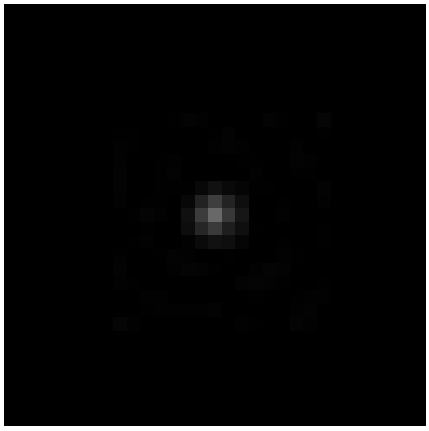
Bilateral Filtering

Neharika Jali, 160040101
Swadha Sanghvi, 16D070037
Sucheta, 160040100

Instructions to run the code :

Used myMainScript.m and myBilateralFiltering.m for barbara input. And used myMainScript2.m and myBilateralFiltering2.m for grassyNoisy and honeyComb.

Gaussian Mask :



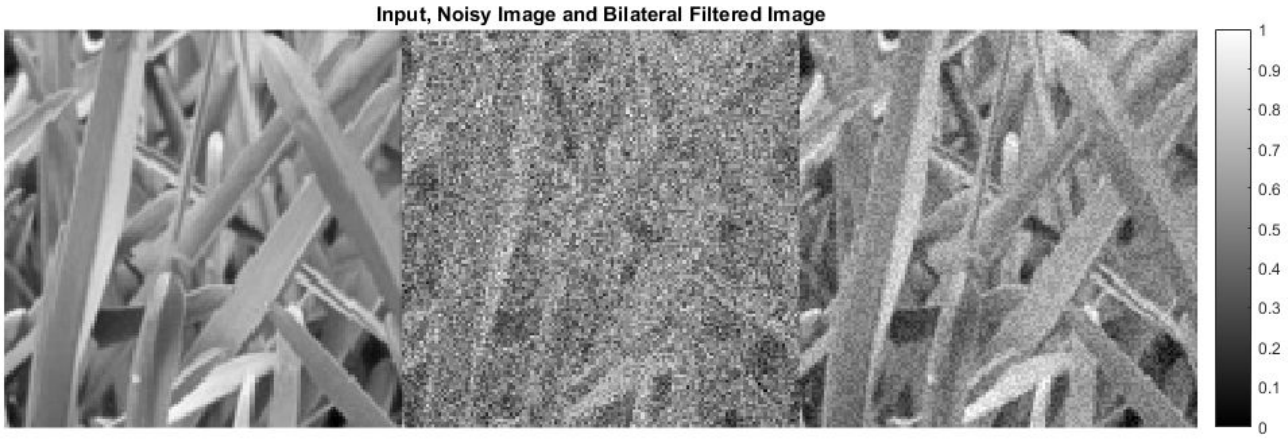
1. grassyNoisy :

The following is the optimal parameters that I found by fixing the window size of the **gaussian filter at 7** and performing a grid search over the standard deviations of space and intensity, first a coarse search and then a finer search.

Optimal parameters

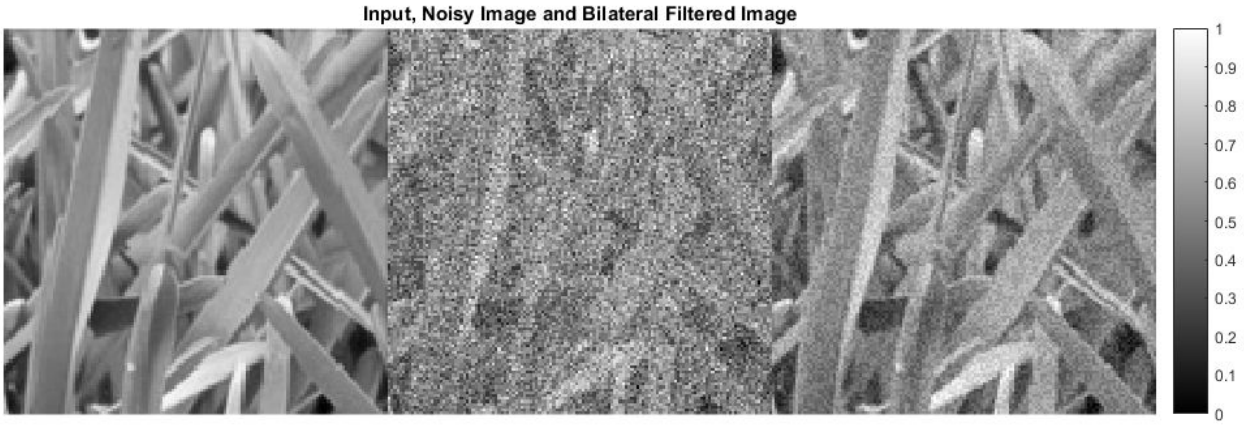
Standard deviation of space = 5.33
Standard deviation of intensity = 0.0167
RMSD = 14.177

