Assignment8

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01.08.2021

Contents

1 Dilation

[1] The basic idea of dilation is it dilates the boundaries of the foreground object. The kernel slides through the image (as in 2D convolution). A pixel in the original image (either 1 or 0) will be considered 1 only if at least one of the pixels under the kernel is 1.

So the thickness or size of the foreground object increases, or it increases, the white region in the image or size of the foreground object increases.

2 Erosion

[1] The basic idea of erosion is it erodes away the boundaries of the foreground object. The kernel slides through the image (as in 2D convolution). A pixel in the original image (either 1 or 0) will be considered 1 only if all the pixels under the kernel is 1, otherwise it is eroded (made to zero).

So the thickness or size of the foreground object decreases or simply white region decreases in the image. It is useful for removing small white noises.

3 Opening

[1] Opening is just another name for erosion followed by dilation. It is useful in removing noise.

4 Closing

[1] Closing is reverse of Opening, Dilation followed by Erosion. It is useful in closing small holes inside the foreground objects, or small black points on the object.

5 Analysis

In the code, we used 3 types of 35x35 kernel. One is rectangular shape, one is ellipse shape and one is cross shape. We used,

```
kernel_1 = cv2.getStructuringElement(cv2.MORPH_RECT,(35,35))
```

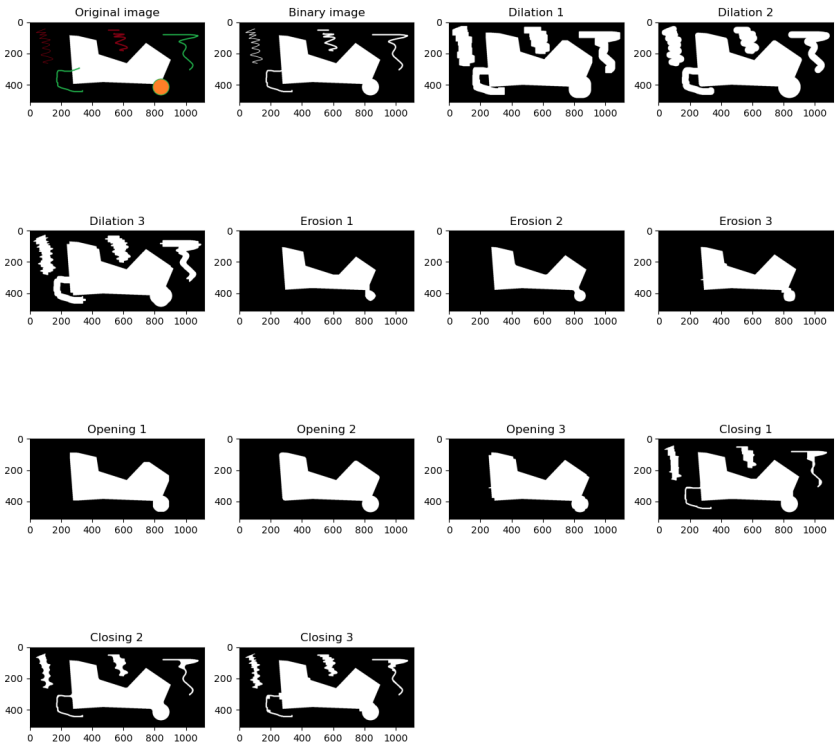
```
kernel_2 = cv2.getStructuringElement(cv2.MORPH_ELLIPSE,(35,35))

kernel_3 = cv2.getStructuringElement(cv2.MORPH_CROSS,(35,35))
```

.

And to perform operation we used open-cv built in functions,

```
cv2.dilate(img,kernel)
cv2.erode(img, kernel)
cv2.morphologyEx(img, cv2.MORPH_OPEN, kernel)
cv2.morphologyEx(img, cv2.MORPH_CLOSE, kernel)
```

We can see the result in the image below



References

[1] Morphological analysis.