

Image processing: Assignment 2

Images E1,E2,E3,E4

Table 1: Number of distinct pixel values of image before and after dilations with increasing structuring element size.

	A	E1	E2	E3	E4	E5
Element size	N.A.	3	5	7	9	11
# of values	255	250	248	246	244	244

After applying a dilation, we see a decrease in distinct pixel values in the image. Greyscale dilation is defined on an image I and structuring element H as follows:

$$(I \oplus H)(u, v) = \max_{(i,j) \in H} \{I(u+i, v+j) + H(i, j)\}$$

Since this maximum value can be the same in two neighbouring subimages of I , two adjacent pixels of different pixel values can end up with the same value. If for example a white pixel is surrounded by a variety of lower valued pixels, these surrounding pixels will all become white as a result of the dilation. This in turn can lead to a loss in the number of pixel values used.