

EX NO: 6

DATE:

## FUZZY LOGIC - IMAGE PROCESSING

AIM:

To implement image processing using fuzzy logic.

PROGRAM:

Import RGB Image and Convert to Grayscale  
import the image.

```
Irgb = imread('peppers.png');
```

```
Irgb = rgb2gray(Irgb);
```

```
figure
```

```
image(Igray, 'cDataMapping', 'scaled')
```

```
colormap('gray')
```

```
title('Input Image in Grayscale')
```

```
I = im2double(Igray);
```

```
Gx = [-1 1];
```

```
Gy = Gx';
```

```
Ix = conv2(I, Gx, 'same');
```

```
Iy = conv2(I, Gy, 'same');
```

```
figure
```

```
image(Ix, 'cDataMapping', 'scaled')
```

```
colormap('gray')
```

title('Ix')

figure

image(Iy, 'cdataMapping', 'scaled')

(colormap('gray'))

title('Iy')

edgeFIS = mamfis('Name', 'edgeDetection');

edgeFIS = addInput(edgeFIS, [-1], 'Name', 'Ix');

edgeFIS = addInput(edgeFIS, [-1], 'Name', 'Iy');

sx = 0.1;

sy = 0.1;

edgeFIS = addMF(edgeFIS, 'Ix', 'gaussmf', [sx 0], 'Name', 'zero');

edgeFIS = addMF(edgeFIS, 'Iy', 'gaussmf', [sy 0], 'Name', 'zero');

edgeFIS = addOutput(edgeFIS, [0, 1], 'Name', 'Iout');

wa = 0.1;

wb = 1;

wc = 1;

ba = 0;

bb = 0;

bc = 0.7;

edgeFIS = addMF(edgeFIS, 'Iout', 'trimpf', [wa wb wc],  
'Name', 'white');

edgeFIS = addMF(edgeFIS, 'Iout', 'trimpf', [ba bb bc],  
'Name', 'black');

figure

subplot (2,2,1)

plotmf (edgeFIS, 'input', 1)

title ('Ix')

subplot (2,2,2)

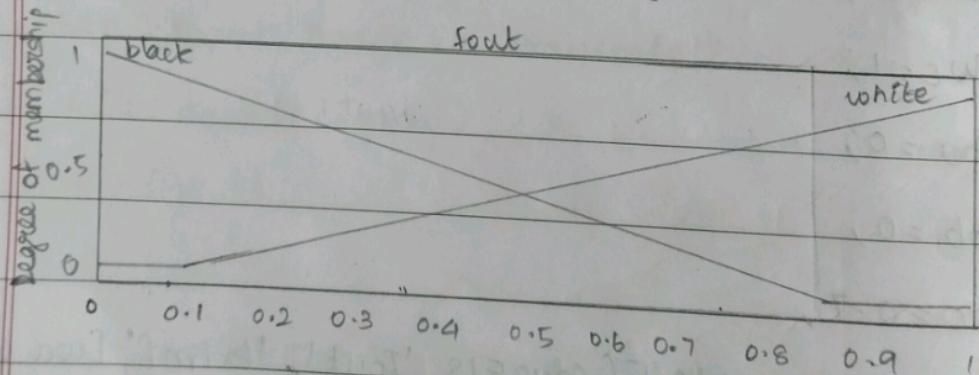
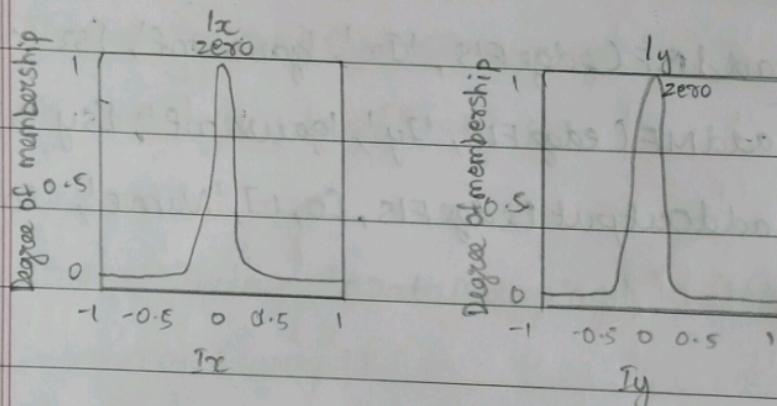
plotmf (edgeFIS, 'input', 2)

title ('Iy')

subplot (2,2,[3,4])

plotmf (edgeFIS, 'output', 1)

title ('Iout')



$r_1 = \text{"If } I_x \text{ is zero and } I_y \text{ is zero then } I_{out} \text{ is white";}$

$r_2 = \text{"If } I_x \text{ is not zero and } I_y \text{ is not zero then}$

$I_{out} \text{ is black";}$

edgeFIS = addRule(edgeFIS, [r<sub>1</sub>, r<sub>2</sub>]);

edgeFIS.Rules

ans =

1x2 fisrule array with properties:

1 "I<sub>x</sub> == zero & I<sub>y</sub> == zero => I<sub>out</sub> = white(1)"

2 "I<sub>y</sub> == zero | I<sub>x</sub> == zero => I<sub>out</sub> = black(1)"

level = zeros(size(I));

for ii = 1:size(I, 1)

level(ii, :) = evalfis(edgeFIS, [(Ix(ii, :)); (Iy(ii, :))]);

end

figure

image(I, 'DataMapping', 'scaled')

colormap('gray')

title('Original Grayscale Image')

figure

image(level, 'DataMapping', 'scaled')

colormap('gray')

~~title('Edge Detection using Fuzzy Logic')~~

**RESULT :**

To implement Image processing using fuzzy logic is observed and the output is verified.

