Homework #8

8.1 Image noising and de-noising processing

Figure 1: the original input image Lena.bmp

We implement a white noise generator and apply it to the input image Lena to get the 4 noised images as Figure 2's first row shows. After that, we try a Gaussian low-pass filter and medium filter to see if they have capability to de-noise the images shows in Figure 2 second row to the last row show the result. The SNR value is shows in Table 1.

Figure 2: the Lena wall.

Image / filter	Gaussian noise amplitude = 10	Gaussian noise amplitude = 30	Salt-and-pepper threshold = 0.05	Salt-and-pepper threshold = 0.1
3x3 box	14.7787	8.6315	3.4290	1.9846
5x5 box	12.3691	7.7585	3.0014	1.6033
3x3 median	16.1422	8.6336	2.9978	1.4736
5x5 median	14.1525	8.0742	2.8901	1.3857
opening	13.9743	8.1023	1.4184	-0.9080
closing	12.8143	7.8423	0.2077	-1.1348

Table 1: the SNR (signal noise ratio) rates of corresponding image

Appendix

The program is written by MATLAB. To run the program, copy the input data to the folder “dat/”, and run “src/hw8_noise_sh.m” to get the noise image, and use “src/hw8_denoise_sh.m” without any argument to get the output in “out/”.