Region Properties

Motion

Lecture 14
19-10-02

Dilation: Formal Definition

- Let $X_t$ denote translation of pixels of $X$ by position vector $t$
  
  \[ X_t = \{ x + t \mid x \in X \} \]

- Then

\[
B \oplus S = \bigcup_{b \in B} S_b
\]
Dilation

- Given \( B \) and \( S \)
- Sweep \( S \) over \( B \)
- Each time origin of \( S \) is over a binary 1-pixel in \( B \), the entire translated structuring element is ORed to the output image

Dilation example
Example –

Dilation by BOX(3,3)

Erosion

- Formal Definition

\[ B \oplus S = \{ b \mid b + s \in B \ \forall s \in S \} \]

- Given \( B \) and \( S \)
- Sweep \( S \) over \( B \)
- At each position where every 1 in \( S \) covers a 1 in \( B \), put 1 in output at the location of origin
Example – Erosion by BOX(3,3)

Region Properties

- Area
- Centroid
- Bounding Box
- Perimeter (connectivity definitions)
- Perimeter Length
- Circularity Definitions
- 2nd Moments, relation with elliptical shapes
Review of Module 2

- Chapter 3 (3.1-3.6)
- Chapter 5 (5.6-5.8)
- 10.3.2, 10.3.4
- Additional material on GHT