HOG

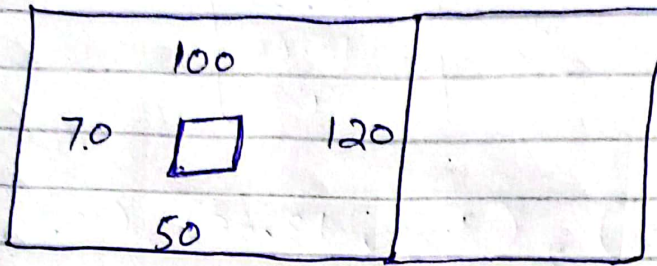|	100	
7.0	□	120
	50	

$$x = 120 - 70 = 50$$
$$y = 100 - 50 = 50$$

$$\text{magnitude} = \sqrt{(120-70)^2 + (100-50)^2}$$
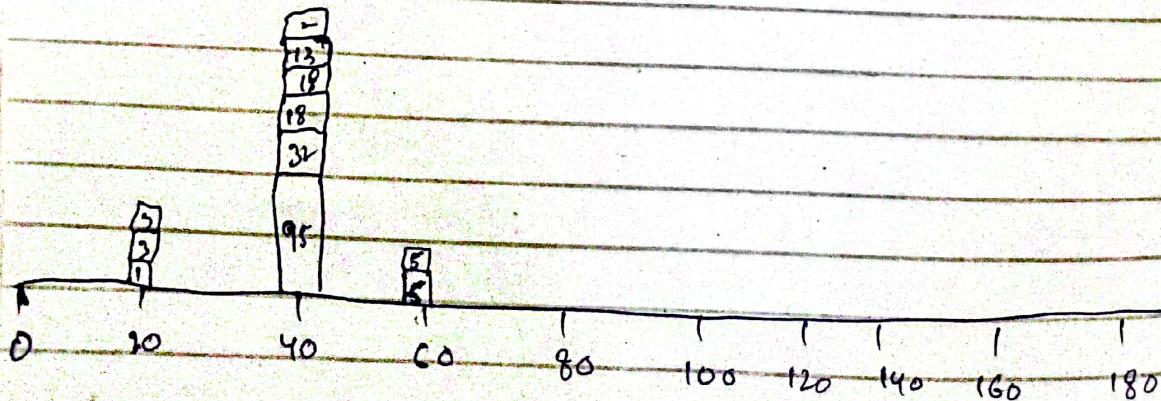
$$\Rightarrow \sqrt{(50)^2 + (50)^2}$$

$$\text{magnitude} \Rightarrow 100$$

$$\tan \theta = x/y$$

$$\theta = \tan^{-1}\left(x/y\right)$$

$$\theta = \tan^{-1}\left(50/50\right)$$

$$\theta = 45°$$

17	24	1	8	15
23	[5]	[7]	[14]	[16]
4	[16]	[13]	20	22
20	12	[19]	[21]	3
11	18	25	2	9

$x = 23 - 7 = 15$

$y = 24 - 6 = 18$

$\sqrt{(15)^2 + (18)^2}$

$= 23$

$Q_2 \ \tan^{-1}\left(15/18\right)$ ⟶ $\theta = 69 \quad 39.80$

$x = 14 - 5 = 9 \qquad = \sqrt{(9)^2 + (12)^2}$

$y = 13 - 1 = 12 \qquad = 21$

$Q \div \tan^{-1}\left(9/12\right)$ ⟹ 36.86

$x = 16 - 7 = 9 \qquad = \sqrt{(9)^2 + (12)^2}$

$y = 20 - 8 = 12 \qquad = 21$

36.86

$y = 12 - 5 = 7$

$x = 13 - 4 = 9$

$= 20 - 6 = 14$

$= 19 - 7 = 12$

$= 14/12$

Harris Conner dectetion

$$4^2 + 7^2 + 6^2 + 8^2 + 8^2 + 7^2 + 8^2 + 6^2 + 5^2$$

$$= 403$$

$$4^2 + 8^2 + 8^2 + 8^2 + 6^2 + 7^2 + 6^2 + 6^2 + 4^2$$

$$= 381$$

$$4 \times 4 + 7 \times 8 + 6 \times 8 + 8 \otimes 8$$
$$8 \times 8 + 8 \times 6 + 7 \times 7 +$$
$$8 \times 6 + 6 \times 6 + 5 \times 4 = 385$$

