15EEE337 Digital Image Processing

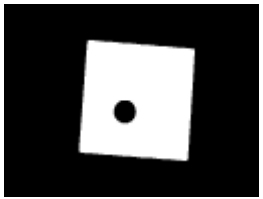
Sarath T.V.

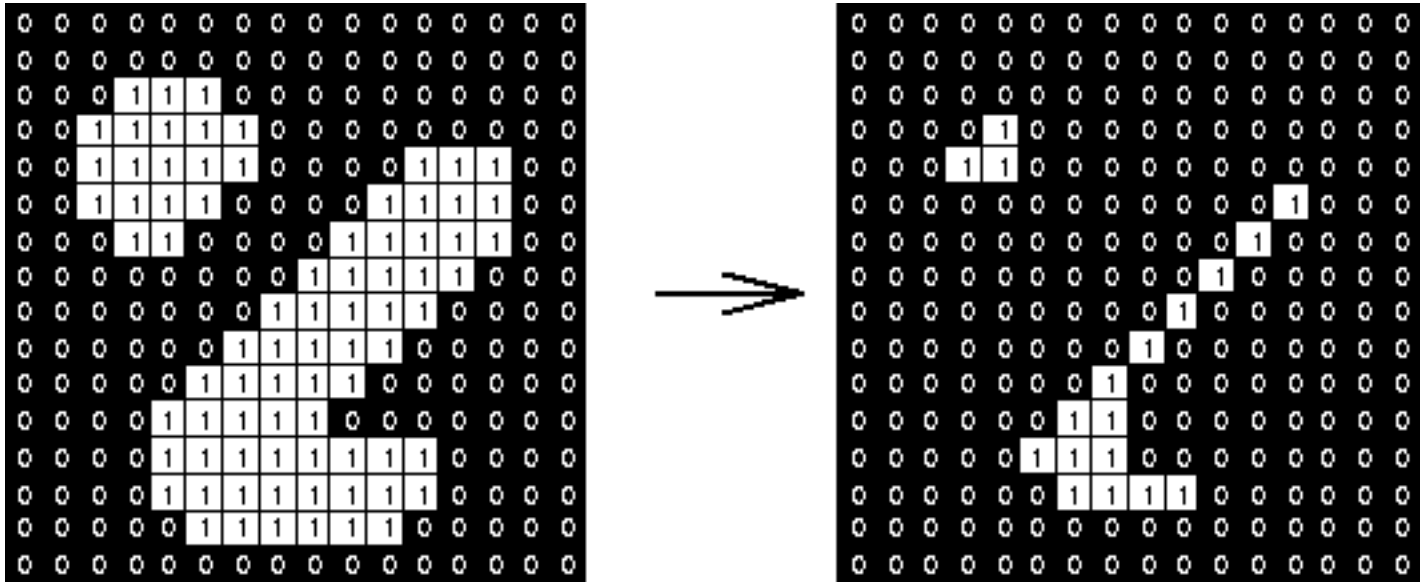
Last Lecture

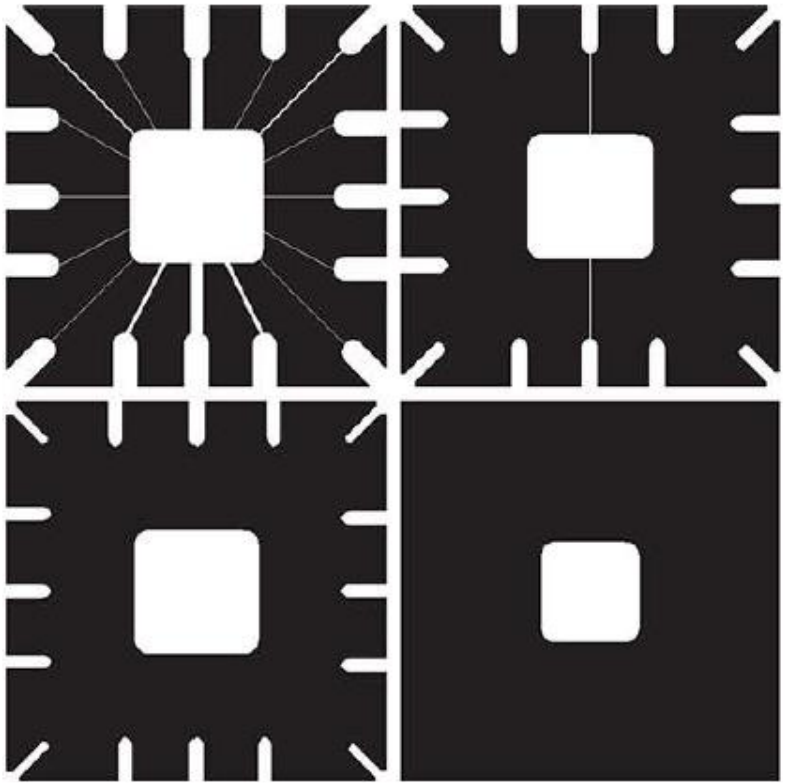
Region based segmentation
Region growing
Region splitting and merging
Morphological operations

