 after applying gaussian filter of 0.66 standard deviation.

For barbara.mat

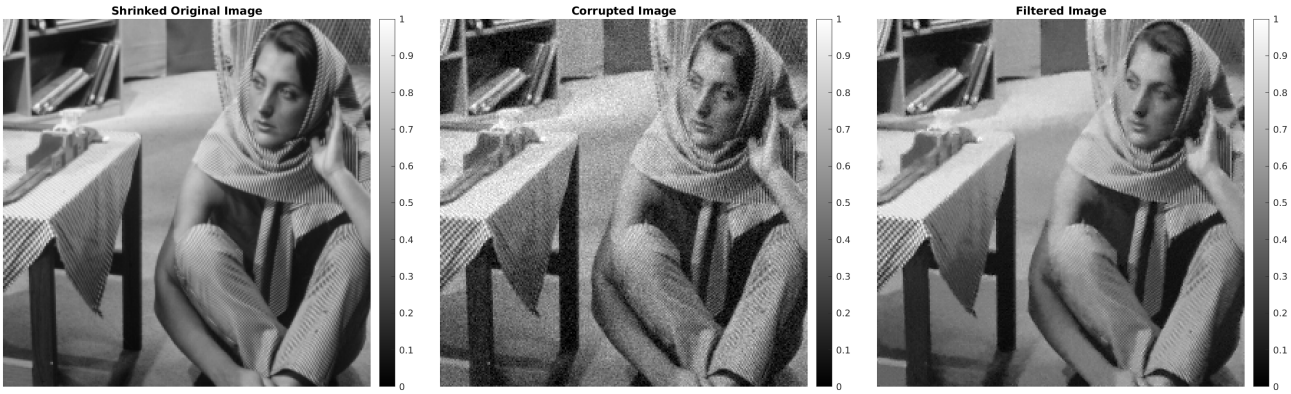

Figure 1: Patch based filtering for barbara.mat

After tuning, we get optimal intensity $\sigma = 0.15$

- RMSD at $\sigma = 0.15$ is 0.0266
- RMSD at $0.9 * \sigma$ is 0.0278
- RMSD at $1.1 * \sigma$ is 0.0271

For grass.png

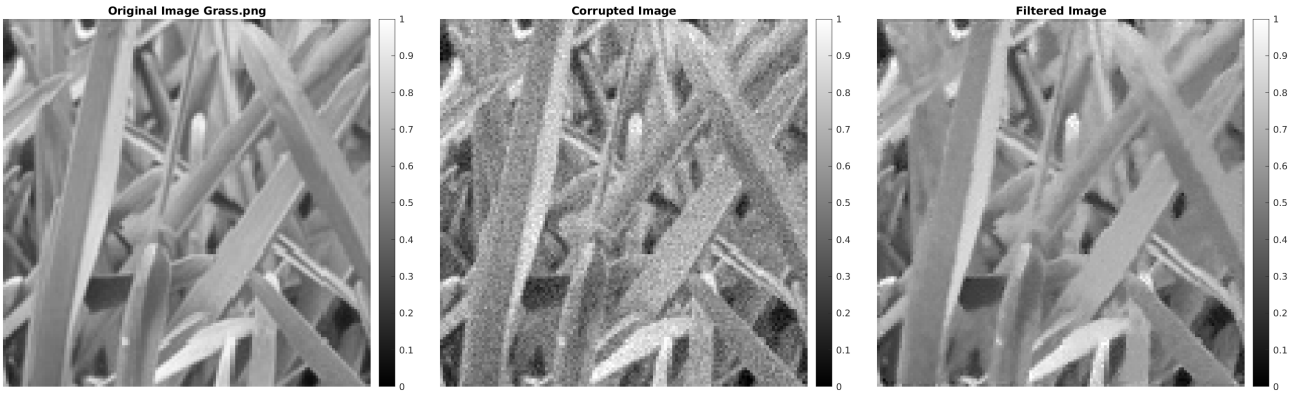

Figure 2: Patch based filtering for grass.png

After tuning, we get $\sigma = 0.1545$

- RMSD at $\sigma = 0.1545$ is 0.0300
- RMSD at 0.139 (0.9 * σ) is 0.0302
- RMSD at 0.17 (1.1 * σ) is 0.0303