$$H = \begin{bmatrix} 403 & 385 \\ 385 & 381 \end{bmatrix}$$

$$\det(H) \Rightarrow (403 \times 381) - (385 \ast 385)$$

$$\Rightarrow 153543 - 148225$$

$$\Rightarrow 5318$$

$$t_{rec}(H)^2 \Rightarrow 403 + 381$$
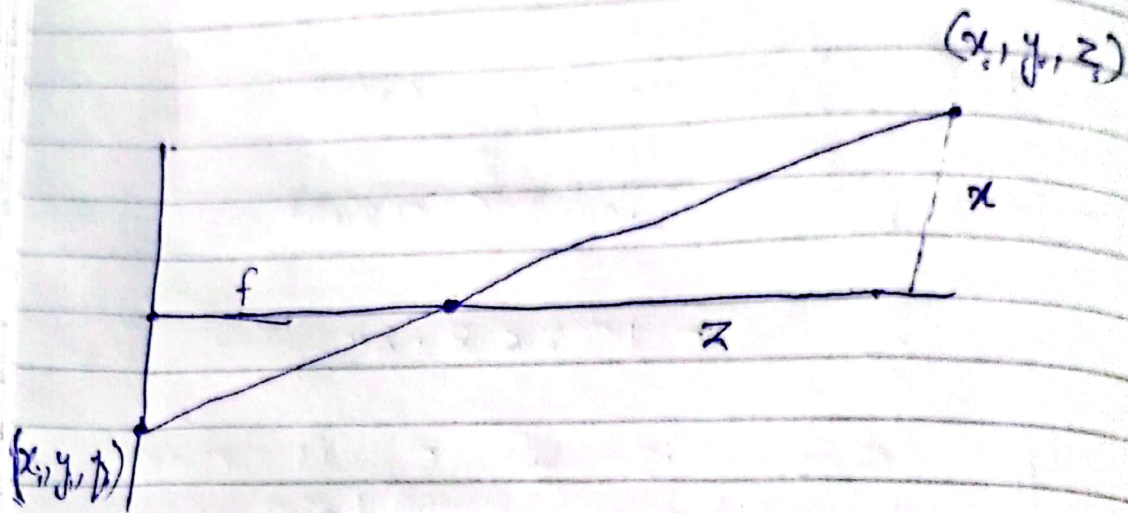
$$\Rightarrow (784)^2 \Rightarrow 614656$$

$K = 0.04$

formula: $det(H) - K \ trace(H)^2$

$= (53.18) - (0.04)(784)^2$

$\Rightarrow \quad -19268.29$

if ans is $\sqrt{n}$ - it means
it have edge

$$\frac{x_i}{f} = \frac{x_s}{z} \qquad \Rightarrow \qquad x_i = f\left(\frac{x_s}{z}\right)$$

$$\frac{y_i}{D} = \frac{y_s}{z} \qquad \Rightarrow \qquad y^i = D\left(\frac{y_s}{z}\right)$$

Predicting the Size of Output image.

$$= \frac{(\text{input image} - \text{Ker}) + 2(\text{pading})}{S} + 1$$

$$5 \times 5 \times 3 \qquad , \qquad 3 \times 3$$

$$\frac{(5 - 3) - 2(0)}{1} + 1$$

$$2 \times 2 \times 1$$

$img = 32 \times 32 \times 3$ $k \ 3 \times 3$

$S = 1$ $p = 0$

$$\frac{32 - 0 + 3}{1}$$

$$\frac{(32 - 3) + 2(0)}{1} + 1$$

$$\frac{29 + 1}{1} \quad \Rightarrow \quad 30$$

$img = 30 \times 30$ $k = 3 \times 3$

$S = 1$ $P = 0$

$$\frac{(30 - 3) + 2(0)}{1} + 1$$

New $img = 28 \times 28$

$img \ 5 \times 5$ $k = 3 \times 3$

$S = 1$ $p = 0$

$$\frac{(5 - 3) + 2(0)}{1} + 1$$

$$\frac{2}{1} + 1 \quad ; \quad 3 \times 3$$

0 ×1/9	9 ×1/9	7	6	5
3	4	5	7	9
4	2	3	1	6
1	4	7	5	2
11	7	2	1	0
6	2			

1/9	1/9	1/9
1/9	1/9	1/9
1/9	1/9	1/9

$$\begin{bmatrix} 4.47 & 4.88 & 4.77 \\ 3.66 & 4.73 & 4.44 \\ 5.22 & 3.77 & 2.55 \end{bmatrix}$$

Average/Mean

(firstly add and divided by filters)

$$\begin{bmatrix} 4.5 & 5 & 4.5 \\ 5 & 4 & 4.5 \\ 6 & 4 & 3.5 \end{bmatrix}$$

Median

(mid value)

$$\begin{bmatrix} 9 & 9 & 9 \\ 9 & 7 & 9 \\ 11 & 10 & 10 \end{bmatrix}$$

max

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

min

$$\begin{bmatrix} 4.5 & 5 & 4.5 \\ 4.5 & 4 & 4.5 \\ 6 & 5.5 & 5 \end{bmatrix}$$

$$\frac{Min+max}{2}$$

Mid-point filter

$$a + 1 + 7/9 + 9$$
$$3/9 + 4/9 + 5/9 +$$
$$4/9 + 2/9 + 3/9 = 3.87$$

$$\Rightarrow 0 + 9 + 7 + 3 + 4 + 5$$
$$+ 4 + 2 + 3 = 37$$
$$37/9 = 4.11$$

$$7 + 6 + 5 + 5 + 7 + 9 + 3 + 1 + 0.9 + 7 + 6 + 4 + 5 + 7$$
$$= 43/9 \qquad + 2 + 3 + 1 = 44/9$$
$$= 4.88$$

$$\begin{bmatrix} 0 & 4.088 & 0 \\ 2.789 & 7.21 & 0 \\ 3.23 & 3.91 & 0 \end{bmatrix}$$ (multiply all values and take power $1/9$)

(Geometric Mean filter)

$$H.M = \sqrt{\dfrac{9 \quad \text{Total val}}{\frac{1}{1^{st}} + \frac{2}{2^n} \cdots \frac{1}{n^{th}}}}$$

$$\sum_{i=1}^{n} \dfrac{n}{\frac{1}{r^i}} \qquad \dfrac{9}{\frac{1}{0} + \frac{2}{9} + \frac{1}{7} + \frac{7}{3} + \frac{1}{4} + \frac{1}{5}}$$
$$+ \frac{1}{9} + \frac{7}{2} + \frac{3}{43}$$

1) K-mean Segmentation

2) K-mean N3 heirical clustring