19CSE367 Digital Image Processing

SARATH TV

Last lecture

- Histograms
- Usage of histograms

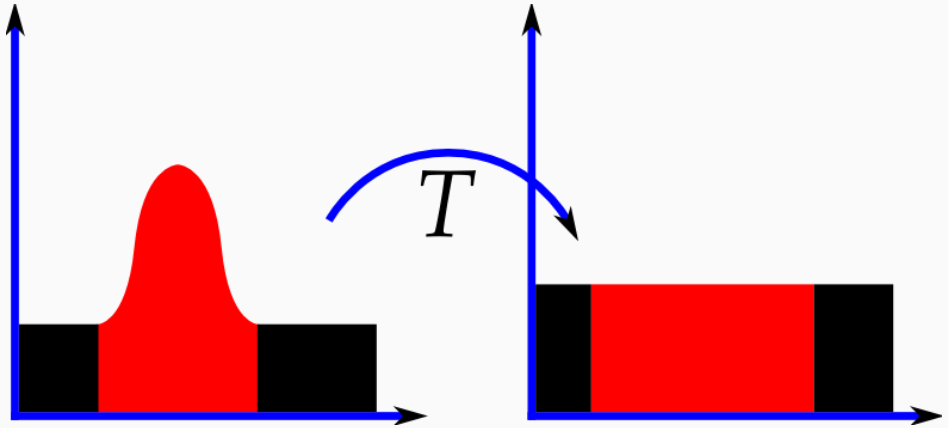
Histogram equalization

- Process images in order to adjust the contrast of an image by modifying the intensity distribution of the histogram
- Objective of this technique is to give a linear trend to the **cumulative probability function** associated to the image

- Histogram equalization is a method in *image processing of contrast adjustment using the image's histogram.*

- What we want as output of hist equalization..
- Two ways . One get linear histograms
- Another perspective -- cdf

Histogram equalization



- Consider a 3 bit, 8x8 image

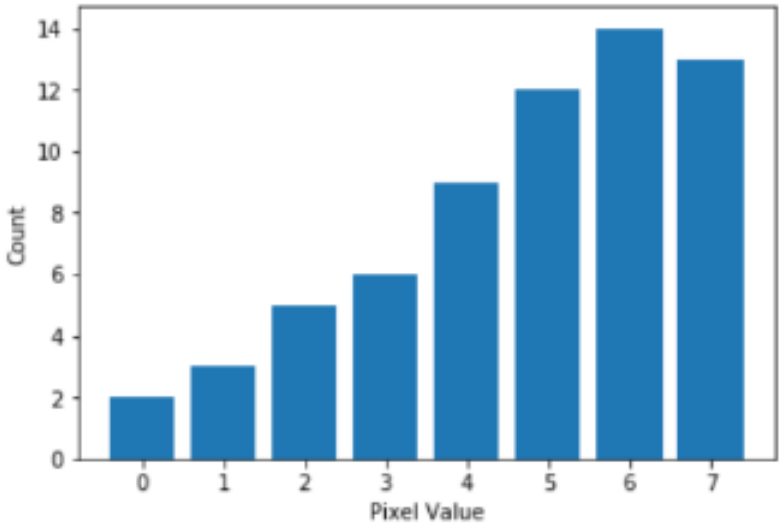
r_k	n_k
0	2
1	3
2	5
3	6
4	9
5	12
6	14
7	13

