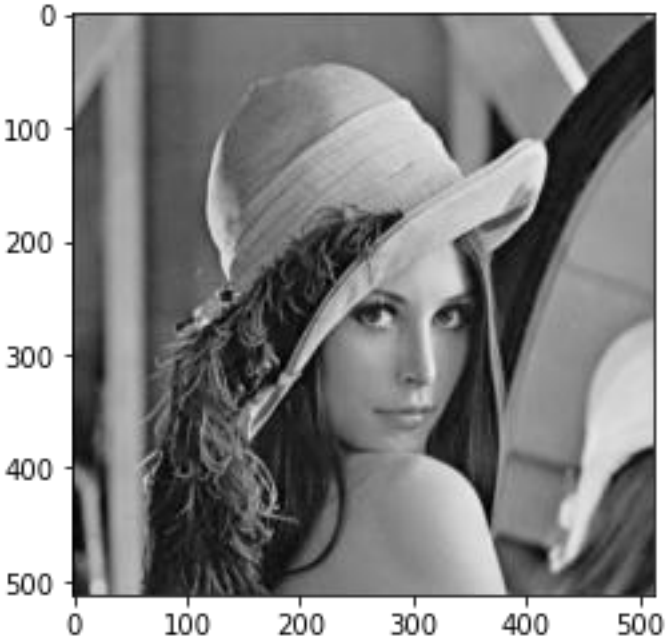
電腦視覺 hw9 資工所碩一 R09922127 林聖哲

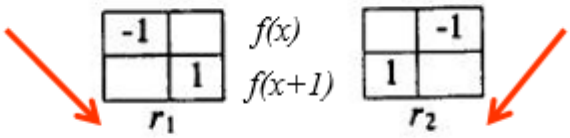
Python 版本 3.6.12
使用套件 cv2, numpy, matplotlib

Original Image:



