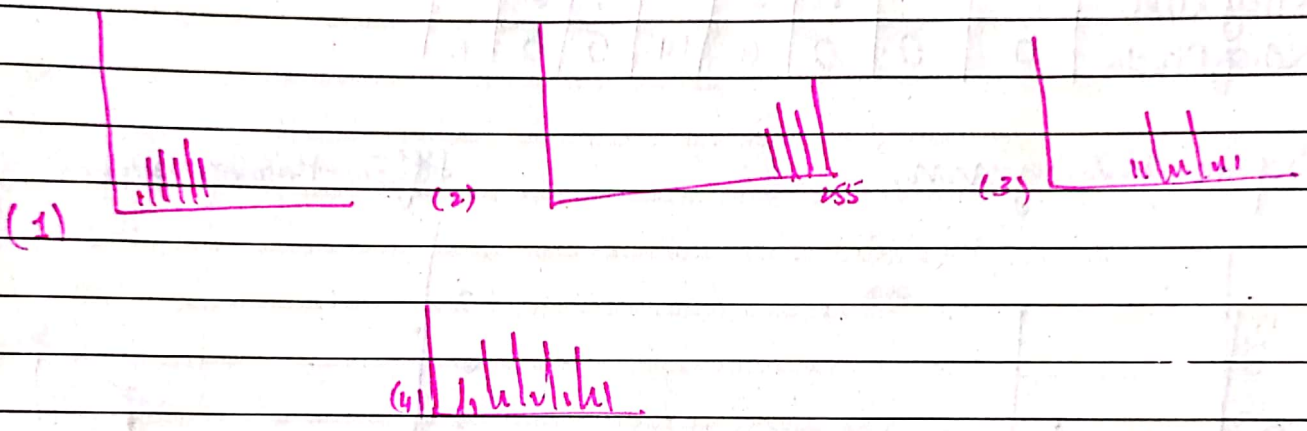
Dated:

"Histogram Equilization"

- Used for image Enhancement.
- Used for Brightness & Contrast
  1. If graph is towards (0-1) left then More of a black image.
  2. If graph is towards (255) - right then it's image is white.

3 - low Contrast → histogram is at centre.

4 - high Contrast → Entire image.



- Controls the Quality of image by Normalizing histogram value to flat profile.

7	7	7	7	7
2	6	7	6	2
2	7	7	7	2
2	6	7	6	2
7	7	7	7	7

→ converted matrix.

Dated: 0

$f(x,y)$ =

4	4	4	4	4
3	4	5	4	3
3	5	5	5	3
3	4	5	4.	3
4	4	4	4	4

→ NO. of Pixel.

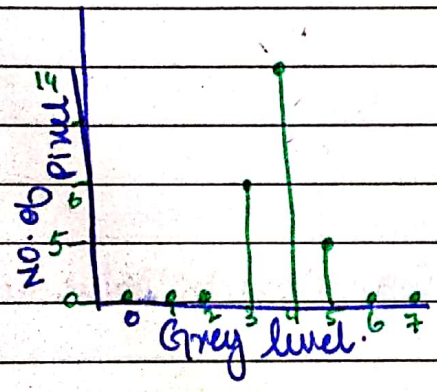
→ highest grey level value = 5

→ bits = $2^3 = 8$.

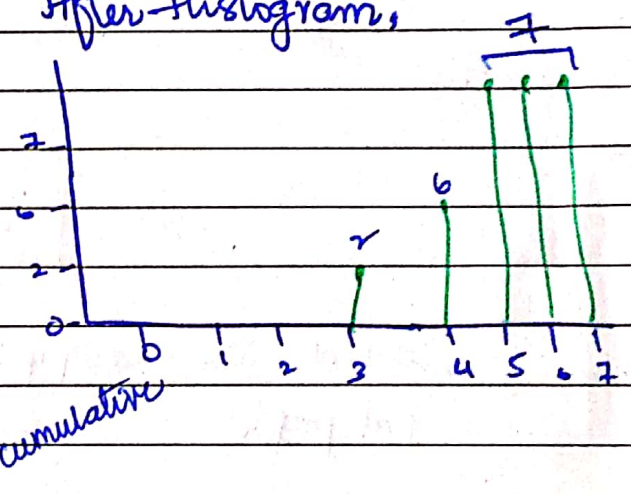
(0–7)

