histogram

5
3
1

0.05

pdf

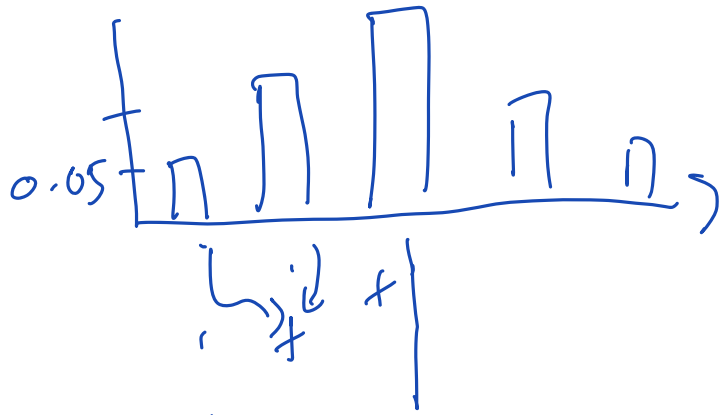$\Sigma = 1$ normalized hist.

1

histogram eq

$$I = \begin{bmatrix} 7 & 4 & 2 & 0 \\ 4 & 2 & 4 & 5 \\ 3 & 3 & 5 & 6 \end{bmatrix}$$

$V_{max} = 7$

$0, 1, 2 \ldots 7$

$N = 3 \cdot 4 = 12$

ℓ	0	1	2	3	4	5	6	7
$h(\ell)$	1	0	2	2	3	2	1	1
$\bar{h}(\ell)$	0.083	0.0	0.167	0.167	0.25	0.167	0.083	0.083
$\bar{c}(\ell)$	0.083	0.83	0.25	0.417	0.667	0.833	0.917	1.00
ℓ'	1	1	2	3	5	6	6	7

$$\bar{c}(\ell) = \sum_{k=0}^{\ell} \bar{h}(\ell) \qquad \ell = 0, 1 \ldots 7$$

$$\ell' = round\left[7 \cdot \bar{c}(\ell) \right]$$

$$I = \begin{bmatrix} 7 & 4 & 2 & 0 \\ 4 & 2 & 4 & 5 \\ 3 & 3 & 5 & 6 \end{bmatrix} \implies I' = \begin{bmatrix} 7 & 5 & 2 & 1 \\ 5 & 2 & 5 & 6 \\ 3 & 3 & 6 & 6 \end{bmatrix}$$

Arithmetic operations

$$I_1 = \begin{bmatrix} 5 & 3 & 0 \\ 7 & 2 & 4 \\ 3 & 3 & 4 \end{bmatrix} \qquad I_2 = \begin{bmatrix} 7 & 0 & 0 \\ 2 & 4 & 3 \\ 3 & 2 & 1 \end{bmatrix}$$

$$I'(x,y) = |I_1(x,y) - I_2(x,y)|$$

abs. diff.

$$I'(x,y) = \begin{bmatrix} 2 & 3 & 0 \\ 5 & 2 & 1 \\ 0 & 1 & 3 \end{bmatrix}$$

weighted average

$$I'(x,y) = round\left(0.2 \cdot I_1(x,y) + 0.8 \, I_2(x,y)\right)$$

$$I'(x,y) = \begin{bmatrix} 7 & 1 & 0 \\ 3 & 4 & 3 \\ 3 & 2 & 2 \end{bmatrix}$$

logical operations

$$I_1 = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix} \qquad I_2 = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$$

$$I_1 \text{ AND } I_2 = I' = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

OR
XOR
NOT

I_1 NOT I_1

        inverse

        complement

$$I^1 = \begin{bmatrix} 0 & 0 & 0 \\ 1 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$$