Computer Vision Homework 9

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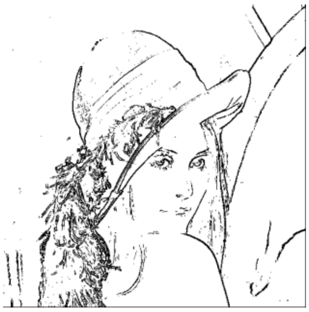
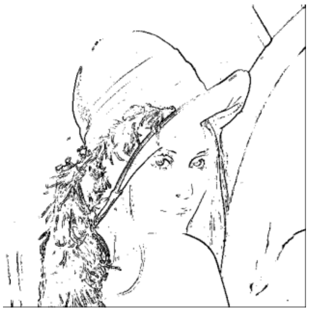
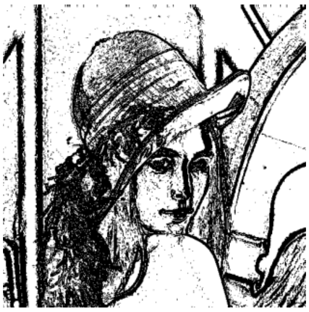
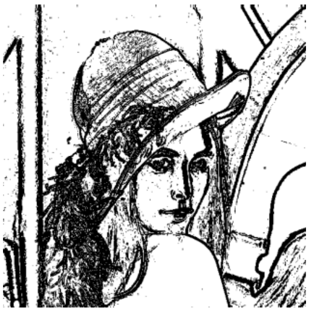
All of the operator implementation follows the introduction on the PDF.

1. **padding**
2. **create np array for different algorithm, e.g. r0, r1, r2, k0, k1, k2...etc**
3. **use different filter to determined whether the value is greater than threshold or not.**
4. **Put corresponding pixel value on new image.**
5. **Result:**

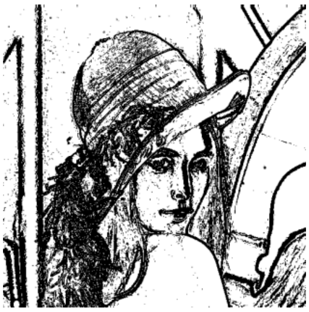
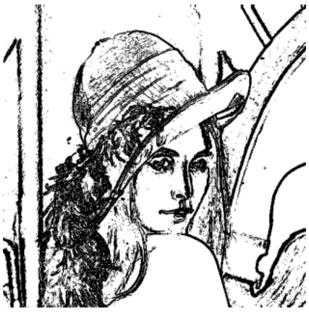
(a) Robert's Operator: 35

		
原圖	Threshold =40	Threshold = 35

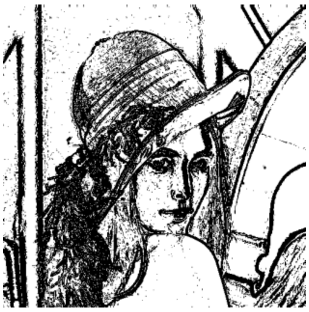
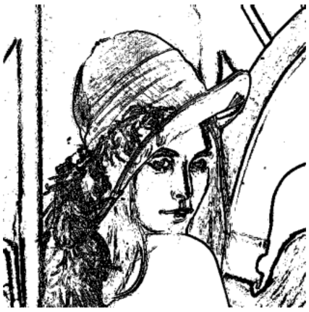
(b) Prewitt's Edge Detector: 30

		
原圖	Threshold =24	Threshold = 30

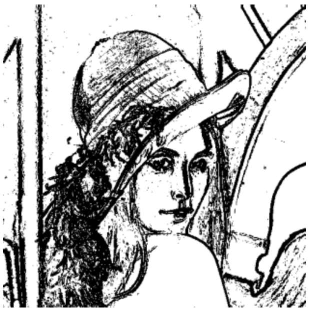
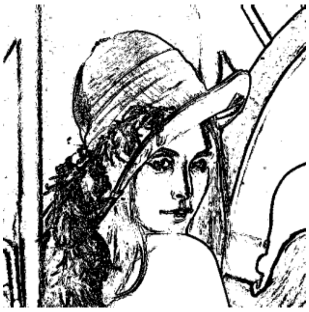
(c) Sobel's Edge Detector: 50