The following is the output obtained using these parameters. The result isn't very good though.

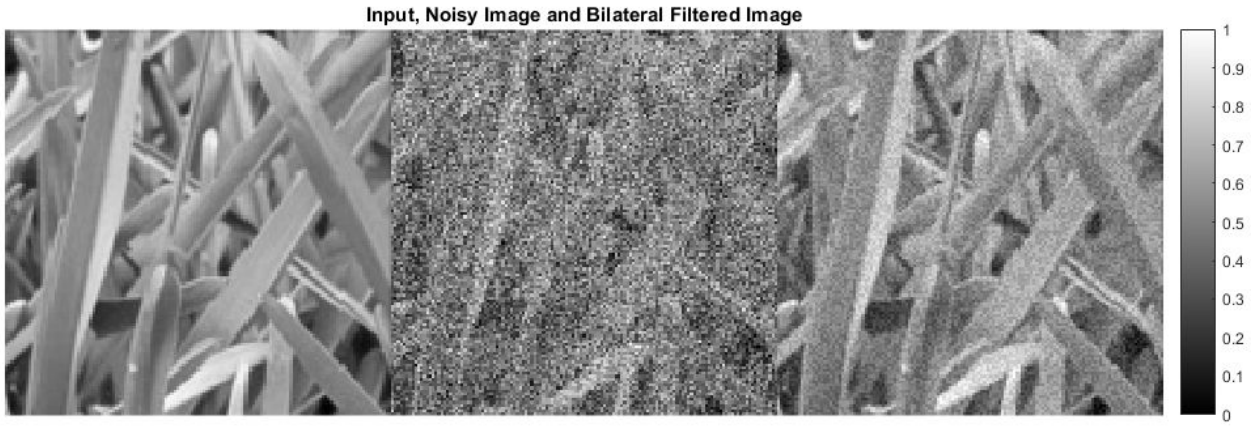


The following are the results with changes parameter values :

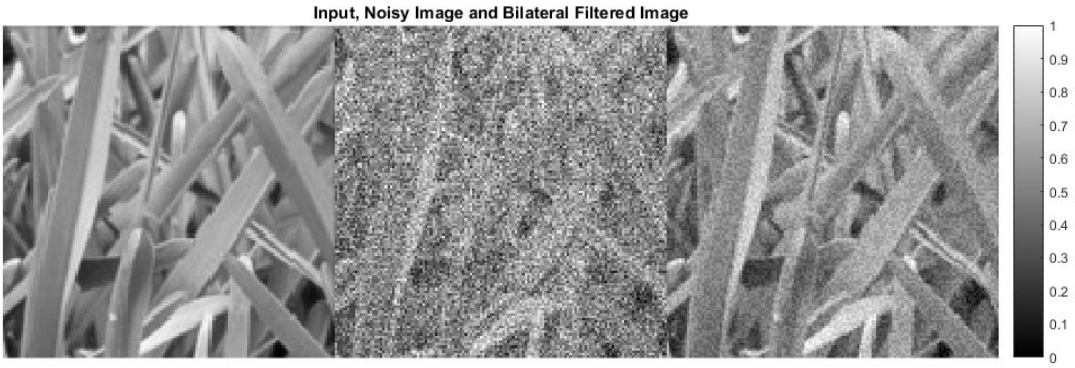
(i) Standard deviation of space = 4.797
Standard deviation of intensity =0.0167
RMSD = 28.0703



