

19CSE367 Digital Image Processing

SARATH TV

Last lecture

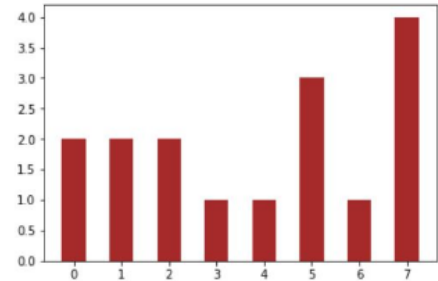
- Power Law Transformation

Image Histogram

- An image histogram tells us how the *intensity values* are *distributed* in an image.
- we plot the intensity values on the x-axis and the no. of pixels corresponding to intensity values on the y-axis
- 1D histogram
- only one feature into our consideration

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

4x4 , 3-bit image



Terminologies

- Tonal range
- Shadows- Left side
- Midtones- Middle, medium gray
- Highlights- Right side

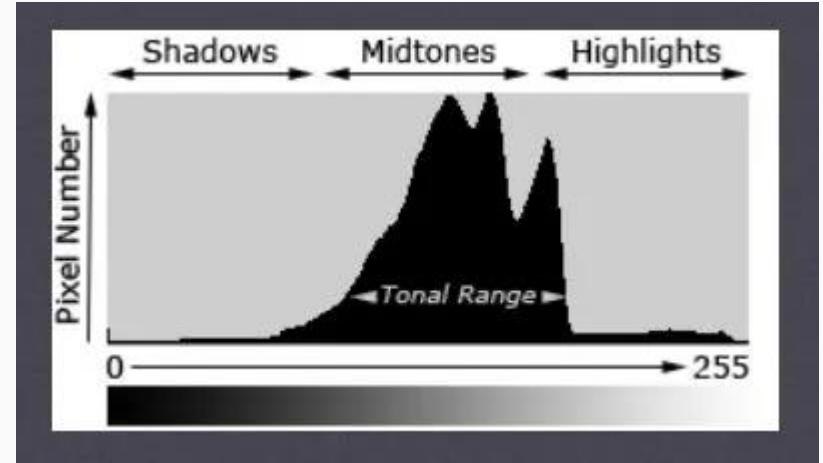
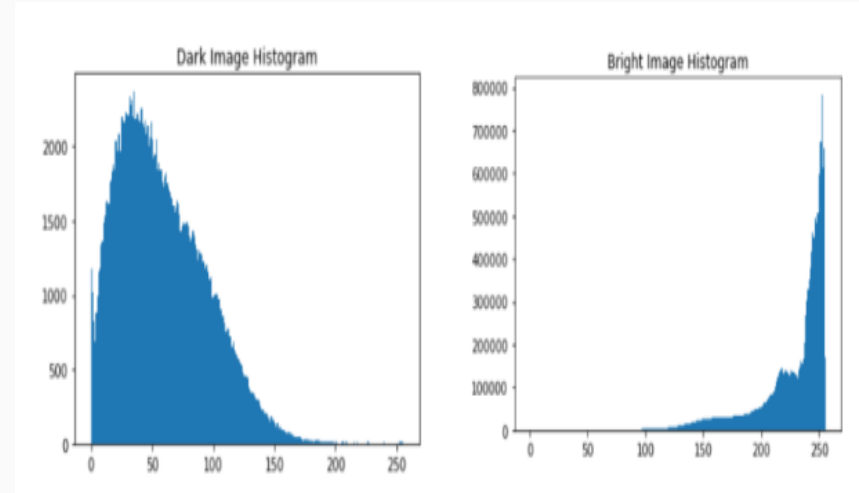
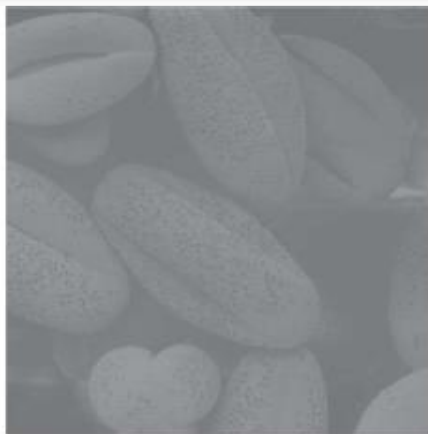
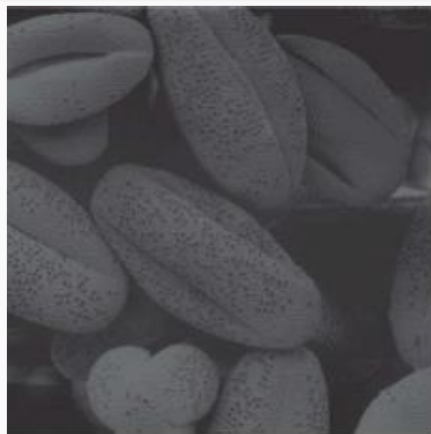


