POLITÉCNICA

EXERCISE 2C:
ESTIMATION OF NUMBER OF OPERATIONS

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1 Estimation of number of operation

In this document, it is going to be explained how to estimate the number of operations when performing the morphological operation of dilation using two different kernels.

Given an image of size NxN we want to perform a dilation. In order to do so, for each pixel, we need to compute the minimum of the kernel pixels taking that pixel as the kernel origin. Hence, as we need to go over all the pixels the minimum operations would be NxN.

The rest of the operations depends on the kernel size. It is important to note that a dilation of an image with kernel MxM is equivalent to performing two sequential dilations with kernels $1xM$ and $Mx1$.

- Kernel MxM. The total number of operations would be:

$$(NxN)\ x\ (MxM-1)\ =\ N^2\ x\ (M^2-1)$$

  . The minus one is due it is not necessary to compare the number with itself.

- Kernels $1xM$ and $Mx1$. The total number of operations would be:

$$N^2\ x\ (Mx1-1) + N^2x(1xM-1)\ =\ N^2\ x\ 2x(M-1)$$