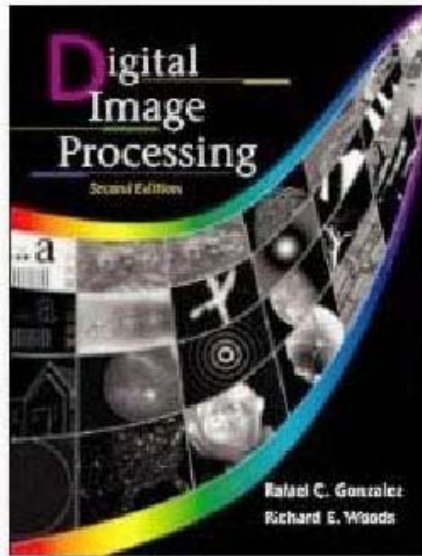# Chapter 9
Morphological Image Processing

Digital Image Processing

Preview

9.1 Preliminaries

9.1.1 Some Basic Concepts from Set Theory

9.1.2 Logic Operations Involving Binary Images

9.2 Dilation and Erosion

9.2.1 Dilation

■ What is **dilation**?

■ Why would one use **dilation**?

- Bridging gaps in between uncompleted edges.

■ Why is **dilation** more desirable than a low-pass filter for bridging gaps?

Because lowpass does a transformation from binary to grayscale, which incurs the cost of transforming an image back to binary. Dilation transforms an image without changing the pixel color properties of the image.

9.2.2 Erosion

What is erosion?

9.3. Opening and Closing

9.4 The Hit-or-Miss Transformation

9.5 Some Basic Morphological Algorithms

9.5.1 Boundary Extraction

9.5.2 Region Filling

9.5.3 Extraction of Connected Components

9.5.4 Convex Hull

What is a convex hull?

9.5.5 Thinning

9.5.6 Thickening

9.5.7 Skeletons

9.5.8 Pruning

9.5.9 Summary of Morphological Operations on Binary Images

9.6 Extensions to Gray-Scale Images

9.6.1 Dilation

9.6.2 Erosion

9.6.3 Opening and Closing

9.6.4 Some Applications of Gray-Scale Morphology

Textural Segmentation

Granulometry

Summary

Questions