RAMA UNIVERSITY

www.ramauniversity.ac.in

FACULTY OF EGINEERING

Digital Image Processing
LECTURE-28

Mr. Dhirendra

Assistant Professor

Computer Science & Engineering

OUTLINE

- Basic Morphological Algorithms
- Boundary Extraction
- Region Filling
- MCQ
- References

Basic Morphological Algorithms

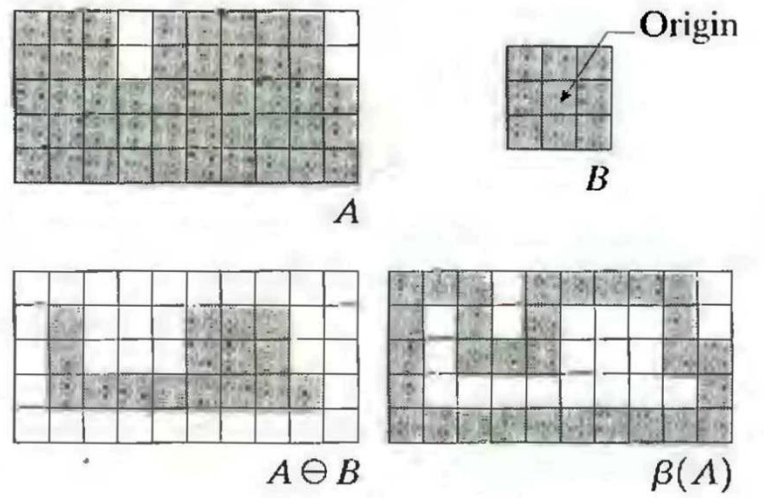
- Boundary Extraction
- Region Filling
- Extraction of Connected Components
- Convex Hull
- Thinning
- Thickening
- Skeletons

Boundary Extraction

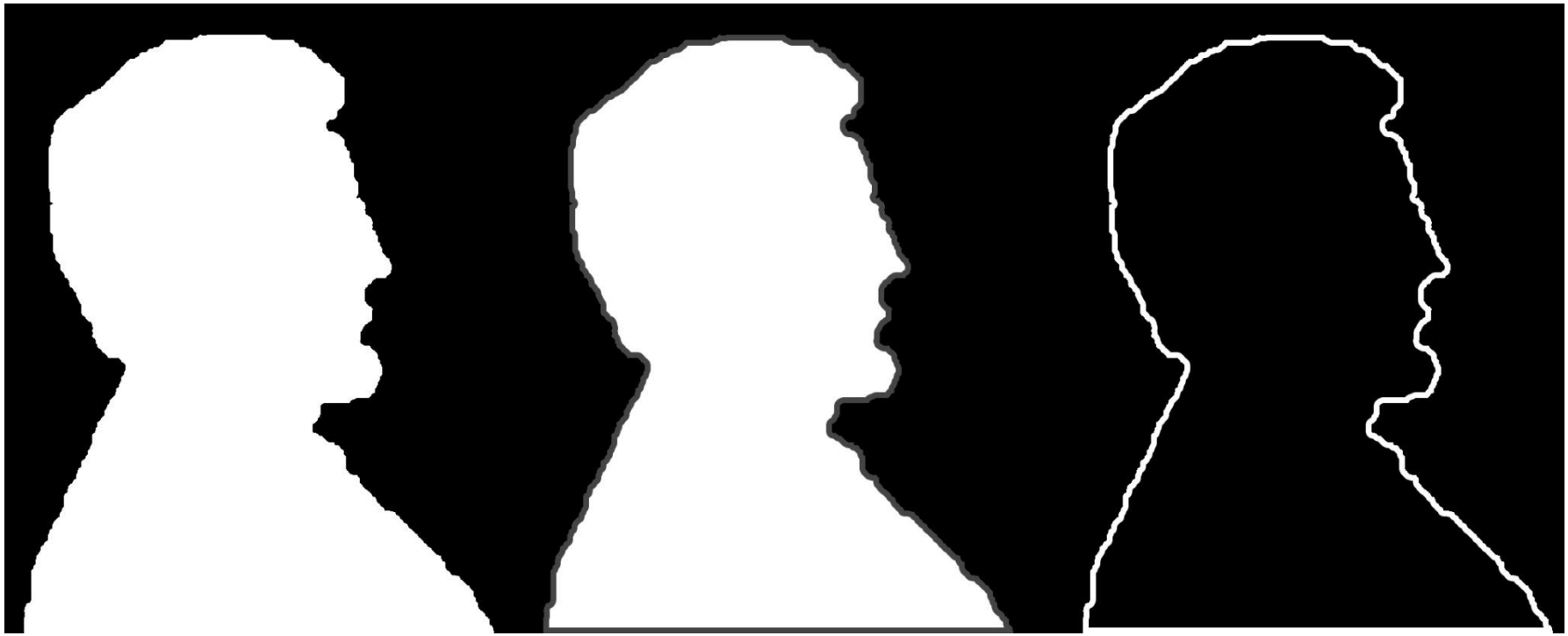
•First, erode A by B, then make set difference between A and the erosion

