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CENG 466

Fundamentals of Image Processing

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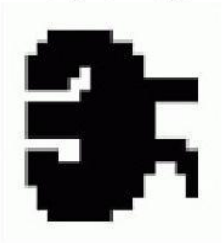
Assignment 2

As a beginning, I want to mention about Morphological filters and its operations. Morphological Image Processing is a type of filter which is collection of non-linear operations related to the shape or morphology of features in an image. These features can be boundaries or skeletons. This filter has two fundamental operations. These are “dilation” and “erosion”. We can add this list “opening” and “closing”. Actually we can create opening and closing operations by using dilation and erosion. If we do erosion first and then dilation its mean “opening” if we do dilation first then erosion its mean “closing”. Now, before my report I want to show my result images after Morphological Image Processing which is done by me.

Original İmage



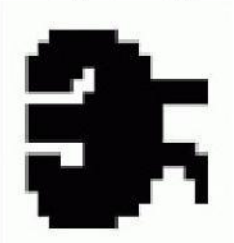
Erosion Image

(7*7 Structuring Element)

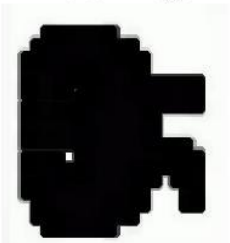
Erosion Image

(11*11 Structuring Element)

Original İmage

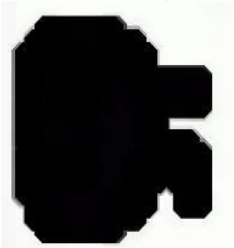


Dilation Image



(7*7 Structuring Element)

Dilation Image



(11*11 Structuring Element)

Structuring element is the number of pixels added or removed from the objects in a image depends on the size and shape of the structuring element. The center pixel of the structuring element, called the **origin**.

For Dilation,

It added pixels to the boundaries of object in my image. It grew and thicken in this image. Thickening is controlled by a shape referred to as structuring element. I applied on my image with different parameters. Firstly i used 7 and then i used 11 as a parameter or window. When I increased the parameter 7 to 11, the folds(curves) of my image gradually disappeared. When I decreased the parameter folds re-appeared.

For Erosion,

It removed pixels on object boundaries of my image. It made smaller and thinned my image. This changing is controlled by structuring element which i used. When i increased the structuring element, detail of image like folds, small protrusion or recess are started to disappear. When I decreased the parameter, details like folds, small protrusion or recess are started to re-appeared.

This processing has been widely use in image processing in recent years. In this processing , we use mathematical morphology. Because of the nature of mathematical morphology, there are some limitations in the performance of simple morphological algorithms that use a single structuring element which we called it as a parameter. When we want to performance of morphological-based filters, we can use multiple multiple structuring elements.

For Comparison of my filter type(Morphological-based Filter) I used an image which containing gaussian noise that is added by me. Then, I observed the results which are obtained by using Morphological, Median and Averaging Filters. Qualities of these result are different and their main error are also different.

When we compare Morphological Filter and Median and Averaging filtering techniques for same image, result are better for Morphological Filter than Median and Averaging techniques.