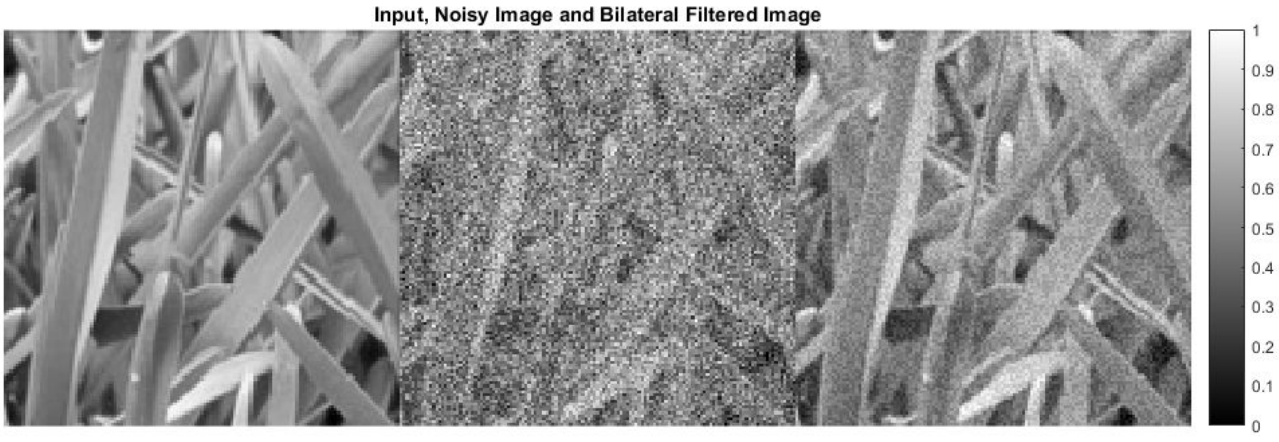
(ii)
Standard deviation of space = 5.863
Standard deviation of Intensity = 0.0167
RMSD= 28.2733



(iii)Standard deviation of space = 5.33
Standard deviation of intensity = 0.01503
RMSD = 28.1081



(iv)Standard deviation of space = 5.33
Standard deviation of intensity = 0.018
RMSD = 28.2178



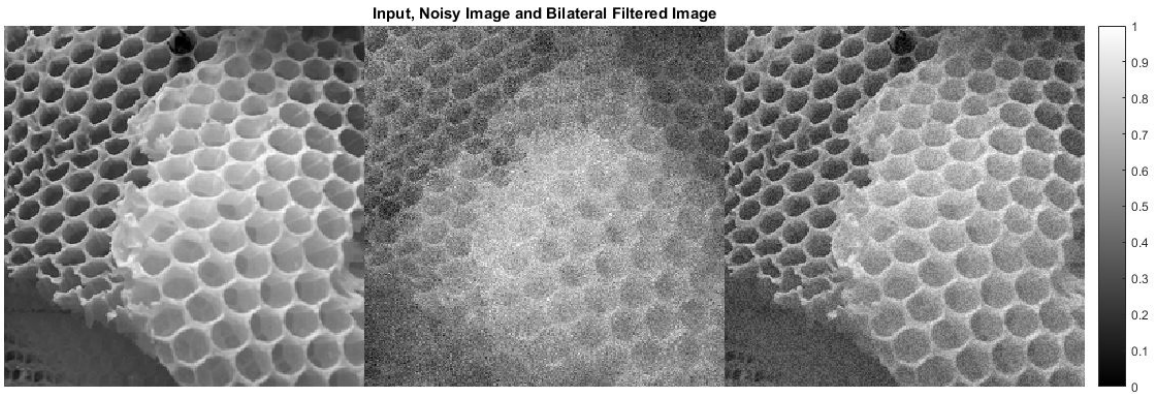
2. Honey :

The following is the optimal parameters that I found by fixing the window size of the **gaussian filter at 7** and performing a grid search over the standard deviations of space and intensity, first a coarse search and then a finer search.

