Session 5

Morphological Image Processing

OBJECTIVE:

The objective of this lab is to understand:

1. Dilation
2. Erosion
3. Opening
4. Closing

CONCEPTS TO LEARN:

1. Structuring element
2. hit
3. fit
4. miss
5. Set definitions regarding image

NOTE:

Morphological Operations are always done on binary images.

CODE OF MORPHOLOGICAL OPERATIONS:

Program-code 5.1 shows a sample code which takes in input image and shows the binary, dilation, erosion, opening and closing images as in Figure 5.1. The implementation of functions `hitfitmiss()`, `myerosion()`, `mydilation()`, `myopening()`, `myclosing()` are left as exercises.

```
R = imread('fprint.jpg');
%figure;
se = [0 1 0;
      1 1 1;
      0 1 0];


subplot(2,3,1);
imshow(R);
title('input')

I =im2bw(R);
subplot(2,3,2);
imshow(I);
title('binary')
```

```
16
17 S=myerosion(R,se);
18 subplot(2,3,3);
19 imshow(S)
20 title('erosion')
21
22 S=mydilation(R,se);
23 subplot(2,3,4);
24 imshow(S)
25 title('dilation')
26
27 S=myopening(R,se);
28 subplot(2,3,5);
29 imshow(S)
30 title('opening')
31
32 S=myclosing(R,se);
33 subplot(2,3,6);
34 imshow(S)
35 title('closing')
```

Program 5.1: Morphological Operations

SAMPLE INPUT/OUTPUT:

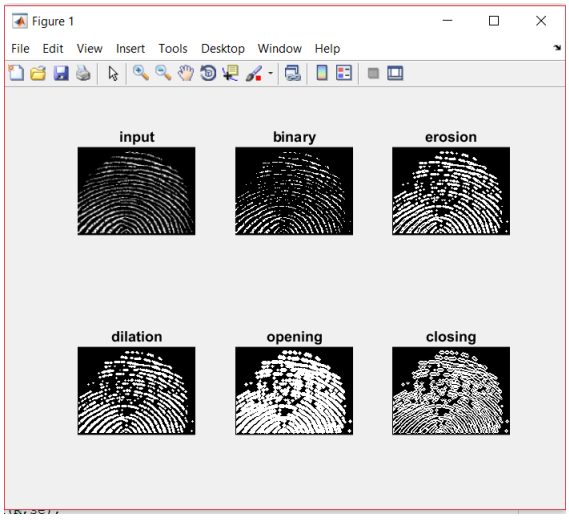

Figure 5.1: Original images and morphologically operated images.

Task 1. Write a program to implement dilation and note the effect on binary images

Task 2. Write a program to implement erosion and note the effect on binary images

Task 3. Write a program to implement opening and note the effect on binary images

$$A \circ B = (A \ominus B) \oplus B$$

Task 4. Write a program to implement closing and note the effect on binary images

$$A \bullet B = (A \oplus B) \ominus B$$