Grey level	0	1	2	3	4	5	6	7
NO. of Pixels	0	0	0	6	14	5	0	0

Before Histogram,



After Histogram,



Gray level	NO. of Pixel. (Nk)	PDF. Nk/Σ(Nk)	CDF Sk.	Sk×7	Histogram Eq. Level.
0	0	0/25 = 0	0	0×7=0	0
1	0	0/25=0 + 0 →	0	0×7=0	0
2	0	0/25=0 + 0 →	0	0×7=0	0
3	6	6/25 ~ 0.24 →	0.24	1.68	2
4	14	14/25 = 0.56 →	0.8	5.6	6
5	5	5/25 = 0.2 →	1	7	7
6	0	0/25 = 0 →	1	7	7
7	0	0/25 = 0 →	1	7	7.
	Σ 25.				

← transformed Matrix.

Dated:

1 row ka liye 0 (w1, w2, b=1)
2nd → w1 w2 b2 (1st row).
goes on.

x_1	x_2	t	yin	y	Δw_1	Δw_2	Δb	w_1	w_2	b.
1	1	1	0	0	1	1	1	1	1	1.
-1	1	-1	1	1.	1	-1	-1	2	0	0.
1	-1	-1	2	1.	-1	1	-1	1	1	-1
-1	-1	-1	-3	-1	0	0	0	1	1	-1

$w_1, w_2, b = 0$
$\alpha = 1.$

$w_1 = 1 \quad w_2 = 1 \quad b = 1 \quad \alpha = 1$

(1)

$yin = b + \{w_1 x_1 + w_2 x_2\}.$

$yin = 0 + \{\{0 * x1\} + \{0 x 1\}\}$
$0 + 0$
$= 0.$

$\Delta w_1 = \alpha t x_i$
$1 x 1 x 1 = 1.$
$\Delta w_2 = \alpha t x_2.$
$1 x 1 x 1 = 1$
$\Delta b = \alpha t$
$1 x 1 = 1$
$w_1 = w(old)\ (\alpha t x_i)$
$w_1 = 0 + 1 = 1$
$w_2 = 0 + 1 = 1$
$b = b old + (\alpha t)$
$= 0 + 1$
$= 1$

$y_2 = w_1 3.\ w_2 = 1 \quad b = -1\ \alpha 1$

$-1 + \{1 x -1$

(2) $= 1 + \{(1 x -1) + (1 x 1)$
$1 + 0$
$= 1.$

$\Delta w_1 = \alpha t x_i$
$1 x -1 x 1 = 1.$
$\Delta w_2 = 1 x -1 x 1 = -1.$
$b = \alpha t$
$1 x -1 = -1.$
$w_1 = old + (\alpha t x_1)$
$1 + 1 = 2.$
$w_2 = 1 + (-1) = 0.$
$b = 1 + (-1) = 0.$

(3) $w_1 = 2, w_2 = 0 \quad b = 0 \quad \alpha = 1.$

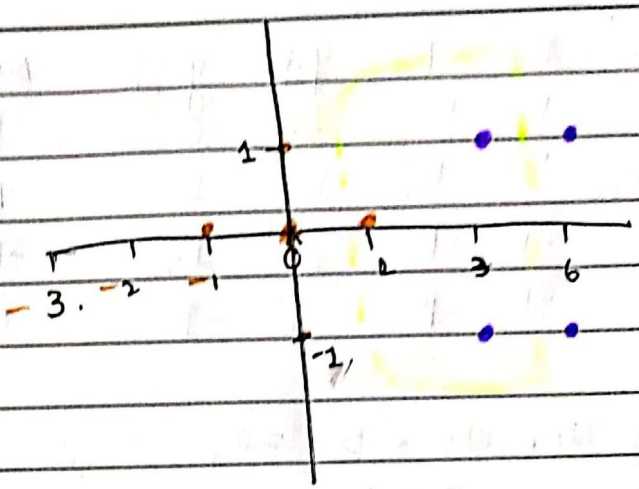
$yin = 0 + \{(2 x 1) + (0 x -1)\}$
$= 0 + 2 = 2.$