Optimal parameters :

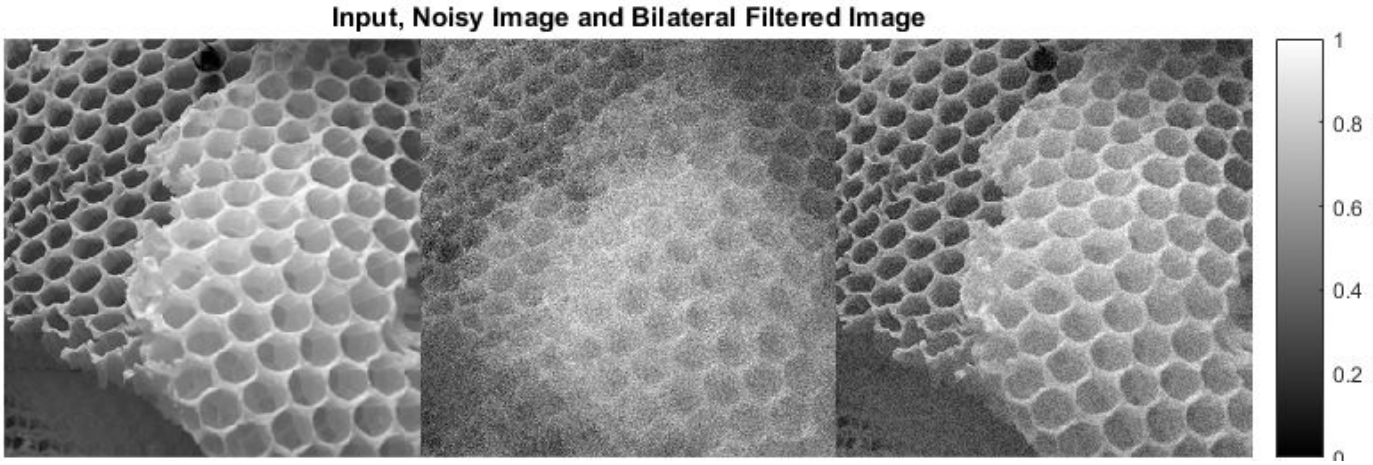
Standard deviation of space = 9
Standard deviation of intensity = 0.33
RMSD = 35.76

The following is the output obtained using these parameters. The result isn't very good though.

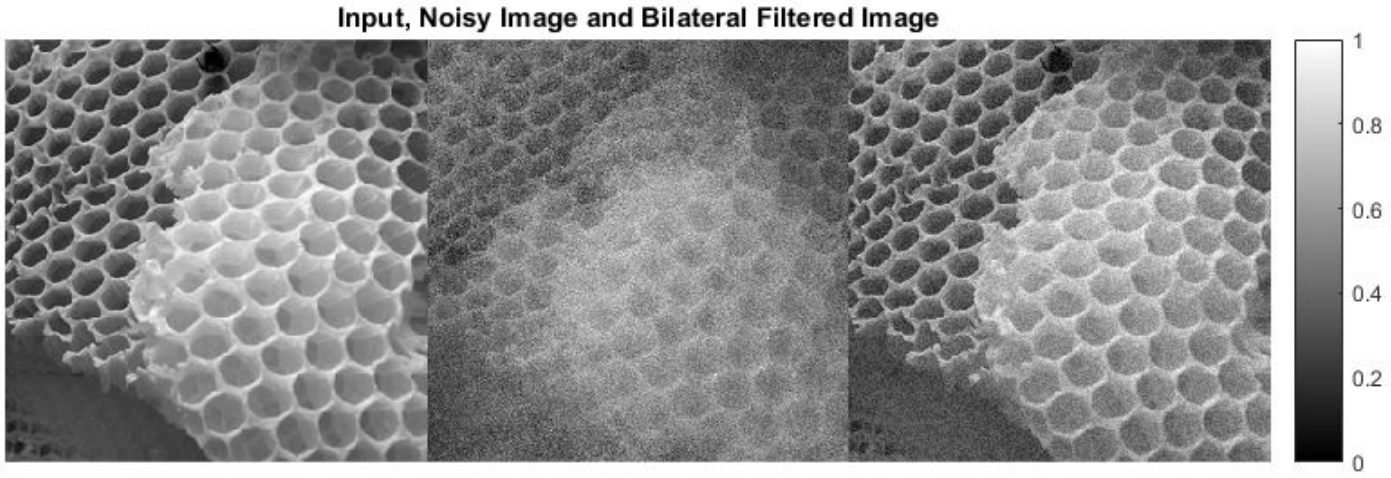


The following are the results with changes parameter values:

