Edge Detection

① point Detection $\begin{bmatrix} 1 & 1 & 1 \\ 1 & -8 & 1 \\ 1 & 1 & 1 \end{bmatrix}$

Line Hor $\begin{bmatrix} -1 & -1 & -1 \\ 2 & 2 & 2 \\ -1 & -1 & -1 \end{bmatrix}$

45° $\begin{bmatrix} 2 & -1 & -1 \\ -1 & 2 & -1 \\ -1 & -1 & 2 \end{bmatrix}$

Ver $\begin{bmatrix} -1 & 2 & -1 \\ -1 & 2 & -1 \\ -1 & 2 & -1 \end{bmatrix}$

-45° $\begin{bmatrix} -1 & -1 & 2 \\ -1 & 2 & -1 \\ 2 & -1 & -1 \end{bmatrix}$

10 Sunday

Robert Hor $\begin{bmatrix} 0 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ 29-25

ver $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & 1 & 0 \end{bmatrix}$ 28-26

MARCH 2024

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

NOTES

prewitt
Hor $\begin{bmatrix} -1 & -1 & -1 \\ 0 & 0 & 0 \\ +1 & +1 & +1 \end{bmatrix}$ Ver $\begin{bmatrix} -1 & 0 & 1 \\ -1 & 0 & 1 \\ -1 & 0 & 1 \end{bmatrix}$

sobel
Hor $\begin{bmatrix} -1 & -2 & -1 \\ 0 & 0 & 0 \\ 1 & 2 & 1 \end{bmatrix}$ Ver $\begin{bmatrix} -1 & 0 & 1 \\ -2 & 0 & 2 \\ -1 & 0 & 1 \end{bmatrix}$

Average filter / box filter $\begin{bmatrix} 1/9 & 1/9 & 1/9 \\ 1/9 & 1/9 & 1/9 \\ 1/9 & 1/9 & 1/9 \end{bmatrix}$

Min, Max, Median.

⇒ HSI. RGB

Intensity = $R+G+B/3$

Saturation = $1 - \frac{3}{R+B+G}(\min(R, G, B))$

$$Hue = \cos^{-1}\left[\frac{\frac{1}{2}[(R-G)+(R-B)]}{\sqrt{(R-G)^2+(R-B)*(G-B)}}\right]$$

NOTES

H I S 0-1

$B = S(1-S)$

$R = S\left(1 + \frac{S\cos H}{\cos(60^\circ - H)}\right)$.

$G = 3I - (R+B)$

opening ⇒ Erosion → Result
↓
Dilation.

closing ⇒ Dilation → Result
↓
Erosion.

Erosion $\quad S=1$

$$\begin{bmatrix} 1 & 0 & 1 \\ 0 & 0 & 0 \\ 1 & 0 & 1 \end{bmatrix}$$

	1	0	1
0	1	2	3
1	4	5	6
	7	8	9

$$\begin{bmatrix} 0 & 1 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix}$$

Min (0, 1, 5, 5) ⇒ erosion ⇒ $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

