

# Computer Vision HW8 Report

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## SNR

先根據規定的 SNR 製作出函數

```
def snr(img, img_noise):  
    r, c = img.shape  
    img = img / 255.0  
    img_noise = img_noise / 255.0  
  
    n = r * c  
    u = np.mean(img)  
  
    vs = 0.0  
    for i in range(r):  
        for j in range(c):  
            vs += math.pow(img[i,j] - u, 2)  
    vs = vs / n  
  
    un = 0.0  
    for i in range(r):  
        for j in range(c):  
            un += (img_noise[i][j] - img[i][j])  
    un = un / n  
  
    vn = 0.0  
    for i in range(r):  
        for j in range(c):  
            vn += (math.pow(img_noise[i][j] - img[i][j] - un, 2))  
    vn = vn / n  
  
    return 20*math.log10(math.sqrt(vs)/math.sqrt(vn))
```

## Guassian Noise(Amplitude 10)

Original (snr: 13.606)



**box 3x3 filter (snr: 17.736)**

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**box 5x5 filter (snr: 14.858)**

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**med 3x3 filter (snr: 17.634)**

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**med 5x5 filter (snr: 16.000)**

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**O-C (snr: 13.154)**

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**C-O (snr: 13.388)**

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**Guassian Noise(Amplitude 30)**

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**Original (snr: 4.047)**

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**box 3x3 filter (snr: 12.573)**

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**box 5x5 filter (snr: 12.985)**

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**med 3x3 filter (snr: 11.072)**

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**med 5x5 filter (snr: 12.886)**

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**O-C (snr: 10.686)**

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**C-O (snr: 10.727)**

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**salt and pepper( $p = 0.1$ )**

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**Original (snr: -2.088)**

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**box 3x3 filter (snr: 5.373)**

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**box 5x5 filter (snr: 6.747)**

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**med 3x3 filter (snr: 15.095)**

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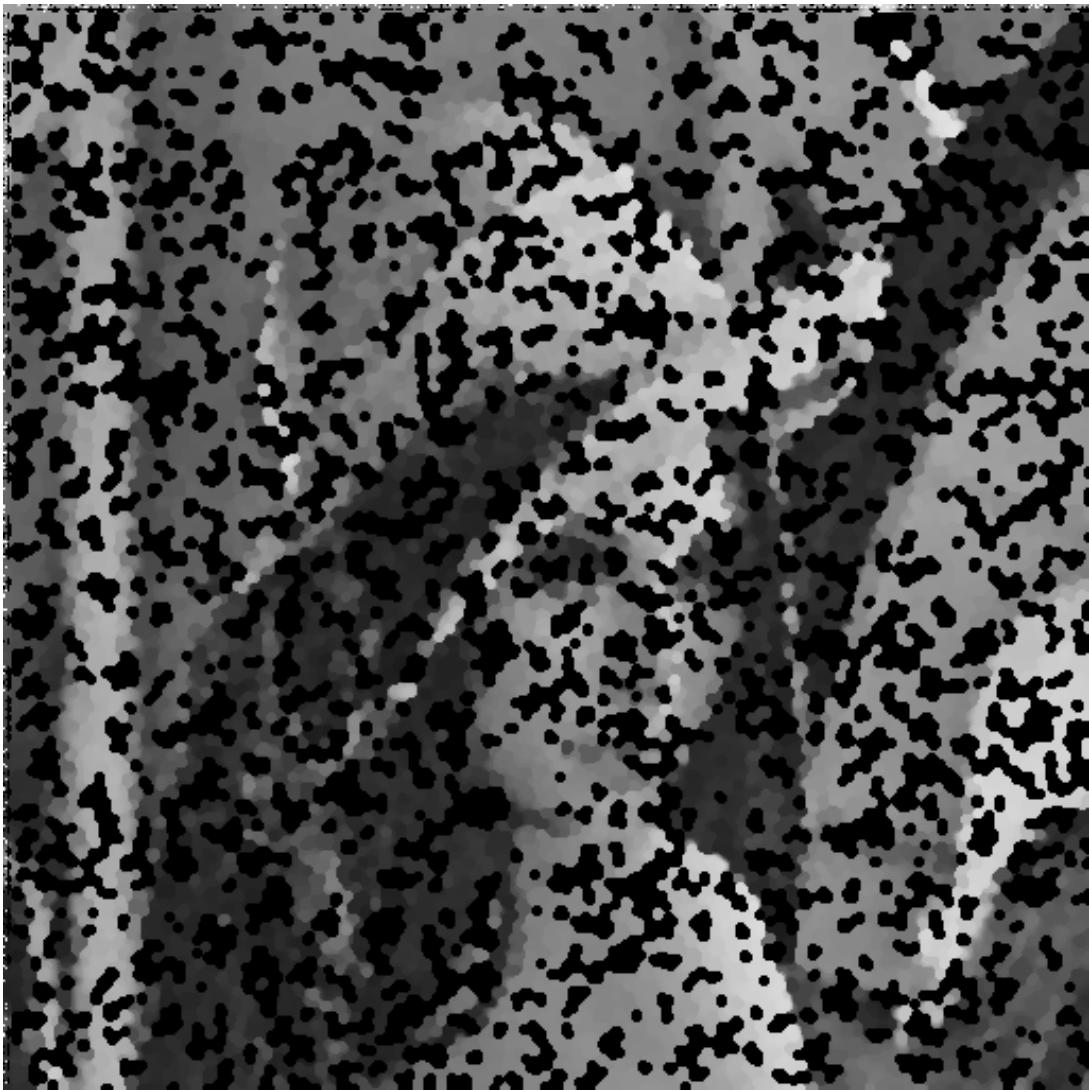
**med 5x5 filter (snr: 15.742)**

