Erosion$_D ilation_O pening_C losing$

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1 Introduction

Morphological operations are a set of operations that process images based on shapes. They apply a structuring element to an input image and generate an output image. The most basic morphological operations are two: Erosion and Dilation

2 Basics of Erosion:

- Erodes away the boundaries of the foreground object
- Used to diminish the features of an image.

Working of erosion:

1. A kernel(a matrix of odd size(3,5,7) is convolved with the image.
2. A pixel in the original image (either 1 or 0) will be considered 1 only if all the pixels under the kernel are 1, otherwise, it is eroded (made to zero).
3. Thus all the pixels near the boundary will be discarded depending upon the size of the kernel.
4. So the thickness or size of the foreground object decreases or simply the white region decreases in the image.

Output of Erosion: white noises is removed and it's edge becomes sharped.

3 Basics of dilation:

- Increases the object area
- Used to accentuate features

Working of dilation:

1. A kernel(a matrix of odd size(3,5,7) is convolved with the image.
2. A pixel element in the original image is '1' if at least one pixel under the kernel is '1'.

Output of Dilation: It do bold the images edges and looks like bold color.

4 Basics of Opening:

The Opening operator was specified which was applying the erosion operation after dilation. It helps in removing the internal noise in the image.

5 Basics of Closing:

In closing operation, dilation followed by an erosion using the same structuring element used in the opening operation. That means we do first erosion and then dilation.