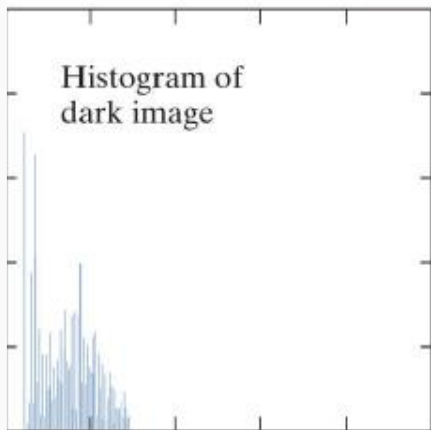
Image histograms

- By looking at the histogram for a specific image a viewer will be able to judge the entire tonal distribution at a glance.
- The horizontal axis of the graph represents the tonal variations, while the vertical axis represents the total number of pixels in that particular tone
- the histogram for a very dark image will have most of its data points on the left side and center of the graph.
- Conversely, the histogram for a very bright image with few dark areas and/or shadows will have most of its data points on the right side and center of the graph.

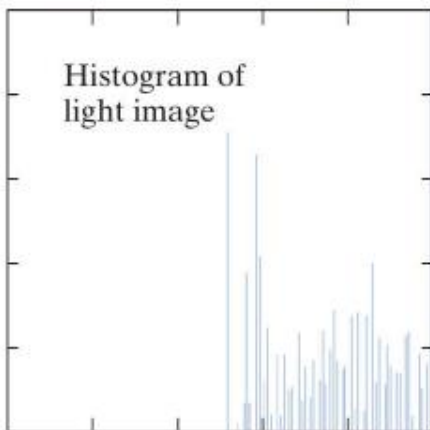




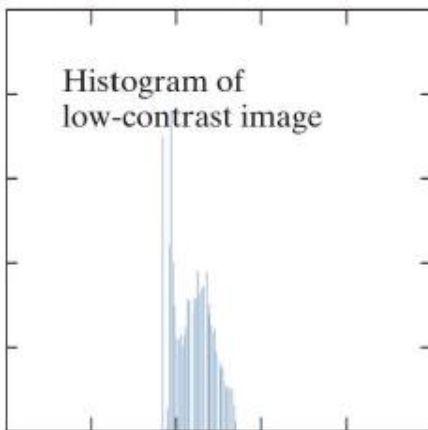
Histogram of
dark image



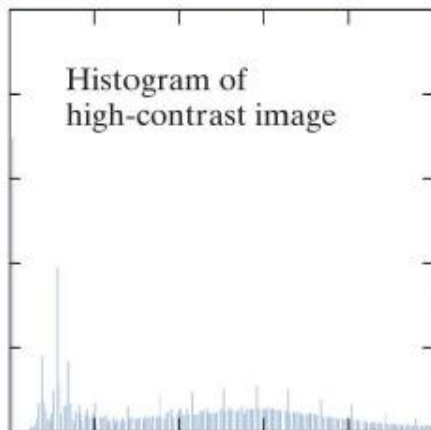
Histogram of
light image



Histogram of
low-contrast image



Histogram of
high-contrast image



Histogram equalization

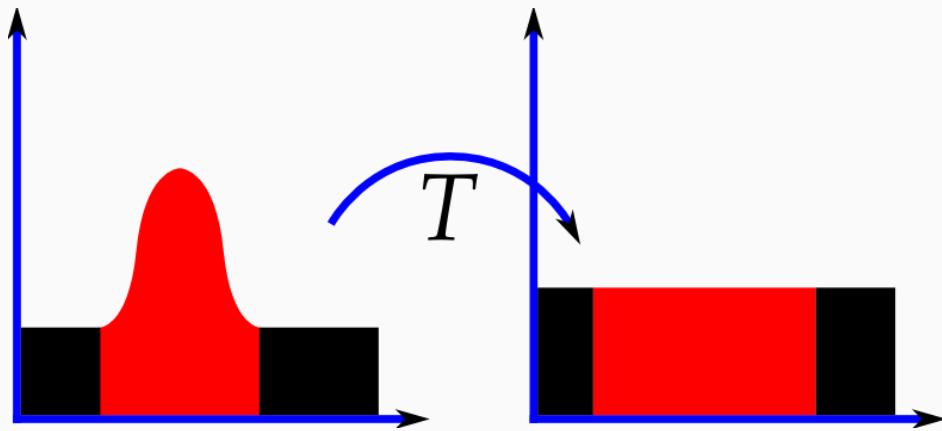
- Unnormalized histogram

$$h(r_k) = nk \text{ for } k = 0, 1, 2, \dots, L - 1$$

- Normalized histogram

$$p(r_k) = \frac{h(r_k)}{MN} = \frac{n_k}{MN}$$

- Proportion of pixels that have an intensity less than or equal to a particular value.
- It's a non decreasing function of intensity
- Always ends with 1



THANK YOU!