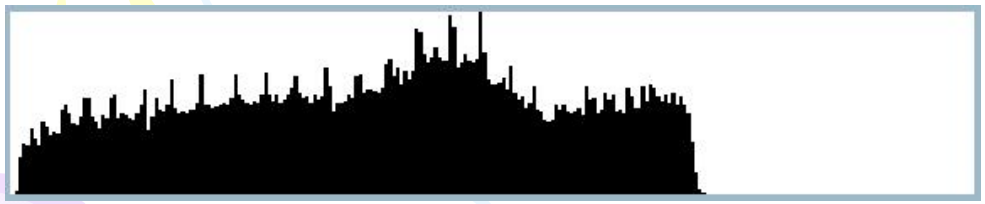
Histogram

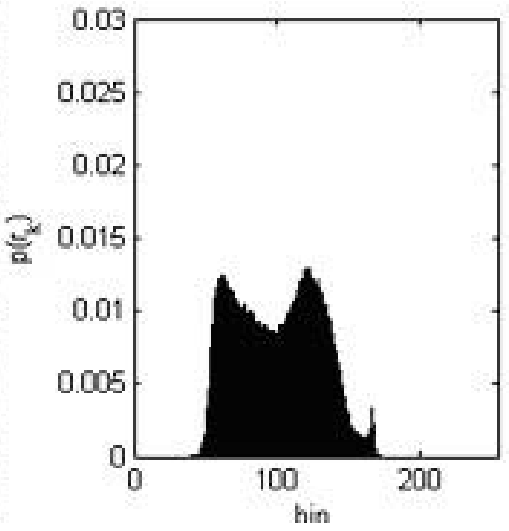
- Probability distribution of the different grays in an image

