

2018CSE0621

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7-CSE-10

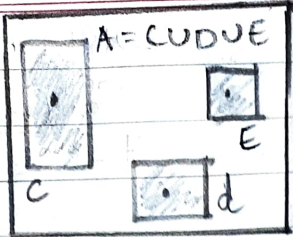
## Part-B

Q.1) Hit or Miss Transformation :-

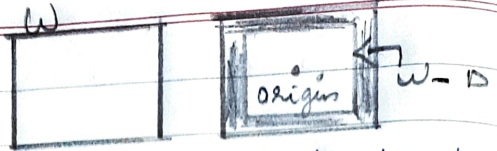
- The hit or miss transform is a morphological tool used for shape detection.
- Let the origin of each shape be located at its center of gravity.
- If we want to find the location of a shape 'X' at image 'A' then:
  - Let 'X' be enclosed by a window 'W'.
  - The local background of the 'X' with respect to W is defined as set difference  $(W - X)$ .
  - Apply ~~erosion~~ erosion operator of A by X will get us the set of locations of the origin of X such that X is completely contained in 'A'.
  - It may also view geometrically as the set of all locations of the origin of X at which 'X' found a match i.e. hit in 'A'.
  - Apply erosion operator on the complement of 'A' by the local background set  $(W - X)$ .
  - The set of locations for which 'X' exactly fits inside 'A' is the intersection of these two last operators above. The intersection is precisely the location sought.

→ If B denotes the set composed of 'X' and its background -  $B = (B_1, B_2)$ ;  $B_1 = X$ ,  $B_2 = (W - X)$ .  
The match of B in A is given as:

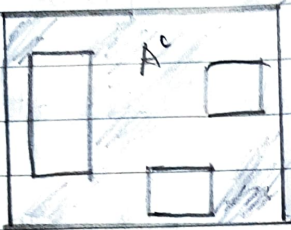
$$A \circledast B = (A \ominus B_1) \cap (A^c \ominus B_2)$$



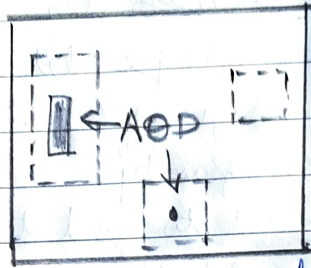
Set A



A window  $w$  of the local background of  $D$  w.r.t  $w(w-D)$



Complement of A



Erosion of A by D

- The reason for using these kind of elements  $B = (B_1, B_2)$  is based on the definition 'two or more objects are distinct only if they are disjoint'.
- It is also used in some algorithms to identify characters within text.