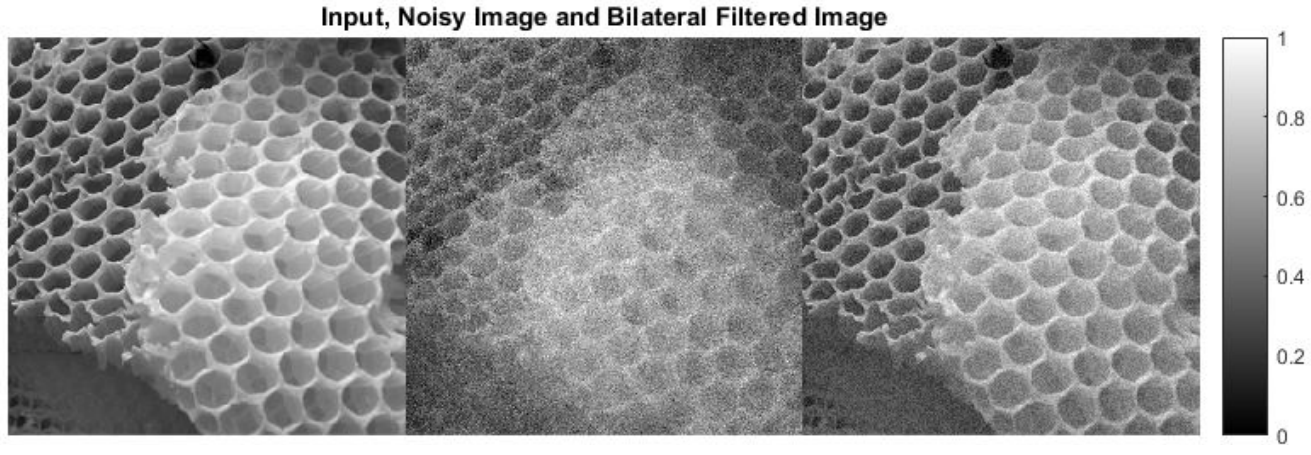
(i) Standard deviation of space = 8.1
Standard deviation of intensity = 0.3
RMSD = 38.58



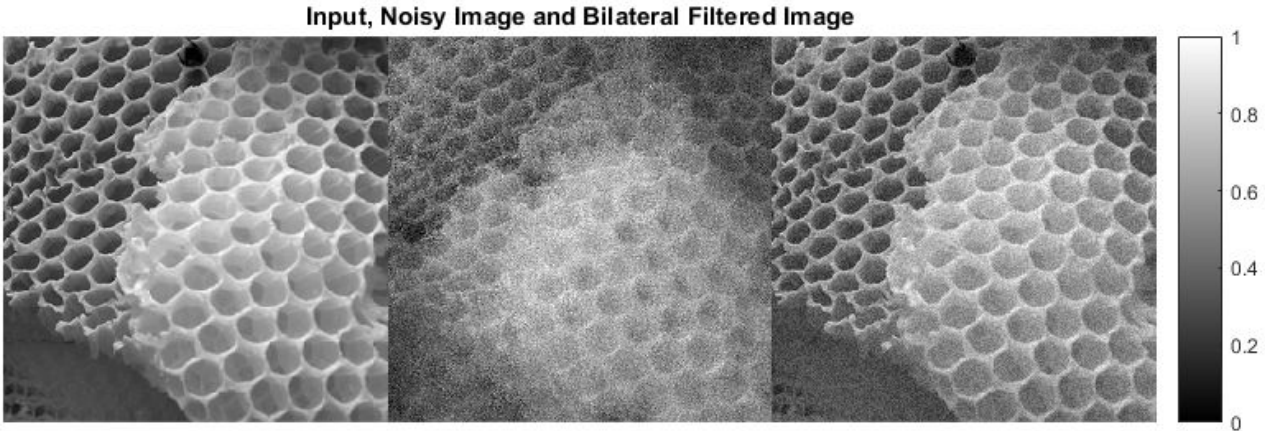
(ii) Standard deviation of space = 9.9
Standard deviation of intensity = 0.33
RMSD = 37.57