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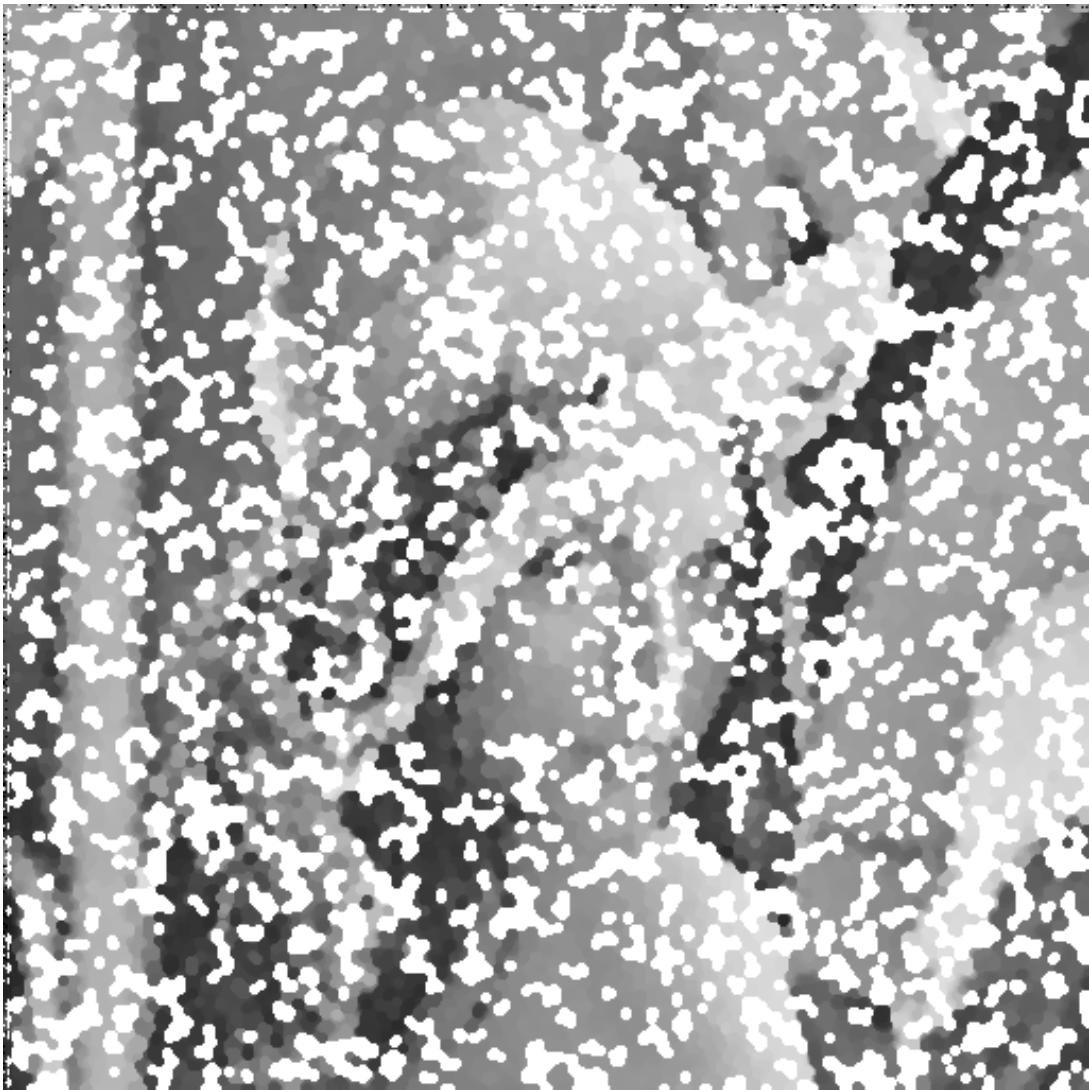
**O-C (snr: -2.283)**

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C-O (snr: -2.505)

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**salt and pepper( $p = 0.05$ )**

**Original (snr: 0.901)**

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**box 3x3 filter (snr: 9.416)**

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**box 5x5 filter (snr: 11.090)**

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**med 3x3 filter (snr: 19.116)**

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**med 5x5 filter (snr: 16.331)**

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**O-C (snr: 5.597)**

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**C-O (snr: 5.007)**

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