APPLICATIONS OF BINARY MORPHOLOGICAL OPERATIONS

- Thinning and Thickening

- **Skeleton Method**

- A skeleton is known as the medial axis of an object,

and is a one-pixel thick line through the middle of the object, preserving the topology of the object.

- Skeleton can represent the shape of an object, and is used as a feature of objects in image analysis and image recognition.
- Skeleton of A can be expressed in terms of erosions and openings and is shown as

$$S(A) = \bigcup_{k=0}^{K} S_k(A)$$

with

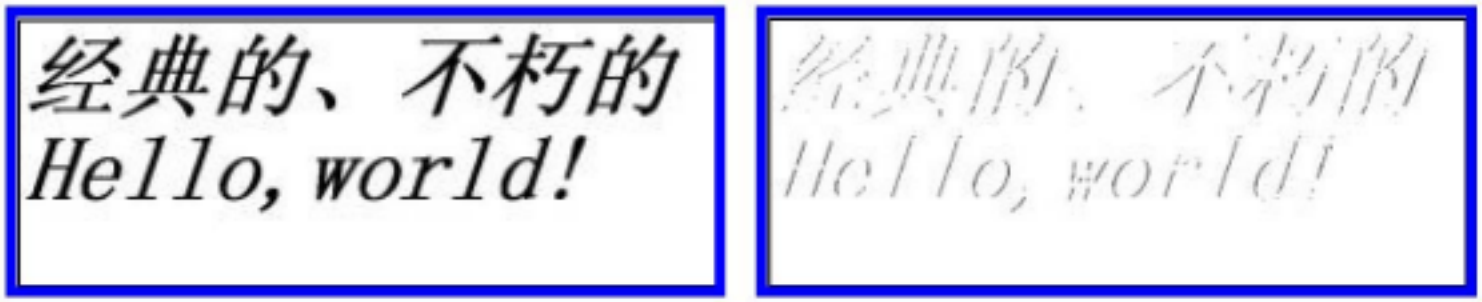
$$S_k(A) = (A \ominus kB) - (A \ominus kB) \circ B$$

$$(A \ominus kB)$$

where B is structuring element and indicates k successive erosions of A.

- K is the last iterative step before A erodes to an empty set. In other words,

$$K = \max\{k | (A \ominus kB) \neq \varnothing\}$$



(a) Original image (b) Skeleton result of (a)

FIGURE 5.9 The result of a binary skeleton operation: (a) the original image, and (b) its skeleton result.