assignment 8

Abdur Rahim Sheikh

August 2022

1 Introduction

This problem was stated as "Implement functions for erosion, dilation, opening and closing operations by Python. Then compare the output of your implemented functions with the output of the OpenCV's built-in functions."

So I used custom made function erode and dilate to output the desired functions. How I completed the problem is described below.

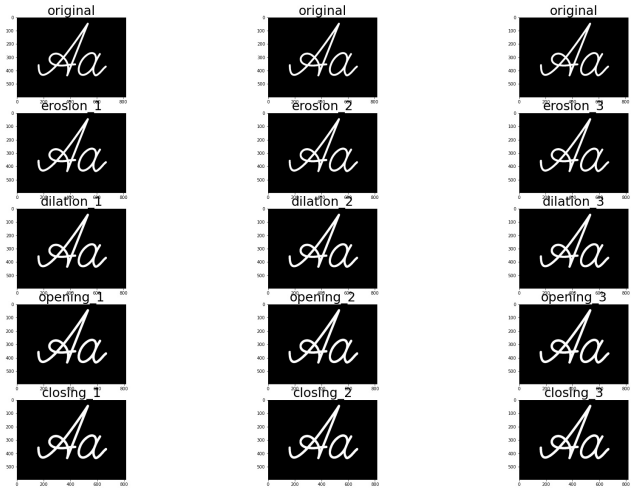
1. imported necessary packages like numpy,matplotlib and cv2
2. loaded an image of english alphabet 'Aa' then converted it to grayscale and then to binary.0,255.
3.
```
def dilate(img,kernel):
    h,w = kernel.shape
    new_img = np.zeros((img.shape[0]-h+1,img.shape[1]-w+1))

    for i in range(new_img.shape[0]):
        for j in range(new_img.shape[1]):
            hit = np.matmul(img[i:i+h,j:j+w],kernel).sum() > 0
            new_img[i,j] = hit

    return new_img
```
4. erode will be same
```
fit = np.matmul(img[i:i+h,j:j+w],kernel).sum() >= kernel.sum()
```
5. Created 3 kernel
6. implemented 2 function named 'erode' and 'dilate' to perform the job.
7. Applied erode and dilate to the binary image.
8. then mixed these methode to create opening and closing like below. let A is the image and B is the kernel then,

- opening = dilate(erode(image,kernel),kernel)
- closing = erode(dilate(image,kernel),kernel) 6) finally I plotted those image using matplotlib.

2 Outcome



This is the result of my work