Erosion and dilation

- The erosion of a binary image *f* by a structuring element s produces a new binary image with ones in all locations *(x,y)* of a structuring element's origin at which that structuring element fits the input image *f*, i.e. *g(x,y) = 1* is *s* fits *f* and 0 otherwise, repeating for all pixel coordinates *(x,y).*

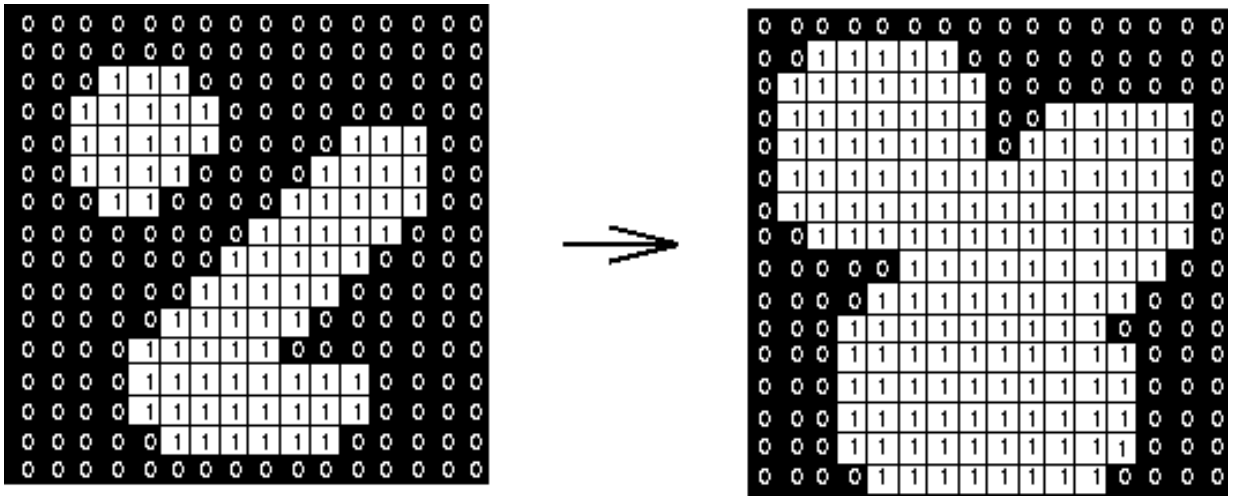


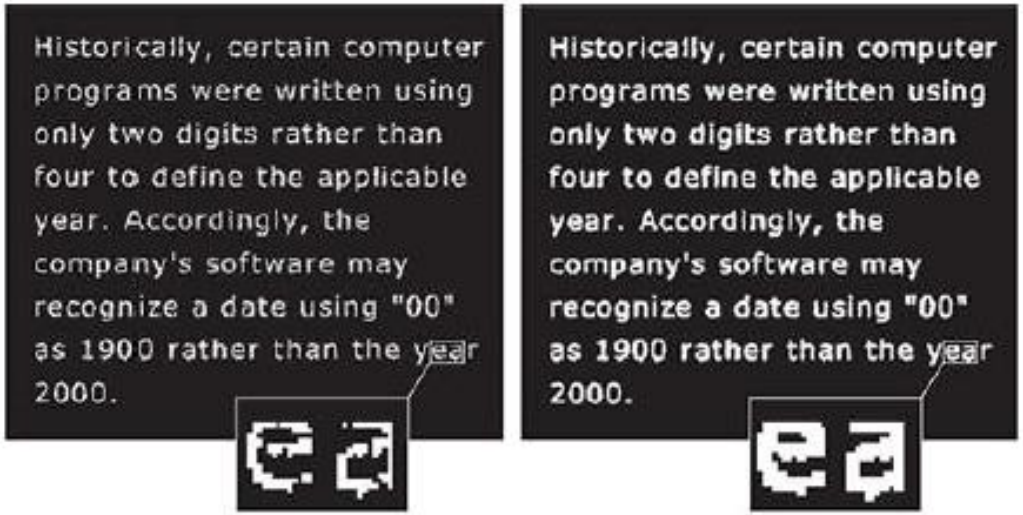


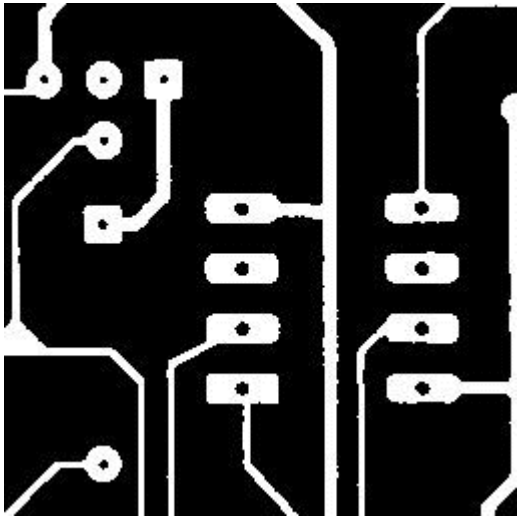


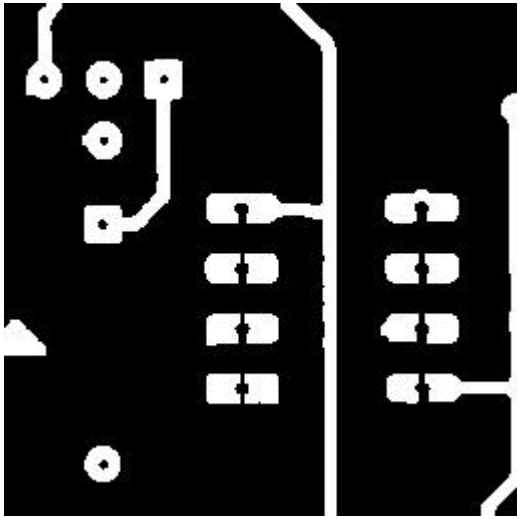
Dilation

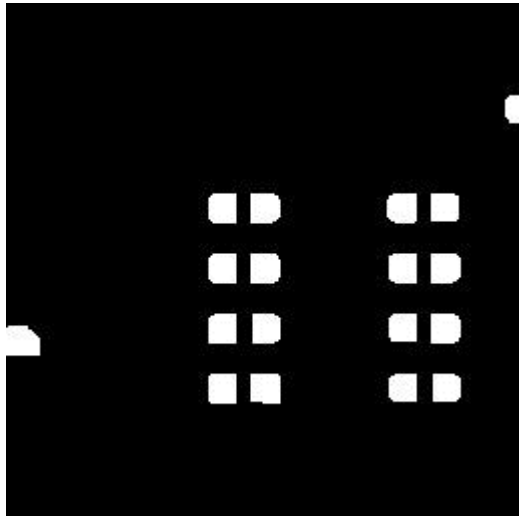
- The dilation of an image *f* by a structuring element produces a new binary image with ones in all locations *(x,y)* of a structuring element's origin at which that structuring element *s* hits the input image *f*, i.e. *g(x,y)* = 1 if *s* hits f and 0 otherwise, repeating for all pixel coordinates *(x,y).*
- Dilation has the opposite effect to erosion -- it adds a layer of pixels to both the inner and outer boundaries of regions.




Historically, certain computer programs were written using only two digits rather than four to define the applicable year. Accordingly, the company's software may recognize a date using "00" as 1900 rather than the year 2000.
Historically, certain computer programs were written using only two digits rather than four to define the applicable year. Accordingly, the company's software may recognize a date using "00" as 1900 rather than the year 2000.