•The thickness of the contour depends on the size of constructing object – B

$$\beta(A) = A - (A \ominus B)$$



Boundary Extraction



Region Filling

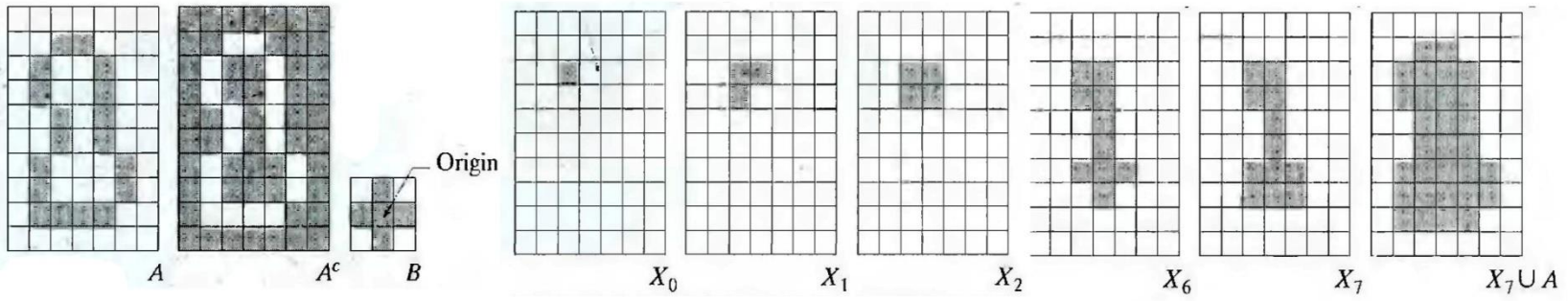
•This algorithm is based on a set of dilations, complementation and intersections

•p is the point inside the boundary, with the value of 1

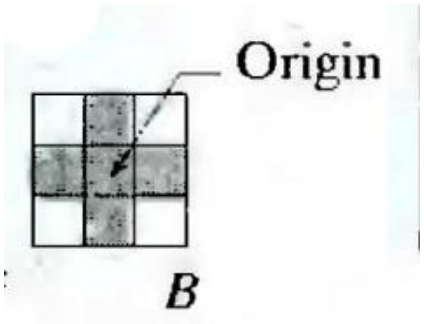
•X(k) = (X(k-1) xor B) conjunction with complemented A

•The process stops when X(k) = X(k-1)

