**Morphological Operations**

Morphological operations are a set of operations related to the shape or morphology of features in an image. They are particularly useful in the processing of binary images (but can also be applied to grayscale images) and are often used for tasks such as noise removal, hole filling, component connection, and finding intensity bumps or gaps. The two basic morphological operators are dilation and erosion, and there are several others built upon these.

**Erosion**

Erosion shrinks bright regions and enlarges dark regions. It works by convolving a kernel over the image and replacing the central pixel with the minimum pixel value in the area covered by the kernel. As a result, bright areas smaller than the kernel disappear.

**Dilation**

Dilation does the opposite of erosion. It grows bright regions and shrinks dark regions. During dilation, the central pixel of the kernel area is replaced with the maximum value of the pixels under the kernel. This can cause bright regions to grow and can fill in small holes and gaps.

**Opening**

This is an erosion followed by a dilation, used to remove small objects from the foreground (typically small white noises), while preserving the shape and size of larger objects in the image.

**Closing**

This is a dilation followed by an erosion, used to close small holes inside the foreground objects or small black points on the object.