RAMA UNIVERSITY

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FACULTY OF EGINEERING

Digital Image Processing
LECTURE-33

Mr. Dhirendra

Assistant Professor

Computer Science & Engineering

OUTLINE

- Some Applications of Gray-Scale Morphology
- Granulometry
- MCQ
- References

Applications of Gray-Scale Morphology

Morphological smoothing

Perform opening followed by a closing

The net result of these two operations is to remove or attenuate both bright and dark artifacts or noise.

Morphological gradient

Dilation and erosion are use to compute the morphological gradient of an image, denoted g:

$$g = (f \oplus b) - (f \ominus b)$$

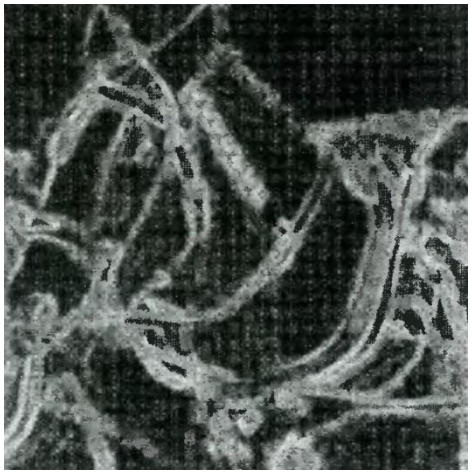
It uses to highlights sharp gray-level transitions in the input image.

Obtained using symmetrical structuring elements tend to depend less on edge directionality.

Some Applications of Gray-Scale Morphology

Morphological smoothing

Morphological gradient



Some Applications of Gray-Scale Morphology

Top-hat transformation

Denoted h, is defined as: $h = f - (f \circ b)$

Cylindrical or parallelepiped structuring element function with a flat top.

Useful for enhancing detail in the presence of shading.

Textural segmentation

The objective is to find the boundary between different image regions based on their textural content.

Close the input image by using successively larger

structuring elements.

Then, single opening is preformed ,and finally a simple threshold that yields the boundary between the textural regions.

Some Applications of Gray-Scale Morphology

Granulometry

Granulometry is a field that deals principally with

determining the size distribution of particles in an image.

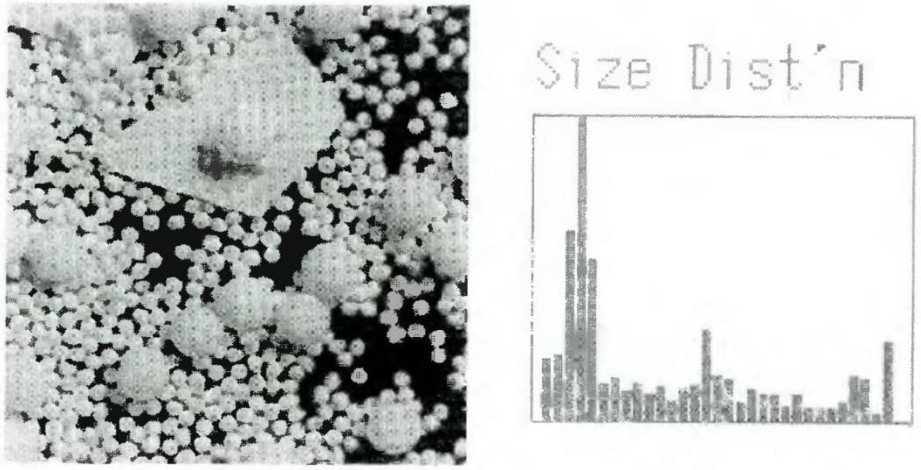
Because the particles are lighter than the background, we can use a morphological approach to determine size distribution. To construct at the end a histogram of it.

•Based on the idea that opening operations of particular size have the most effect on regions of the input image that contain particles of similar size.

•This type of processing is useful for describing regions with a predominant particle-like character.

Some Applications of Gray-Scale Morphology

Granulometry



a b

FIGURE 9.36
(a) Original image consisting of overlapping particles; (b) size distribution. (Courtesy of Mr. A. Morris, Leica Cambridge, Ltd.)

MCQ

1. What is accepting or rejecting certain frequency components called as?
   a) Filtering
   b) Eliminating
   c) Slicing
   d) None of the Mentioned

2. A filter that passes low frequencies is _____
   a) Band pass filter
   b) High pass filter
   c) Low pass filter
   d) None of the Mentioned

3. What is the process of moving a filter mask over the image and computing the sum of products at each location called as?
   a) Convolution
   b) Correlation
   c) Linear spatial filtering
   d) Non linear spatial filtering

MCQ

4. The standard deviation controls _____ of the bell (2-D Gaussian function of bell shape).

   a) Size

   b) Curve

   c) Tightness

   d) None of the Mentioned

5. What is required to generate an M X N linear spatial filter?

   a) MN mask coefficients

   b) M+N coordinates

   c) MN spatial coefficients

   d) None of the Mentioned

References

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