$$p(x_i) = \frac{n_i}{n}$$



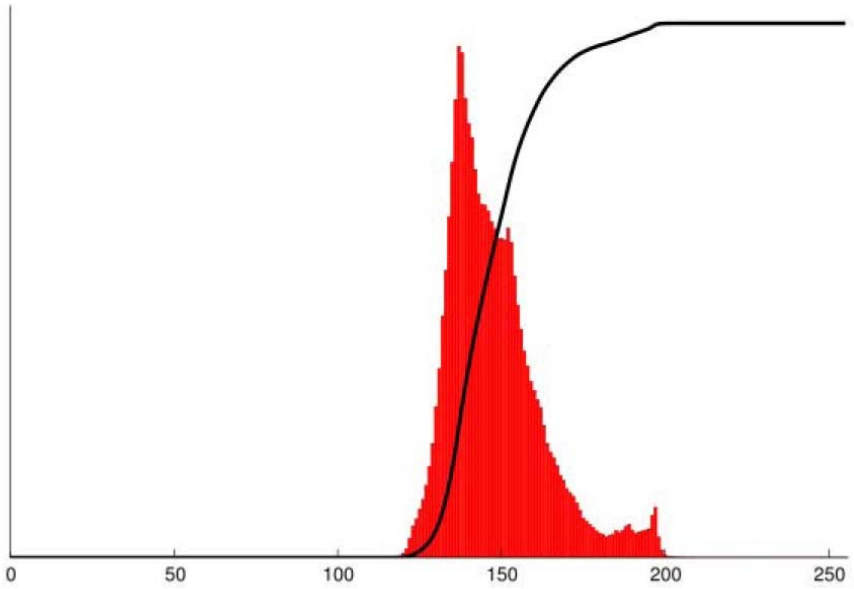
Contrast Enhancement

- Limited gray levels are used
- Hence, low contrast
- Enhance contrast



Histogram Stretching

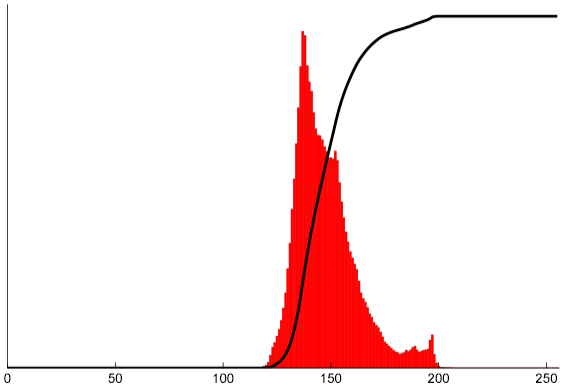
$$c(i) = \sum_{j=0}^{i} p(x_j)$$



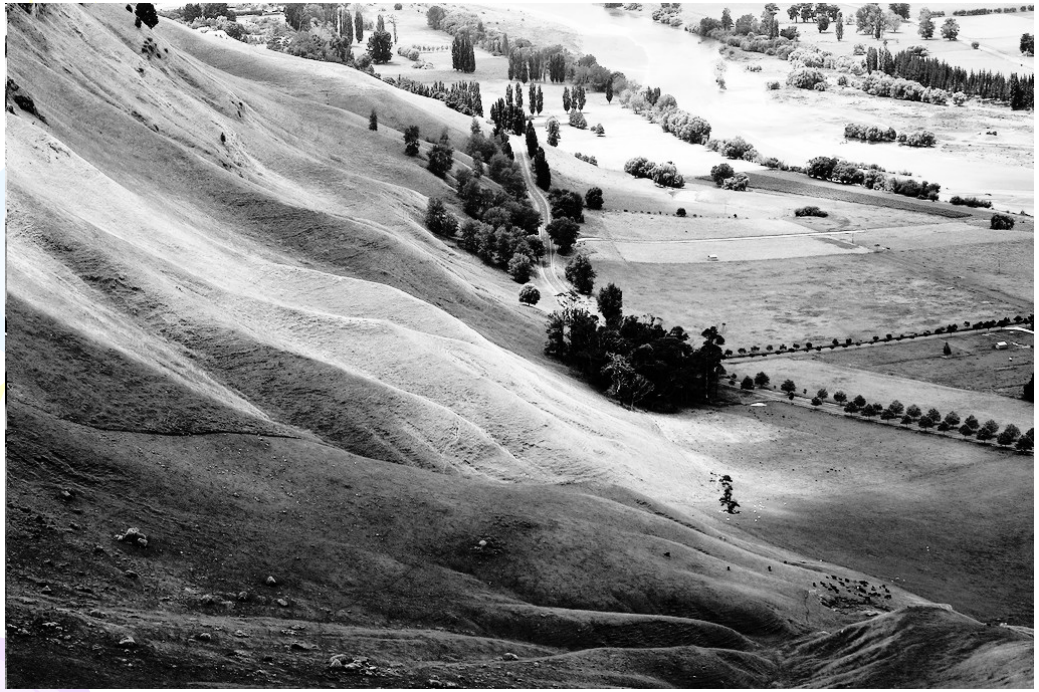
- Monotonically increasing function between 0 and 1
- c(0) = 0
- c(1) = 1

$$y_i = T(x_i) = c(i)$$

Results



Results



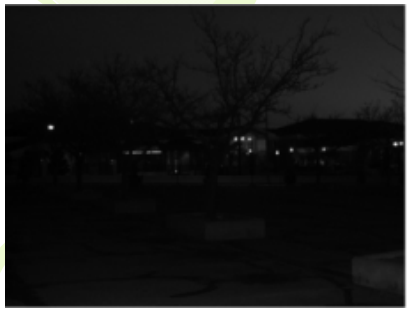
Burn out effects

Adaptive Histogram Stretching

- Choose a neighborhood
- Apply histogram equalization to the pixels in that window
- Replace the center pixel with the histogram equalized value
- Do this for all pixels
- Compute intensive
- Leads to noise

