

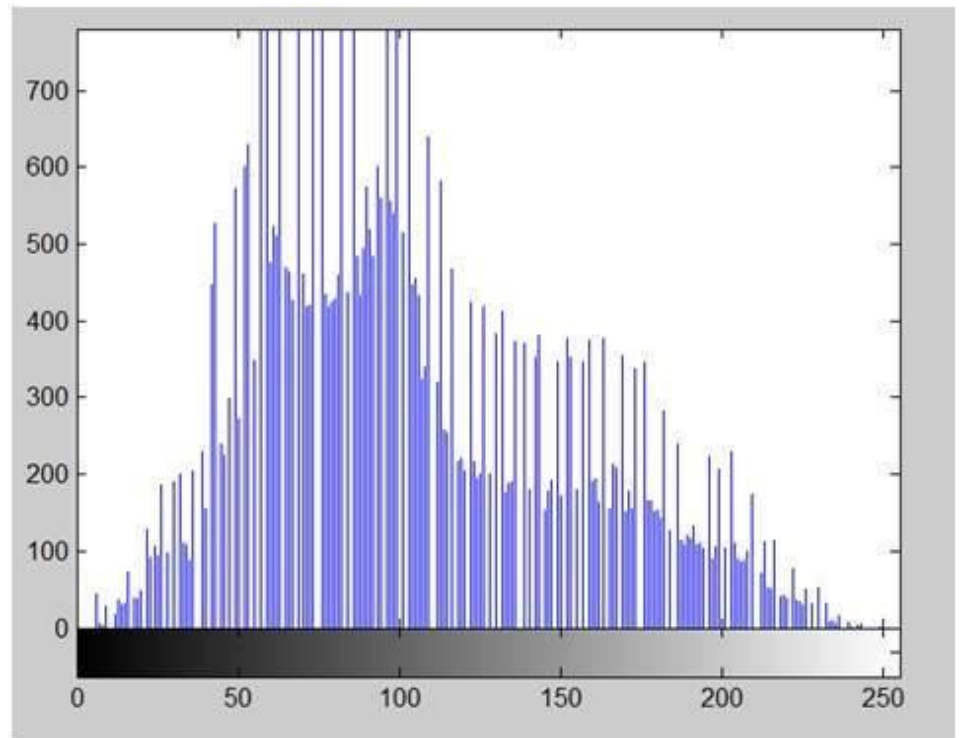
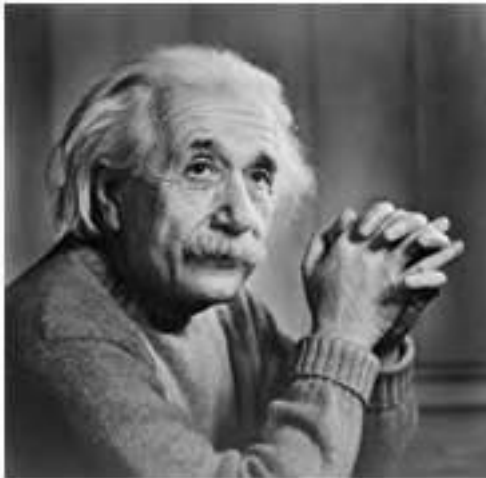
Color and Texture



Histograms

- A histogram of a gray-tone image is an array $H[*]$ of bins, one for each gray tone.
- $H[i]$ gives the count of how many pixels of an image have gray tone i .
- $P[i]$ (the normalized histogram) gives the percentage of pixels that have gray tone i .

Gray image histogram



$$h(i) = \sum_x \sum_y \begin{cases} 1 & \text{if } F(x, y) = i \\ 0 & \text{otherwise} \end{cases}$$

Color histograms can represent distribution of pixel values

- Histogram is fast and easy to compute.
- Size can easily be normalized so that different image histograms can be compared.
- Can match color histograms for database query or classification.

How to make a color histogram

- Make a single 3D histogram.
- Make 3 histograms and concatenate them
- Create a single pseudo color between 0 and 255 by using 3 bits of R, 3 bits of G and 2 bits of B
- Use normalized color space and histograms.

Multi-scale spatial color representation

- Divide an image into $N \times N$ grids at multiple scales
- Compute color histogram for each grid
- Concatenate all the histograms across scales and grids as a feature vector