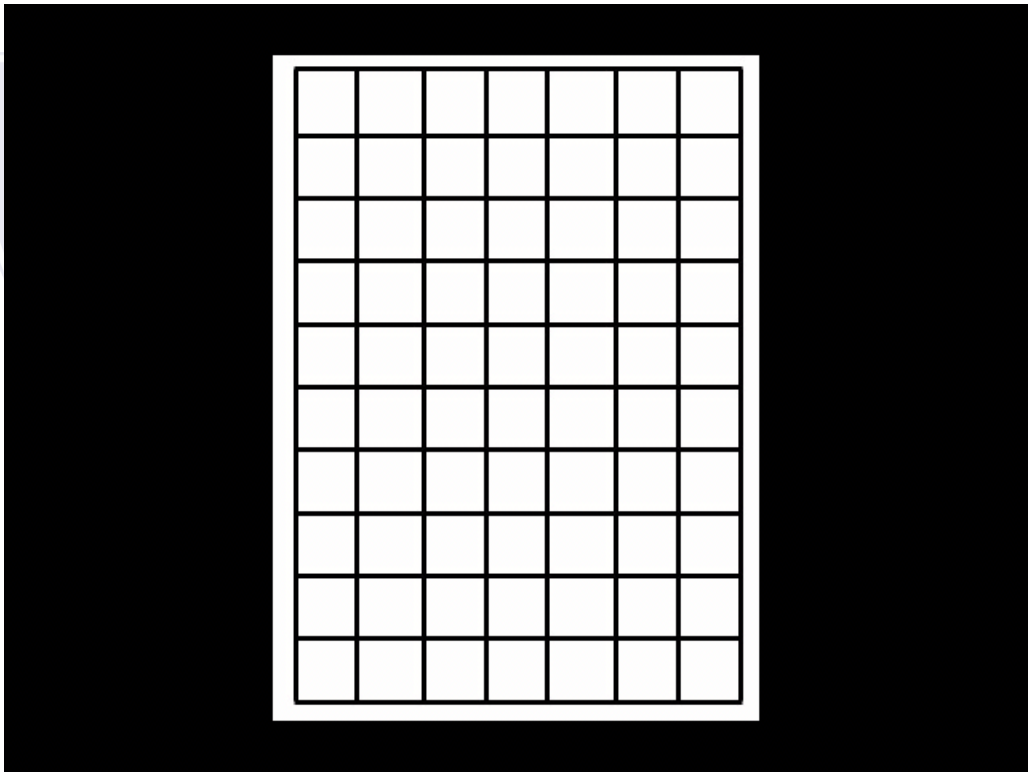
•The result that given by union of A and X(k), is a set contains the filled set and the boundary



Region Filling



$$X_k = (X_{k-1} \oplus B) \cap A^c$$



MCQ

1. The principle objective of Sharpening, to highlight transitions is _____

   a) Pixel density

   b) Composure

   c) Intensity

   d) Brightness

2. How can Sharpening be achieved?

   a) Pixel averaging

   b) Slicing

   c) Correlation

   d) None of the mentioned

3. What does Image Differentiation enhance?

   a) Edges

   b) Pixel Density

   c) Contours

   d) None of the mentioned

MCQ

4. What does Image Differentiation de-emphasize?

   a) Pixel Density

   b) Contours

   c) Areas with slowly varying intensities

   d) None of the mentioned

5. The requirements of the First Derivative of a digital function:

   a) Must be zero in areas of constant intensity

   b) Must be non-zero at the onset of an intensity step

   c) Must be non-zero along ramps

   d) All of the Mentioned

References

- https://www.javatpoint.com/digital-image-processing-tutorial
- Henry Sambrooke Leigh, Carols of Cockayne, The Twins Morphological Image Processing (Digital Image Processing – Gonzalez/Woods)
- https://www.geeksforgeeks.org/
- Digital Image Processing 2nd Edition, Rafael C. Gonzalvez and Richard E. Woods. Published by: Pearson Education.
- Digital Image Processing and Computer Vision, R.J. Schalkoff. Published by: JohnWiley and Sons, NY.
- Fundamentals of Digital Image Processing, A.K. Jain. Published by Prentice Hall,Upper Saddle River, NJ.