$$s_k = T(r_k) = (L-1)\sum_{j=0}^{k} p_r(r_j)$$

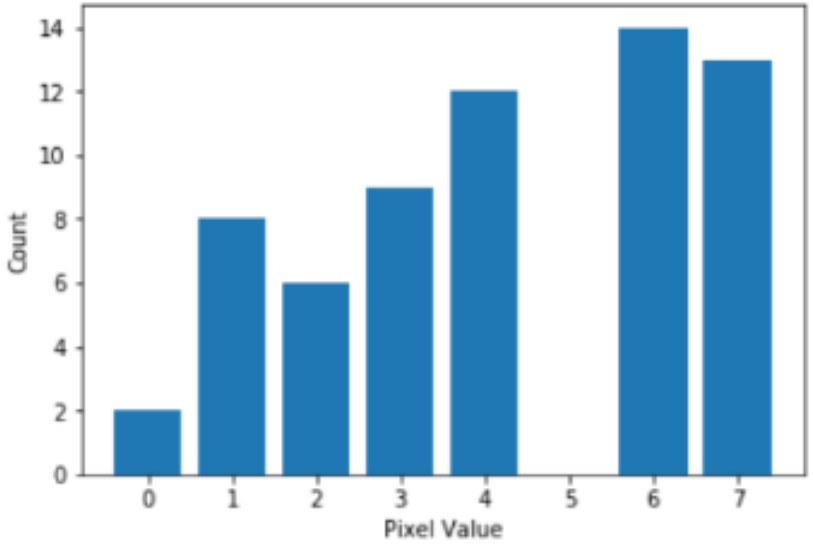
$$p_r(r_j) = \frac{n_j}{MN}$$

r_k	n_k	Pr(rk)	Sk
0	2	0.03	0.21
1	3	0.05	0.56
2	5	0.08	1.12
3	6	0.09	1.75
4	9	0.14	2.73
5	12	0.19	4.06
6	14	0.22	5.60
7	13	0.22	7.00

r_k	n_k	Pr(rk)	Sk	Round
0	2	0.03	0.21	0
1	3	0.05	0.56	1
2	5	0.08	1.12	1
3	6	0.09	1.75	2
4	9	0.14	2.73	3
5	12	0.19	4.06	4
6	14	0.22	5.60	6
7	13	0.22	7.00	7



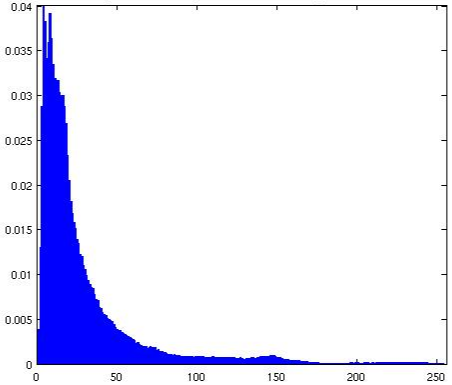
Original



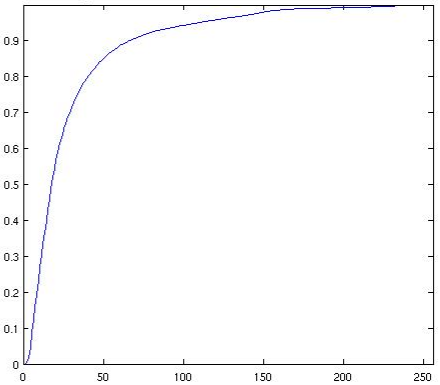
Equalized

Input Image

Original Histogram before equalization

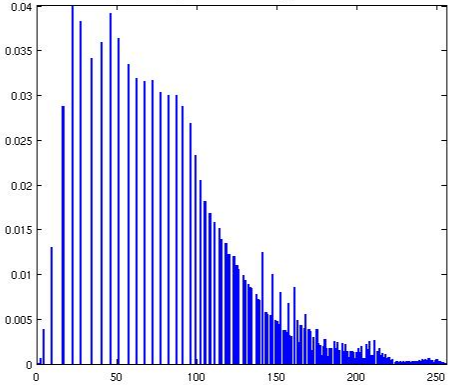


Original Cumulative Distribution Function

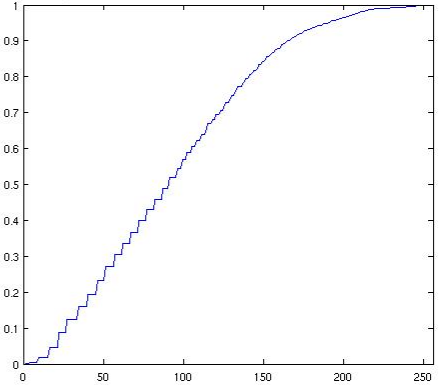


Output Image

Equalized histogram



Equalized Cumulative Distribution Function




THANK YOU!