

# 電腦視覺 HW8

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source code : src/img\_process.py, src/SNR.py

using language : python

using material : numpy, PIL, math

\* following images are resized to fit in the page

## # Result

src/gaussian\_30.png



gaussian noise, amplitude = 30



box filter 3x3

5.87845463347391

box filter 5x5

5.34827167787990

medium filter 3x3

5.65582345240829



medium filter 5x5

5.31668114940015

opening then closing

4.50117906066508

closing then opening

3.622808437436198

src/gaussian\_10.png



gaussian noice, amplitude = 10

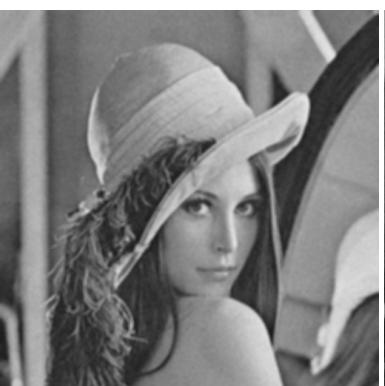


box filter 3x3

13.11170748087524

box filter 5x5

11.5502244657552



medium filter 3x3

13.25276099732106



medium filter 5x5

12.08194495110329

opening then closing

7.74797897998646



closing then opening

6.967274601357224

src/pepper\_010.png



salt and pepper noise, threshold = 0.1



box filter 3x3

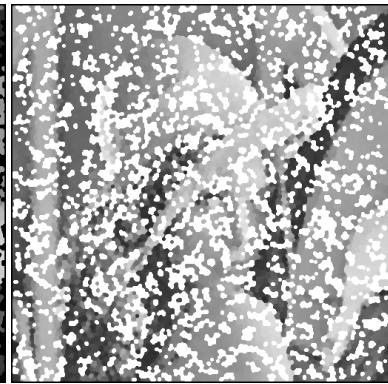
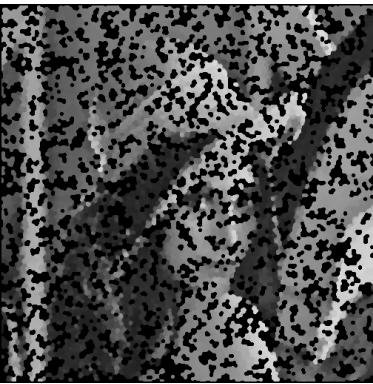
1.987840860883255

box filter 5x5

1.615142917662591

medium filter 3x3

1.45619854458644



medium filter 5x5

1.385110066978916

opening then closing

-0.98868955353703

closing then opening

-1.3254533918285

src/pepper\_005.png



salt and pepper noise, threshold = 0.05



box filter 3x3

3.47739687695812



box filter 5x5

3.05975875134327



medium filter 3x3

3.01349915790343



medium filter 5x5

2.91093625084466



opening then closing

1.613592531770341



closing then opening

1.619637930321703