(iii) Standard deviation of space = 9
Standard deviation of intensity = 0.297
RMSD = 36.59



(iv) Standard deviation of space = 9
Standard deviation of intensity = 0.363
RMSD = 36.04



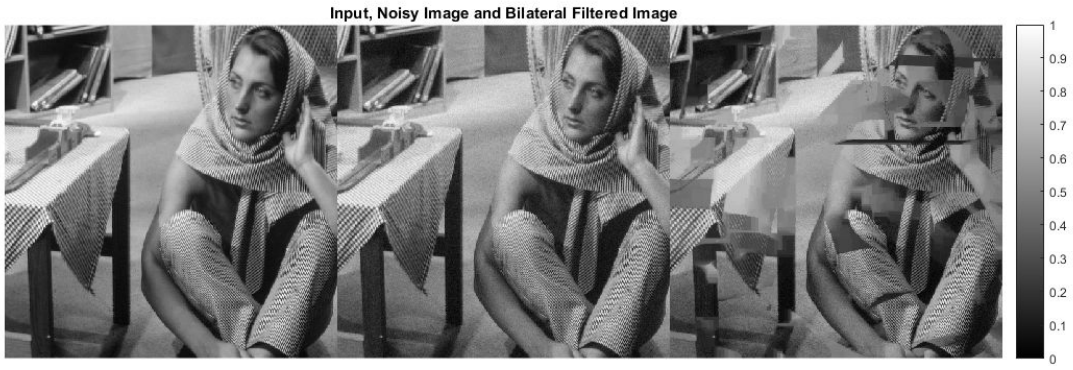
3. Barbara :

The following is the optimal parameters that I found by fixing the window size of the gaussian filter at 5 and performing a grid search over the standard deviations of space and intensity, first a coarse search and then a finer search.

Optimal parameters :

Standard deviation of space = 7.44
Standard deviation of intensity = 2.22
RMSD = 6506.3

The following is the output obtained using these parameters. The result isn't very good though.

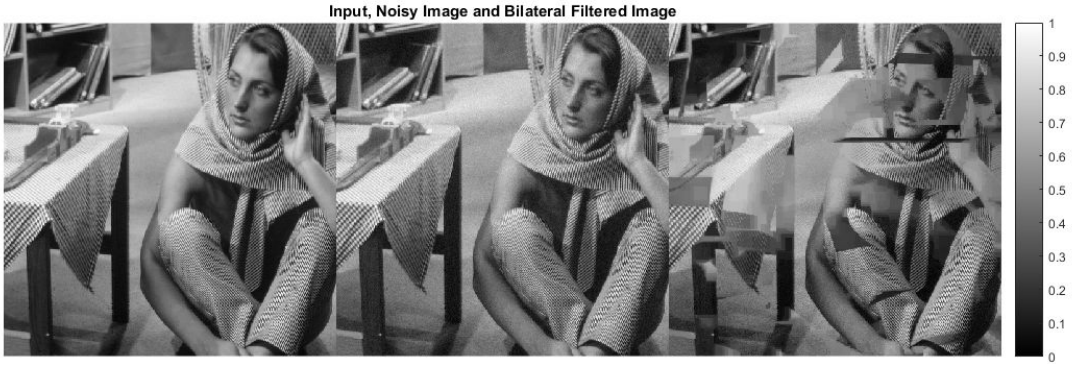


On experimenting with increasing the standard deviations beyond 20 with a filter size of 3, the output image rotated and flipped by itself (I haven't been able to understand why). On performing a grid search by optimising over the output rotated and flipped back to point in the right direction, the following are the optimal parameters and the output image that was generated.

The following are the results with changes parameter values:

(i) Standard deviation of space = 6.696
Standard deviation of intensity = 2.22
RMSD = 6563.7

(ii) Standard deviation of space = 8.184
Standard deviation of intensity = 2.22
RMSD = 6559.7



(iii) Standard deviation of space = 7.44
Standard deviation of intensity = 1.998

RMSD = 6560.5

(iv) Standard deviation of space = 7.44
Standard deviation of intensity = 2.442
RMSD = 6599.5