Sibgrapi 2016 - Tutorial Image Operator Learning and Applications

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Exercises

Exercise 1 In this exercise you will apply the hit-miss operator to fill holes in a binary image. The hit-miss operator for a binary image S is defined as:

$$H_{(A,B^c)}(S) = \{x \in E : A_x \subseteq S \text{ and } B_x^c \subseteq S^c\} = \varepsilon_A(S) \cap \varepsilon_{B^c}(S^c)$$

Below is the pair (A, B^c) of structuring elements to "hit-miss" a hole and an image with three objects. The black dot indicates the origin of \mathbb{Z}^2 .



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Image with three objects

Draw your resolution in the figure bellow:



Exercise 2 In this exercise you will apply the hit-miss operator to find extreme points in a binary image.

Below are the structuting elements and the image:



Image with four line segments

Draw your resolution in the figure bellow:



Exercise 3 In this exercise you will collect some window image statistics using a horizontal 1×3 window W with the origin at its center.

Below at left is an image with some vertical stripes with salt and pepper noise and at the right is its original version.



Slide the 1×3 window on the observed image above and count the occurrences of each window pattern. For each pattern, take note of the respective output value in the ideal image above.

Fill the table below.

