電腦視覺 HW4

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source code : src/img_process.py
using language : python
using material : numpy, PIL
* following images are resized to fit in the page

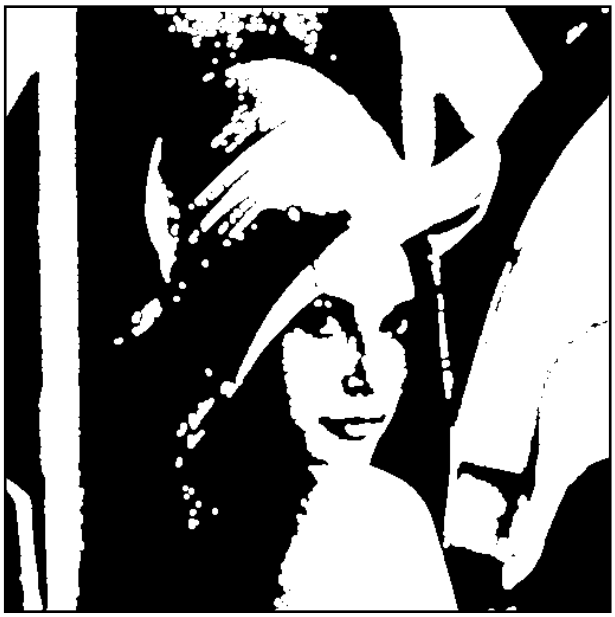
(a). Dilation

src/dil.png

(b). Erosion

src/ero.png

(c). Opening



src/open.png

(d). Closing

src/close.png

(e). Hit-and-Miss

src/HnM.png

The dilation algorithm in (a):

```
Dilation(img, kernel):
        Dil_img = new black canvas
        for white_pixel in img:
                for offset in kernel:
                        if(position(white_pixel) + offset inside canvas):
                                Dil_img[position(white_pixel) + offset] = white_pixel
        return Dil_img
```

(b) to (d) use the same material:

```
Erosion(img, kernel) = invert(Dilation(invert(img), transpose(kernel)))
Opening(img, kernel) = Erosion(Dilation(img, kernel), kernel)
Closing(img, kernel) = Dilation(Erosion(img, kernel), kernel)
```

(e) :

```
Hit_and_Miss(img, J_kernel, K_kernel) =
        IN = Erosion(img, J_kernel)
        OUT = Erosion(invert(img), K_kernel)
        logical = IN AND OUT            // done by np.logical_and
        return logical
```

ALL of the array was transformed into boolean array, since its easier to compute in this form.

Additions: Function improvements from previous homework.

Binary functions (threshold function) now has less steps, significantly improved in speed, also it operates in boolean style now.

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