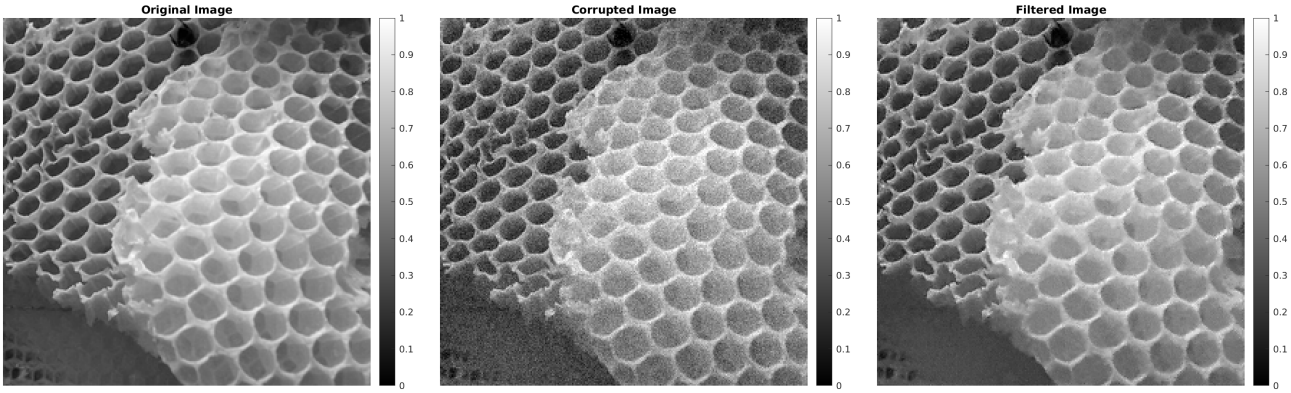

Figure 3: Patch based filtering for honeycombreal.png

After tuning, we get $\sigma = 0.13$

- RMSD at $\sigma = 0.13$ is 0.0316
- RMSD at 0.117 (0.9 * σ) is 0.0345
- RMSD at 0.143 (1.1 * σ) is 0.0343

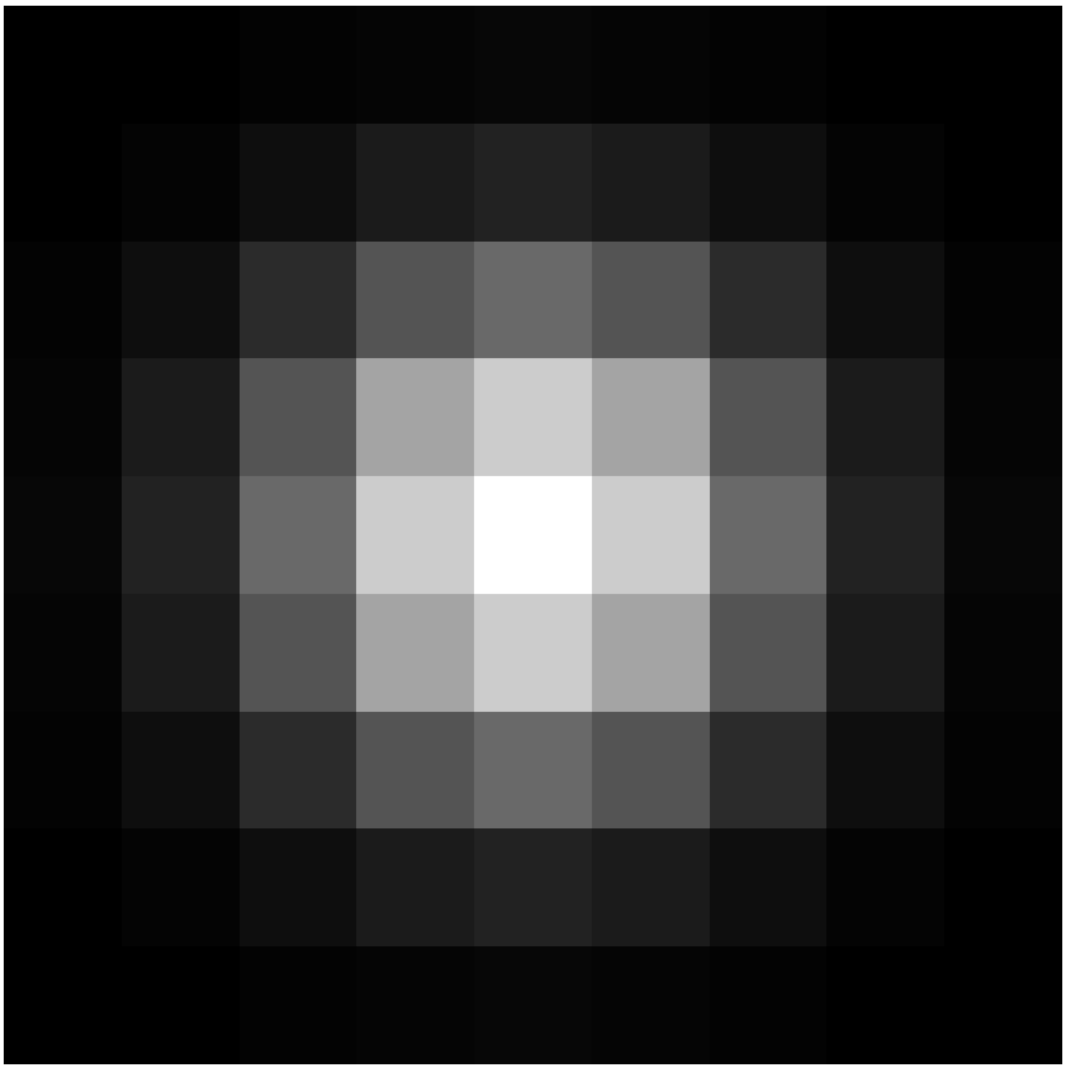

Figure 4: Mask with spatial $\sigma = 1.5$

Gaussian Mask for making patches isotropic, the standard deviation is 1.5