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FDVIP Lab

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Date : *5/4/2023*

AIM - To study and perform morphological operations on an image.

1. Erosion
2. Dilation
3. Opening
4. Closing

Importing Dependencies

```
import cv2
import matplotlib.pyplot as plt
import numpy as np
```

Reading the images

```
image = cv2.imread("../data/mri_2.png", 0)
```

1. Erosion

Creating Kernel

```
kernel = np.ones((5, 5), np.uint8)
```

Applying Erosion

```
binr = cv2.threshold(img, 0, 255, cv2.THRESH_BINARY + cv2.THRESH_OTSU)[1]

invert = cv2.bitwise_not(binr)

erosion = cv2.erode(invert, kernel, iterations=1)
```

2. Dilation

Creating Kernel

```
kernel = np.ones((5, 5), np.uint8)
```

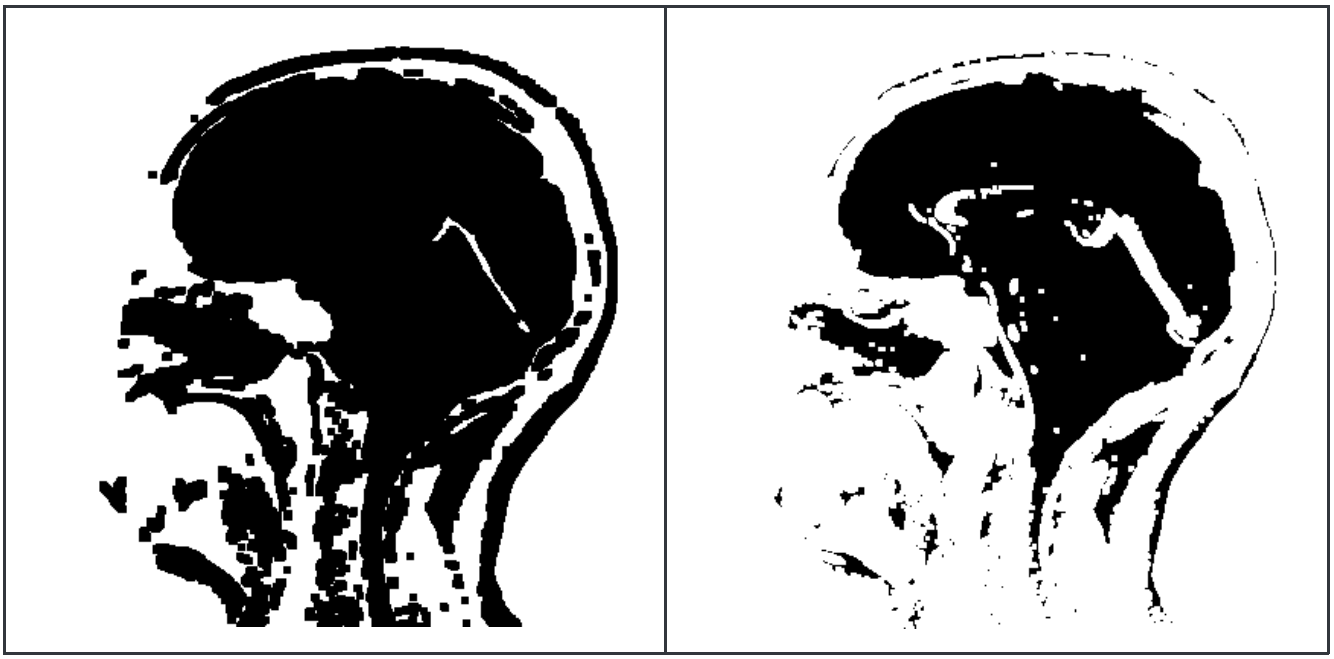
Applying Dilation

```
binr = cv2.threshold(img, 0, 255, cv2.THRESH_BINARY + cv2.THRESH_OTSU)[1]

invert = cv2.bitwise_not(binr)

dilation = cv2.dilate(invert, kernel, iterations=1)
```

Output



Eroded Image	Dilated Image

3. Opening

Creating Kernel

```
kernel = np.ones((5, 5), np.uint8)
```

Applying Opening

```
binr = cv2.threshold(img, 0, 255, cv2.THRESH_BINARY + cv2.THRESH_OTSU)[1]

invert = cv2.bitwise_not(binr)
for i in range(0, 25, 5):
    opening = cv2.morphologyEx(binr, cv2.MORPH_OPEN, kernel, iterations=i)
    cv2.imwrite(f"../data/opening_{i}.png", opening)
```

Output

Image						
Iteration	**0**	**5**	**10**	**15**	**20**	**25**

4. Closing

Creating Kernel

```
kernel = np.ones((5, 5), np.uint8)
```

Applying Closing

```
binr = cv2.threshold(img, 0, 255, cv2.THRESH_BINARY + cv2.THRESH_OTSU)[1]

invert = cv2.bitwise_not(binr)
for i in range(0, 25, 5):
    closing = cv2.morphologyEx(binr, cv2.MORPH_CLOSE, kernel, iterations=i)
    cv2.imwrite(f"../data/closing_{i}.png", closing)
```

Output

Image						
Iteration	0	5	10	15	20	25