Computer Version HW8

(a) Generate noisy images with gaussian noise(amplitude of 10 and 30)

(b) Generate noisy images with salt-and-pepper noise(probability 0.1 and 0.05)

(c) Use the 3x3, 5x5 box filter on images generated by (a)(b)

(d) Use 3x3, 5x5 median filter on images generated by (a)(b)

(e) Use both opening-then-closing and closing-then opening filter (using the octogonal 3-5-5-5-3 kernel, value = 0) on images generated by (a)(b)

1. gaussian noise, amplitude = 10

gaussian noise, amplitude = 10, SNR = 13.59

Box_3x3, SNR = 11.12

Box_5x5, SNR = 11.24

Median_3x3, SNR = 11.38

Median_5x5, SNR = 11.87

Opening-then-closing, SNR = 13.23

Closing-then-opening, SNR = 13.59

2. gaussian noise, amplitude = 30

gaussian noise, amplitude = 30, SNR = 4.05

Box_3x3, SNR = 9.37

Box_5x5, SNR = 10.53

Median_3x3, SNR = 8.91

Median_5x5, SNR = 10.75

Opening-then-closing, SNR = 11.20

Closing-then-opening, SNR = 11.16

3. salt-and-pepper noise, probability = 0.05

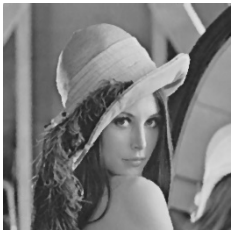salt-and-pepper noise, probability = 0.05, SNR = 0.91

Box_3x3, SNR = 7.73

Box_5x5, SNR = 9.33

Median_3x3, SNR = 11.50

Median_5x5, SNR = 11.83

Opening-then-closing, SNR = 5.50

Closing-then-opening, SNR = 4.89

4. salt-and-pepper noise, probability = 0.1

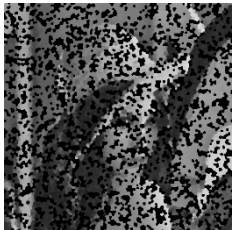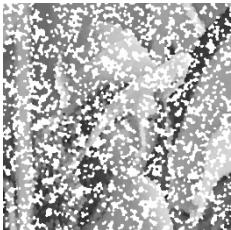salt-and-pepper noise, probability = 0.1, SNR = -2.10

Box_3x3, SNR = 5.47

Box_5x5, SNR = 7.46

Median_3x3, SNR = 10.55

Median_5x5, SNR = 11.70

Opening-then-closing, SNR = -2.27

Closing-then-opening, SNR = -2.45

SNR of test is 15.673697

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SNR of g_10 is 13.594445

SNR of g_30 is 4.050235

------ b ------

SNR of sp_05 is 0.905577

SNR of sp_10 is -2.096012

------ c ------

SNR of box_3_g_10 is 11.121654

SNR of box_5_g_10 is 11.241987

SNR of box_3_g_30 is 9.365654

SNR of box_5_g_30 is 10.526847

SNR of box_3_sp_05 is 7.726883

SNR of box_5_sp_05 is 9.327287

SNR of box_3_sp_10 is 5.473661

SNR of box_5_sp_10 is 7.462913

------ d ------

SNR of median_3_g_10 is 11.377463

SNR of median_5_g_10 is 11.874058

SNR of median_3_g_30 is 8.908818

SNR of median_5_g_30 is 10.745296

SNR of median_3_sp_05 is 11.500012

SNR of median_5_sp_05 is 11.831902

SNR of median_3_sp_10 is 10.552937

SNR of median_5_sp_10 is 11.703424

------ e ------

SNR of opening-then-closing_g_10 is 13.226576

SNR of opening-then-closing_g_30 is 11.196650

SNR of opening-then-closing_sp_05 is 5.502238

SNR of opening-then-closing_sp_10 is -2.274429

SNR of closing-then-opening_g_10 is 13.585689

SNR of closing-then-opening_g_30 is 11.155196

SNR of closing-then-opening_sp_05 is 4.893272

SNR of closing-then-opening_sp_10 is -2.454150