Dilation

For image and structuring element in (2D integer space), Dilation is defined as

In the equation, means taking the reflection of B about the origin and shifting it by . Hence dilation of with is a set of all displacements, , such that and overlap by atleast one element.

Flipping of about the origin and then moving it past image is analogous to the convolution process. In practice, flipping of is not always done. Dilation adds pixels to the boundaries of objects in an image. Number of pixels added depends on the size and shape of the structuring elements.

Erosion

For image and structuring element in (2D integer space), Erosion is defined as

This equation indicates that erosion of A by B is the set of all points Z such that B, translated (shifted by Z), is a subset of A, i.e., B is entirely contained within A. Erosion reduces the number of pixels from the object boundary. The number of pixels removed depends on the size of the structuring element.