Max ( ) Dilation

$$\begin{bmatrix} 1 & 0 & 1 \\ 0 & 0 & 0 \\ 1 & 0 & 1 \end{bmatrix}$$

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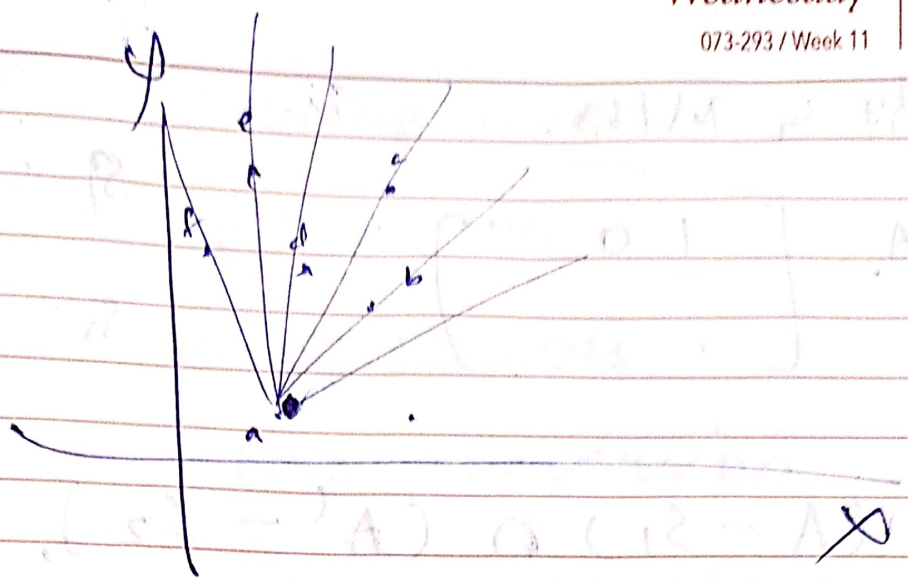
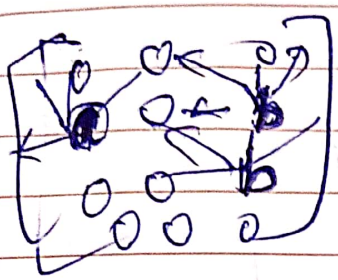
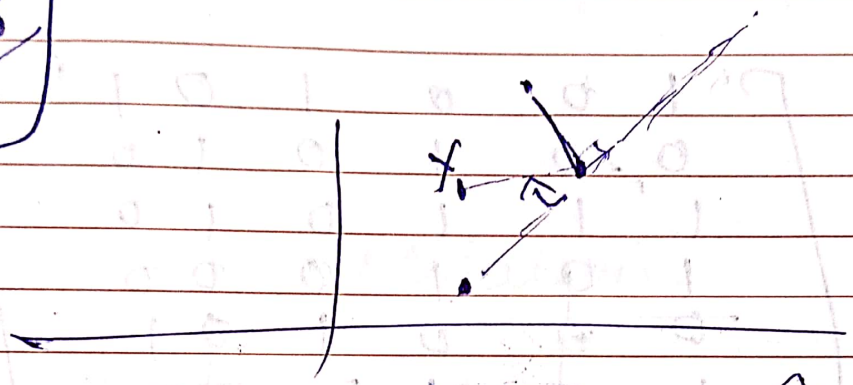
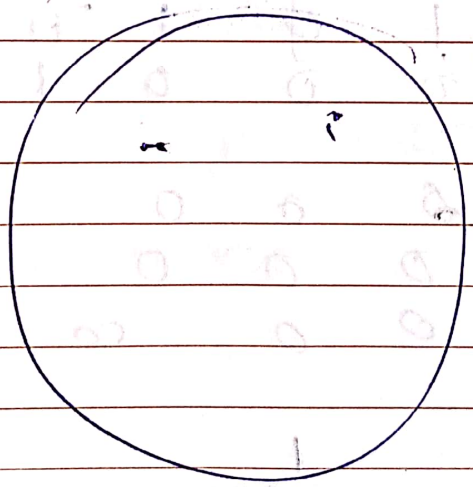
NOTES

Convex Hull



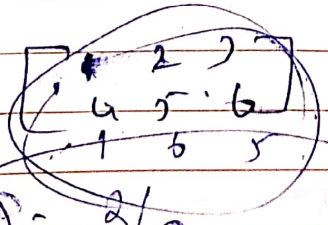






Area = max
cir, min

Hist eg:-



No. of pixels = m x n
pixel subset:

