Digital Image Processing
UPEC - Optics, Image, Vision and Multimedia

1. Morphology Algorithms

1.1. Boundary Extraction

Implement the boundary extraction using the image “boundary.png”. To remind, boundary extraction defines the boundary of an image by first eroding the object with a structuring element and then subtracting the result from the original image. Visualize the result.

$$A - (A \ominus B)$$

1.2. Region Filling

Using the image “coins”, fill holes in the binary image and display the result. Try to do the same on the gray level image.

1.3. Hit-and-miss Transformation

The hit-and-miss transform is a general binary morphological operation that can be used to look for particular patterns of foreground and background pixels in an image.

Using the image “text”, apply the hit-and-miss transformation “*skimage.morphology.binary_hit_or_miss*” to detect a target shape in a string of text. The aim is to identify the letter ‘e’ in a text.

1.4. Morphological Skeletons

The skeleton of a binary image is a representation of the basic form of the object in the image. In other words, it has been reduced down to its minimal level.

Image ‘skeletons’ illustrates different shapes. Consider the function “*bwmorph*”, calculate their corresponding skeletons.