$\Delta w_1 = \alpha t x_1 = 1 x 1 x 1 = 1.$ $\Delta b = -1$
$\Delta w_2 = 1 x 1 x -1 = 1.$ $b = -1$
$w_1 = 2 + 1 = 1$
$w_2 = 0 + 1 = 1.$

ted: **SVM:-**

(+) $\begin{pmatrix}3\\1\end{pmatrix}$ $\begin{pmatrix}3\\-1\end{pmatrix}$ $\begin{pmatrix}6\\1\end{pmatrix}$ $\begin{pmatrix}6\\-1\end{pmatrix}$

(−) $\begin{pmatrix}1\\0\end{pmatrix}$ $\begin{pmatrix}0\\1\end{pmatrix}$ $\begin{pmatrix}0\\-1\end{pmatrix}$ $\begin{pmatrix}-1\\0\end{pmatrix}$



Supporting vectors

$s_1 = \begin{pmatrix}1\\0\end{pmatrix}$ $s_2 \begin{pmatrix}3\\1\end{pmatrix}$ $s_3 \begin{pmatrix}3\\-1\end{pmatrix}$

Now add bias

$\Rightarrow \tilde{s}_1 \begin{pmatrix}1\\0\\1\end{pmatrix}$ $\tilde{s}_2 = \begin{pmatrix}3\\1\\1\end{pmatrix}$ $\tilde{s}_3 \begin{pmatrix}3\\-1\\+1\end{pmatrix}$

$\alpha_1 \tilde{s}_1 \cdot \tilde{s}_1 + \alpha_2 \tilde{s}_2 \times \tilde{s}_1 + \alpha_3 \tilde{s}_3 \cdot \tilde{s}_3$

$\alpha_2 \tilde{s}_1 \tilde{s}_2 + \alpha_2 \tilde{s}_2 \times \tilde{s}_2 + \alpha_2 \tilde{s}_3 \cdot \tilde{s}_2$

$\alpha_3 \tilde{s}_3 \times \tilde{s}_1 + \alpha \tilde{s}_2 \times \tilde{s}_3 + \alpha_3 \tilde{s}_3 \times \tilde{s}_3$

$= \alpha_1 \begin{pmatrix}1\\0\\1\end{pmatrix}\begin{pmatrix}1\\0\\1\end{pmatrix} + \alpha_2 \begin{pmatrix}3\\1\\1\end{pmatrix}\begin{pmatrix}1\\0\\1\end{pmatrix} + \alpha_3 \begin{pmatrix}3\\-1\\1\end{pmatrix}\begin{pmatrix}1\\0\\1\end{pmatrix} = -1.$

$\alpha_2 \begin{pmatrix}1\\0\\1\end{pmatrix}\begin{pmatrix}3\\1\\1\end{pmatrix} + \alpha_2 \begin{pmatrix}3\\1\\1\end{pmatrix}\begin{pmatrix}3\\1\\1\end{pmatrix} + a_3 \begin{pmatrix}3\\-1\\1\end{pmatrix}\begin{pmatrix}3\\1\\1\end{pmatrix} = 1$

$\alpha_3 \begin{pmatrix}1\\0\\1\end{pmatrix}\begin{pmatrix}3\\-1\\1\end{pmatrix} + \alpha_2 \begin{pmatrix}3\\1\end{pmatrix}\begin{pmatrix}3\\-1\end{pmatrix} + \begin{pmatrix}3\\-1\\+1\end{pmatrix}\begin{pmatrix}3\\-1\end{pmatrix} = 1$