Scanned with OKEN Scanner

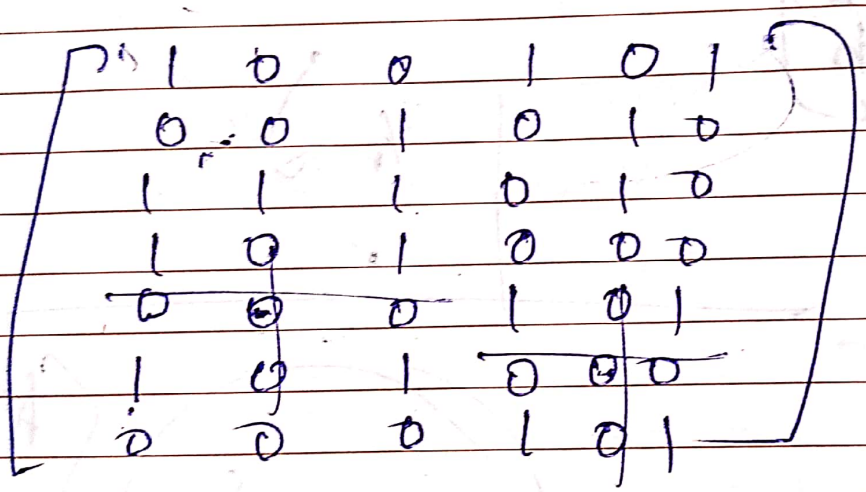
Diff b/w Min.

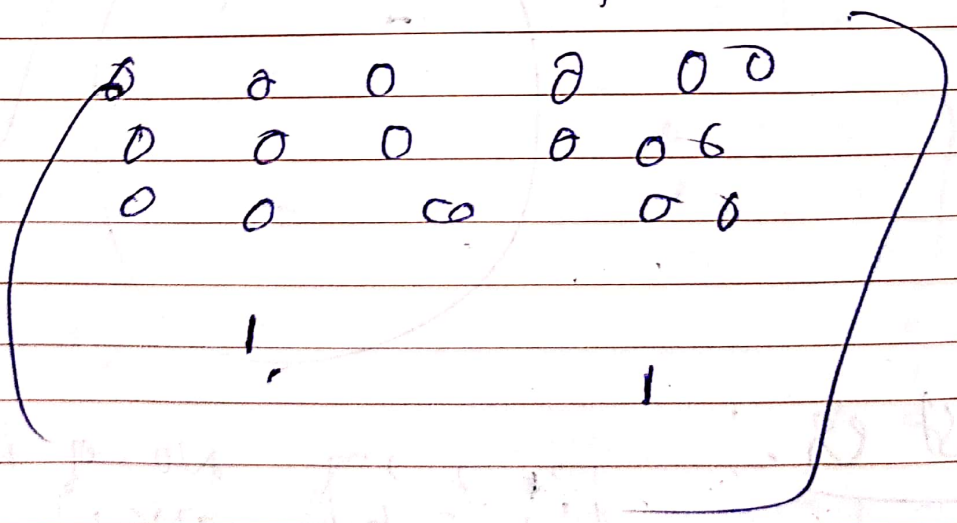
$A = \begin{bmatrix} 1 & 0 & \cdot \\ \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot \end{bmatrix}$

$S_1 = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 0 & 0 \\ 1 & 0 & 1 \end{bmatrix}$

$S_2 = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix}$

$(A - S_1) \cap (A' - S_2)$,





NOTES

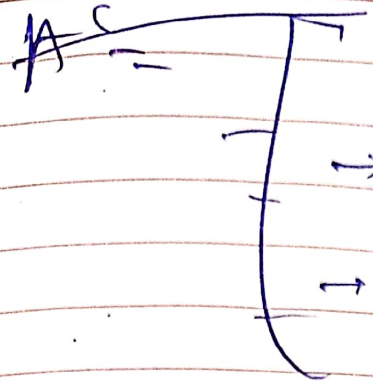


Image Processing

→ Edge Detection

→ Filtering Methods

→ HSI, RGB conversion

→ Opening and closing morphological operations

→ convex Hull

→ Histogram Equalisation

→ Hit & Miss operations

→ Focal Length, Image Distance

→ Threshold operations

→ GLCM

→ Connected components

→ Image Segmentation

NOTES

→ Edge Detector methods