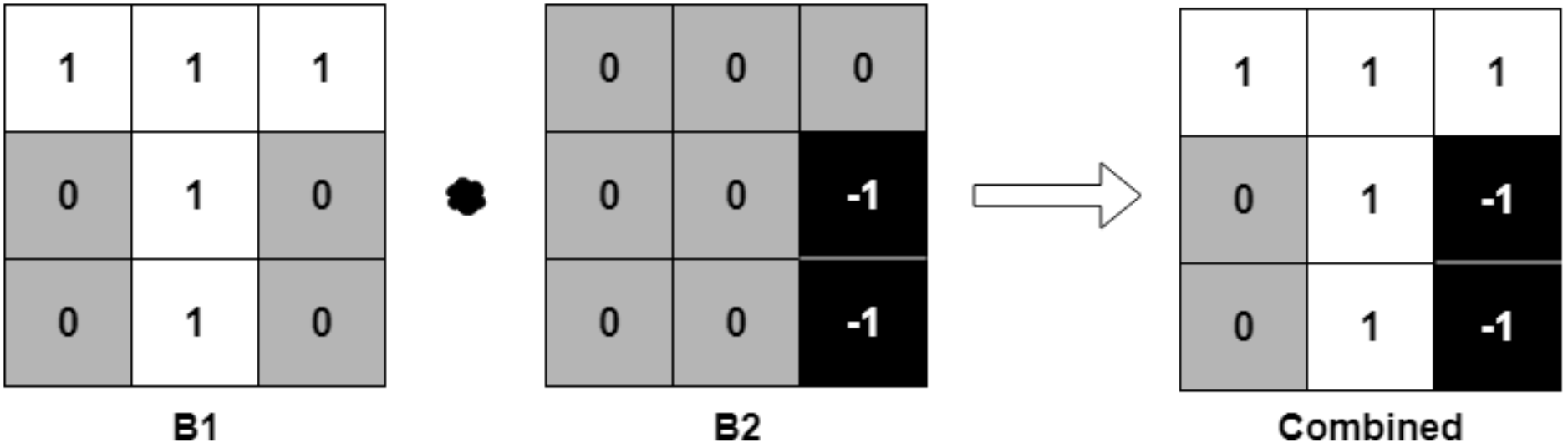


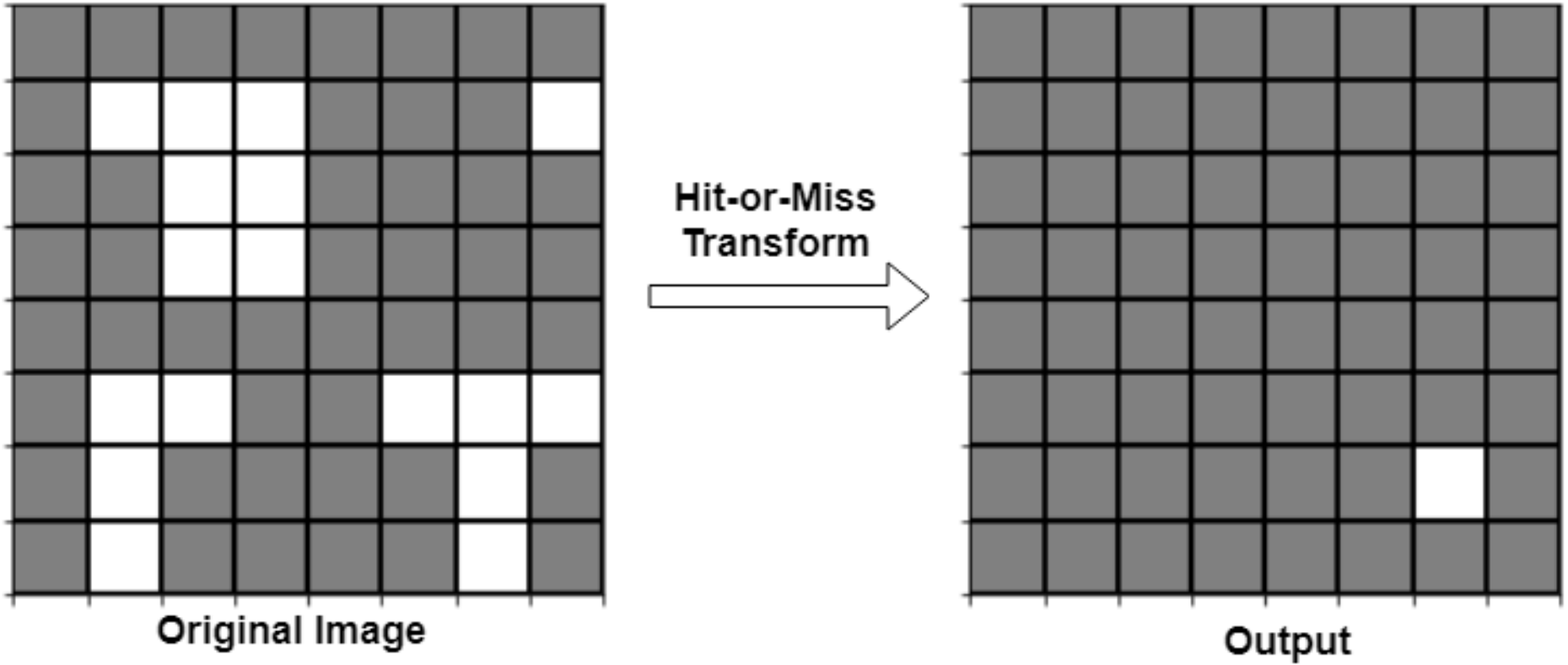


Hit-or-Miss Transform

- used for shape detection or finding particular patterns in the given image.
- pattern to match has to be provided via the structuring element
- we use two structuring elements
- B1 and B2
- does B1 fits the object while, simultaneously, B2 misses the object,

$$A \circledast B = (A \ominus B_1) \cap (A^c \ominus B_2)$$


1 1 1
0 1 0
0 1 0
B1
0 0 0
0 0 -1
0 0 -1
B2
1 1 1
0 1 -1
0 1 -1
Combined


Hit-or-Miss
Transform
Original Image
Output


THANK
YOU