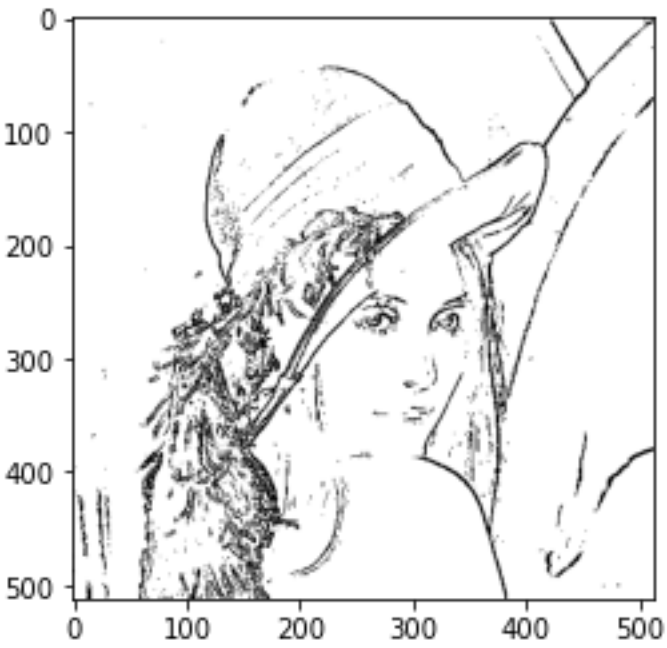
(a) Robert's Operator: 12

$$f'(x) \approx f(x+1) - f(x)$$



gradient magnitude: $\sqrt{r_1^2 + r_2^2}$

對原圖每個 pixel 算出卷積，求出 r1 r2，算出 gradient magnitude >= threshold 設為 0



(b) Prewitt's Edge Detector: 24

$f'(x) \approx f(x+1) - f(x-1)$ **Threshold=24**

-1	-1	-1
1	1	1

p_1

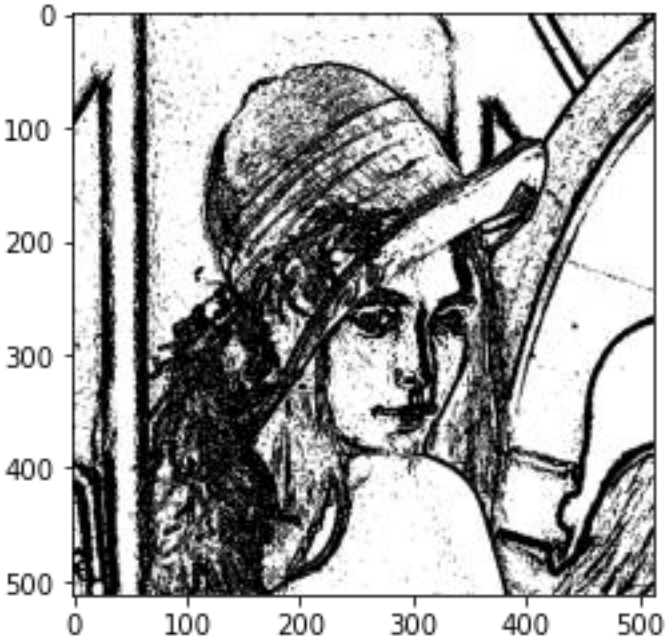
$f(x-1)$

$f(x+1)$

-1		1
-1		1
-1		1

p_2

對原圖每個 pixel 算出卷積, 求出 p1 p2, 算出 gradient magnitude >= threshold 設為 0



(c) Sobel's Edge Detector: 38

$f'(x) \approx f(x+1) - f(x-1)$ **Threshold=38**

-1	-2	-1
1	2	1

s_1

$f(x-1)$

$f(x+1)$

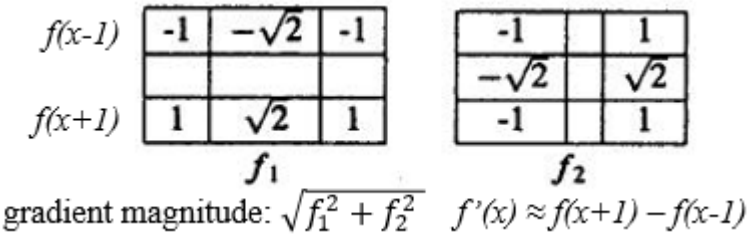
-1		1
-2		2
-1		1

s_2

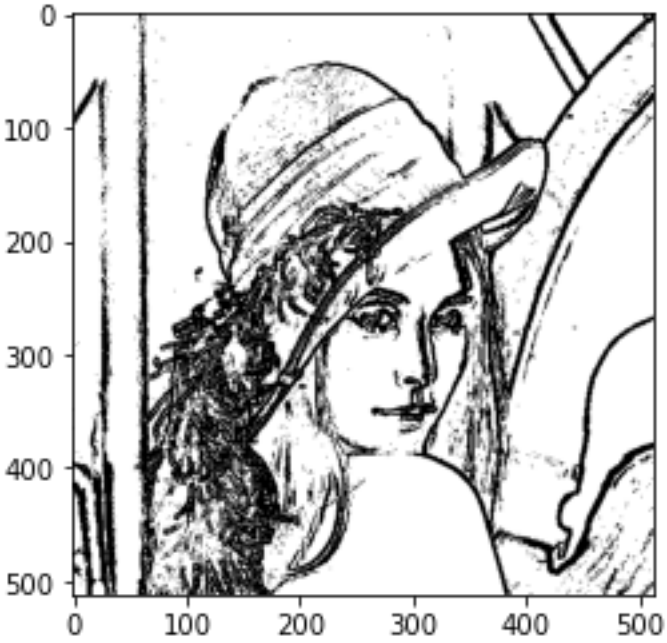
gradient magnitude: $\sqrt{s_1^2 + s_2^2}$

對原圖每個 pixel 算出卷積, 求出 s1 s2, 算出 gradient magnitude >= threshold 設為 0

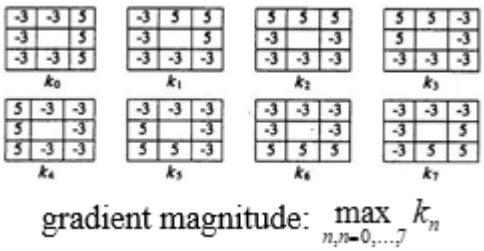
(d) Frei and Chen's Gradient Operator: 30



對原圖每個 pixel 算出卷積, 求出 f1 f2, 算出 gradient magnitude >= threshold 設為 0

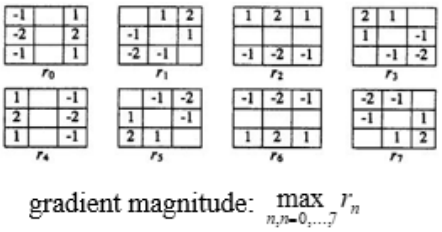


(e) Kirsch's Compass Operator: 135



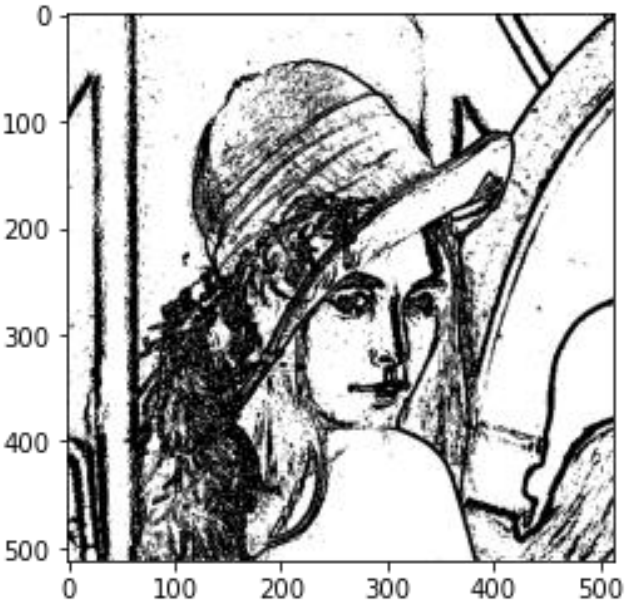
對原圖每個 pixel 算出卷積, 求出 k0~f7, 算出 gradient magnitude(=max(ki)) >= threshold 設為 0

(f) Robinson's Compass Operator: 43

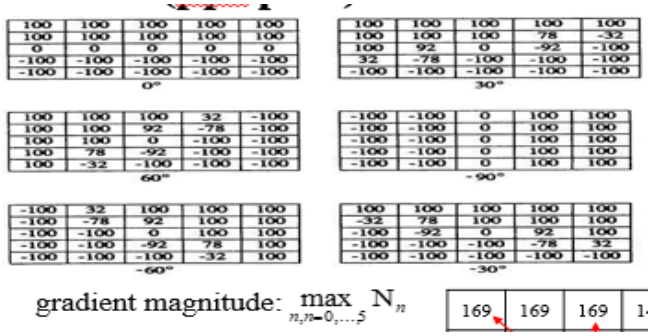


gradient magnitude: $\max_{n,n=0,\ldots,7} r_n$

對原圖每個 pixel 算出卷積, 求出 r0~r7, 算出 gradient magnitude(=max(ri)) >= threshold 設為 0



(g) Nevatia-Babu 5x5 Operator: 12500



gradient magnitude: $\max_{n,n=0,\ldots,5} N_n$

對原圖每個 pixel 算出卷積, 求出 N0~N5,算出 gradient magnitude(=max(Ni)) >= threshold 設為 0