Assignment 4

Date
Page

g.1

$$E = \begin{bmatrix} 6 & 5 & 10 \\ 100 & 100 & 100 \\ 4 & 20 & 10 \end{bmatrix}$$

2 Horizontal line mask $\begin{bmatrix} -1 & -1 & -1 \\ 2 & 2 & 2 \\ -1 & -1 & -1 \end{bmatrix}$

Now $E = \begin{bmatrix} 6 & 6 & 5 & 10 & 10 \\ 6 & 6 & 5 & 10 & 10 \\ 100 & 100 & 100 & 100 & 100 \\ 4 & 4 & 20 & 10 & 10 \\ 4 & 4 & 20 & 10 & 10 \end{bmatrix}$

if $f(x,y) < 0$

$f(x,y) = 0$

else value

Applying the mask

$$E = \begin{bmatrix} 0 & 0 & 0 \\ 555 & 545 & 535 \\ 0 & 0 & 0 \end{bmatrix}$$

Hence Horizontal line detected

Vertical line mask $\begin{bmatrix} -1 & 2 & -1 \\ -1 & 2 & -1 \\ -1 & 2 & -1 \end{bmatrix}$

Applying the Mask

$$E = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

No line detected.

Q2 $F = \begin{bmatrix} 50 & 60 & 70 \\ 5 & 50 & 86 \\ 7 & 9 & 50 \end{bmatrix}$

Applying Sabel transform

$G_x = \begin{bmatrix} -1 & 0 & 1 \\ -2 & 0 & 2 \\ -1 & 0 & 1 \end{bmatrix}$ $G_y = \begin{bmatrix} -1 & -2 & -1 \\ 0 & 0 & 0 \\ 1 & 2 & 1 \end{bmatrix}$

$G_x = 133$ $G_y = -165$

$R = |G_x| + |G_y| = 298$

$\text{Direction} = \tan^{-1}\left(\frac{G_y}{G_x}\right)$

$= \tan^{-1}\left(\frac{-165}{133}\right)$

$= -51^\circ = \frac{-51\pi}{180} = \frac{-17\pi}{60}$

Q3 $F = \begin{bmatrix} 5 & 6 & 1 \\ 6 & 7 & 0 \\ 7 & 1 & 3 \end{bmatrix}$; $I_{max} = 7$

$\cos t(E_1) = 7-15-6| + 7-|6-7| + 7-|7-1|$

$= 6+6+1 = 13$

$\cos t(E_2) = 7-15-6| + 7-|6-7| + 7-|7-0| + 7-|1-3$

$= 6+6+0+5 = 13$

$\cos t(E_3) = 7-15-6| + 7-|6-7| + 7-|7-1| + 7-|1-$

$= 6+6+1+5 = 18$

cost(E4) = 7-|5-6|+7-|6-7|+7-|7-0|+7-|7-1|
+7-|7-1|
= 6+6+0+1+1=14

cost(E5) = 7-|6-1|+7-|7-0|+7-|1-3| = 2+5=7

cost(E6) = 7-|6-1|+7-|6-7|+7-|6-7|+7-|7-1| = 2+6+6+1=15

cost(E7) = 7-|6-1|+7-|7-0|+7-|7-1|+7-|7-1| = 2+0+1+1=4

cost(E8) = 7-|6-1|+7-|6-7|+7-|6-7|+7-|7-1|+7-|1-3|
= 2+6+6+1+5=20

E7 is most significant edge

F = [5 6 4 1
6 7 0 0
7 4 1 3]

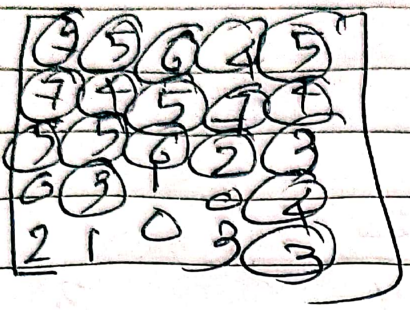
∴ f(A)=1, f(B)=0, f(other)=0

∴ F = [6 7 0
6 7 0
7 0 0]

O/P img

Q.14 $f=$ | 7 5 6 4 5 |
| 7 4 5 7 4 |
| 5 5 6 2 3 |
| 0 3 1 0 4 |
| 2 1 0 2 3 |

⇒ let threshold be 2
Assume seed at $f(2,2)=5$
If $|f(x,y) - S(x',y')| \leq T$
then $f(x,y)$ = Intensity of Segmented Region

$F=$ 

Now seed bef (3,3)

$f=$ 

∴ No. of Segmented regions = 2 $R = R_1 \cup R_2$.

Q.16
a) False
b) False
c) True
d) True
e) False
f) False