		
原圖	Threshold =38	Threshold = 50

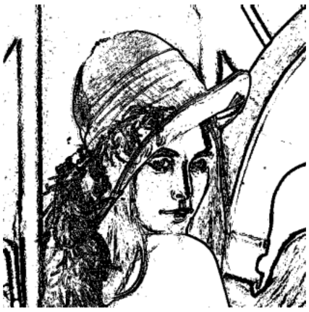
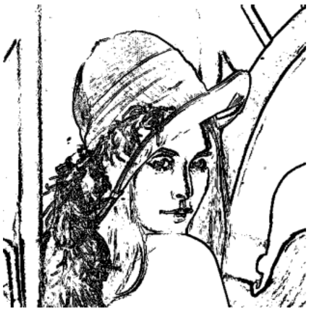
(d) Frei and Chen's Gradient Operator: 40

		
原圖	Threshold =30	Threshold = 40

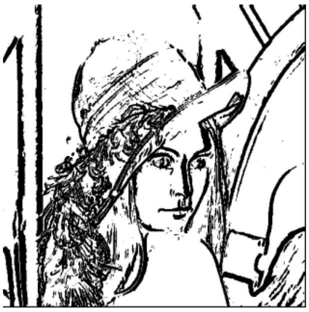
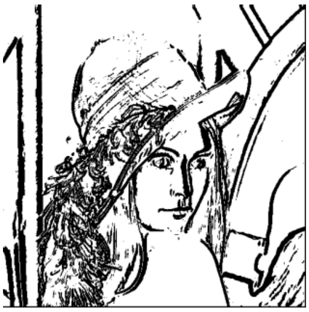
(e) Kirsch's Compass Operator: 150