Dated:

$$\alpha_1\begin{pmatrix}1\\0\\1\end{pmatrix} + \alpha_2\begin{pmatrix}3\\0\\1\end{pmatrix} + \alpha_3\begin{pmatrix}3\\0\\1\end{pmatrix} = \alpha_1(2) + 4\alpha_2 + 4\alpha_3 = -1$$

$$\alpha_1\begin{pmatrix}3\\0\\1\end{pmatrix} + \alpha_2\begin{pmatrix}9\\1\\1\end{pmatrix} + \alpha_3\begin{pmatrix}9\\-1\\1\end{pmatrix} = 4\alpha_1 + 11\alpha_2 + 9\alpha_3 = 1.$$

$$\alpha_1\begin{pmatrix}3\\0\\1\end{pmatrix} + \alpha_2\begin{pmatrix}9\\-1\\1\end{pmatrix} + \alpha_3\begin{pmatrix}9\\1\\1\end{pmatrix} = 4\alpha_1 + 9\alpha_2 + 11\alpha_3 = 1.$$

$2\alpha_1 + 4\alpha_2 + 4\alpha_3 = -1.$

$4\alpha_1 + 11\alpha_2 + 9\alpha_3 = 1.$

$4\alpha_1 + 9\alpha_2 + 11\alpha_3 = 1$

$\alpha_1 = (-1 - 4\alpha_2 - 4\alpha_3)/2$ -1

$-2 - 8\alpha_2 - 8\alpha_3 + 11\alpha_2 + 9\alpha_3 = 1.$

$3\alpha_2 + \alpha_3 = 3$

$\alpha_3 = 3 - 3\alpha_2$ -2

Putting value of α_3 & α_1 in eq 3.

$-2 - 8\alpha_2 - 8\alpha_3 + 9\alpha_2 + 33 - 33\alpha_2 = 1.$ -3

$\alpha_2 - 8\alpha_3 + 30 - 33\alpha_2 =$

$2\alpha_2 = 30 - 8\alpha_3.$

$\alpha_2 = 15 - 4\alpha_3$

$\alpha_3 = 3 - 3(15 - 4\alpha_3).$

$\alpha_3 = 3 - 45 + 12\alpha_3$

$\alpha_3 = 42$

$\alpha_1 = \dfrac{-1 - 4(0.75) - 4(0.75)}{2}$

$= \alpha_1 = -3.5.$

$= -33\alpha_2 - 8\alpha_2 + 9\alpha_2 + 30 - 8\alpha_3 = 0.$

$-32\alpha_2 = 8\alpha_3 - 30$

$\alpha_2 = \dfrac{30 - 8\alpha_3}{32}$ -3 into 2.

$\alpha_3 = 3 - 3\left(\dfrac{30 - 8\alpha_3}{32}\right)$

$\alpha_2 = 30 - 6/32.$

$0.75.$

$\alpha_3 = 3 - \left[\dfrac{90 + 24\alpha_3}{32}\right] = 96 - 90 + 24\alpha_3$

$= 32\alpha_3$

$8\alpha_3 = 6$ $\alpha_3 = 0.75$

Dated:

$$\alpha_1 \tilde{s}_1 + \alpha_2 \tilde{s}_2 + \alpha_3 \tilde{s}_3$$

$$= -3.5 \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix} + 0.75 \begin{pmatrix} 3 \\ 1 \\ 1 \end{pmatrix} + 0.75 \begin{pmatrix} 3 \\ -1 \\ 1 \end{pmatrix}$$

$$= \begin{pmatrix} -3.5 \\ 0 \\ -3.5 \end{pmatrix} + \begin{pmatrix} 2.25 \\ 0.75 \\ 0.75 \end{pmatrix} + \begin{pmatrix} 2.25 \\ -0.75 \\ 0.75 \end{pmatrix}.$$

$$= \begin{pmatrix} 1 \\ 0 \\ -2 \end{pmatrix} \} - w$$
$$- \beta$$

(x=1