		
原圖	Threshold =135	Threshold = 150

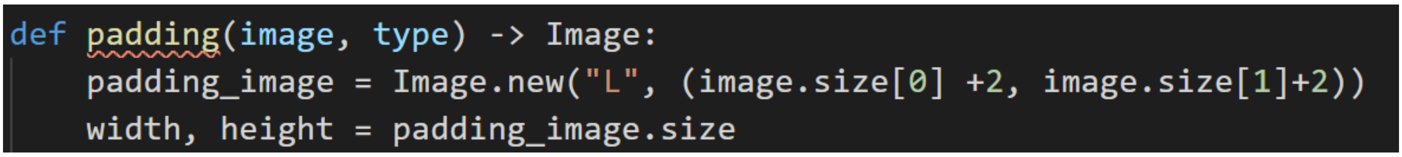
(f) Robinson's Compass Operator: 60

		
原圖	Threshold =43	Threshold = 60

(g) Nevatia-Babu 5x5 Operator: 13000

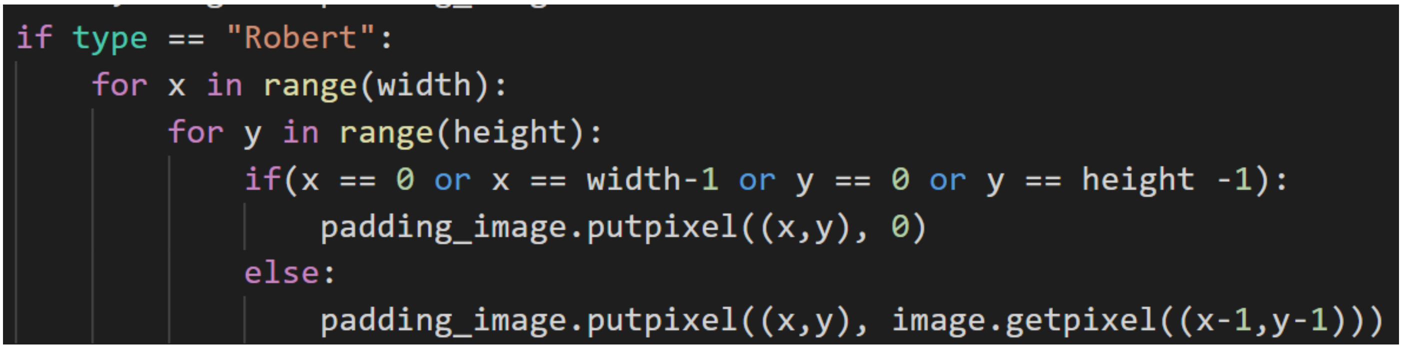
		
原圖	Threshold =12500	Threshold = 13000

Padding implementation



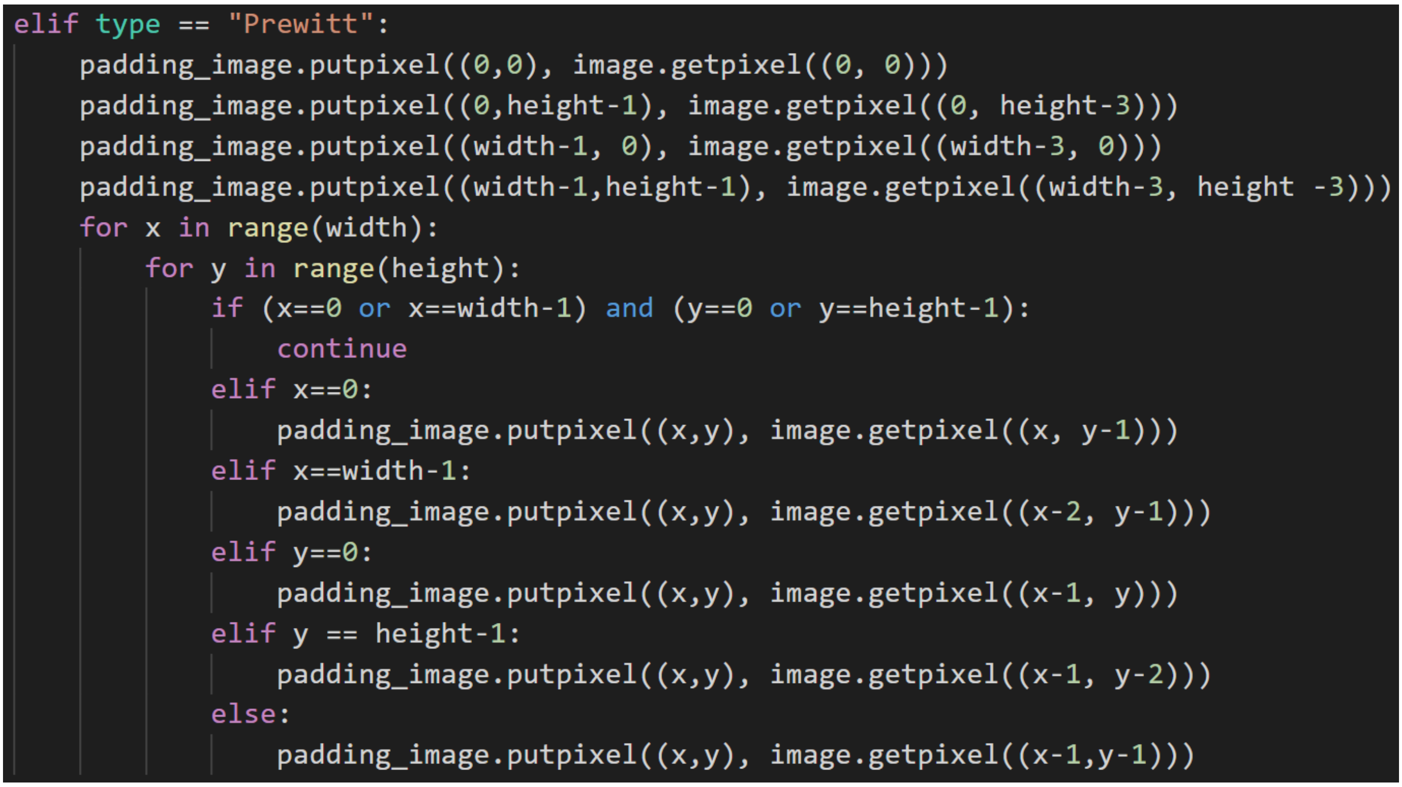
```
def padding(image, type) -> Image:
    padding_image = Image.new("L", (image.size[0] +2, image.size[1]+2))
    width, height = padding_image.size
```

for Robert operator



```
if type == "Robert":
    for x in range(width):
        for y in range(height):
            if(x == 0 or x == width-1 or y == 0 or y == height -1):
                padding_image.putpixel((x,y), 0)
            else:
                padding_image.putpixel((x,y), image.getpixel((x-1,y-1)))
```

For the other



```
elif type == "Prewitt":
    padding_image.putpixel((0,0), image.getpixel((0, 0)))
    padding_image.putpixel((0,height-1), image.getpixel((0, height-3)))
    padding_image.putpixel((width-1, 0), image.getpixel((width-3, 0)))
    padding_image.putpixel((width-1,height-1), image.getpixel((width-3, height -3)))
    for x in range(width):
        for y in range(height):
            if (x==0 or x==width-1) and (y==0 or y==height-1):
                continue
            elif x==0:
                padding_image.putpixel((x,y), image.getpixel((x, y-1)))
            elif x==width-1:
                padding_image.putpixel((x,y), image.getpixel((x-2, y-1)))
            elif y==0:
                padding_image.putpixel((x,y), image.getpixel((x-1, y)))
            elif y == height-1:
                padding_image.putpixel((x,y), image.getpixel((x-1, y-2)))
            else:
                padding_image.putpixel((x,y), image.getpixel((x-1,y-1)))
```