Results

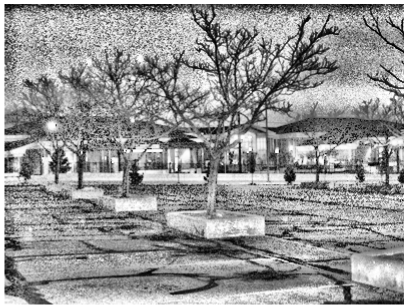
Original

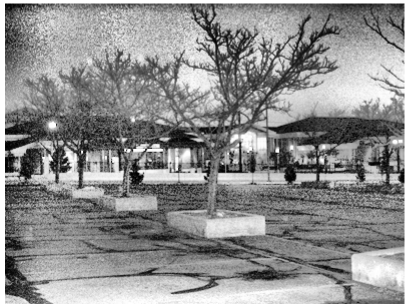


Global

Adaptive (15x15)

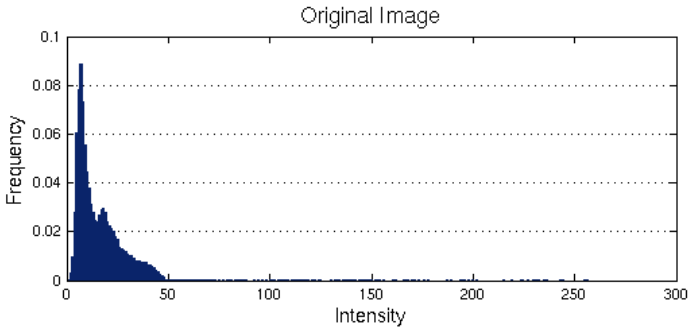
Adaptive (30x30)

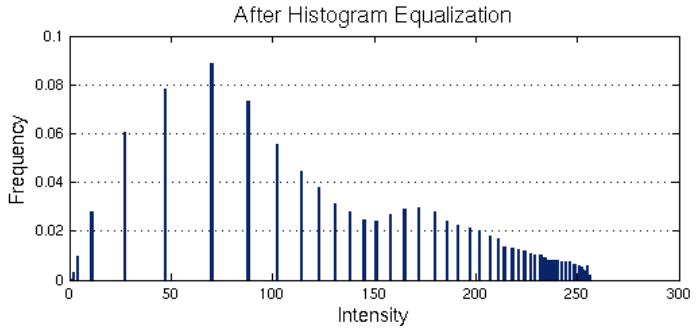




Adaptive (75x75)

Adaptive (150x1500)



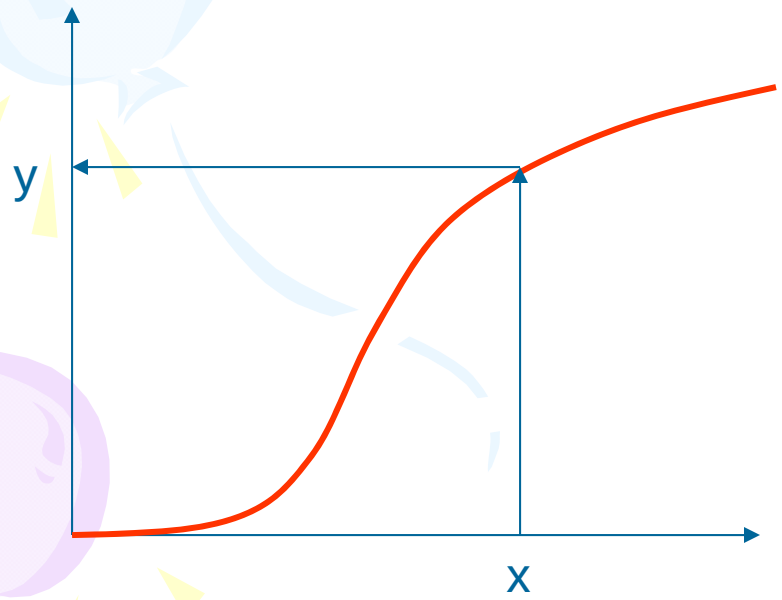


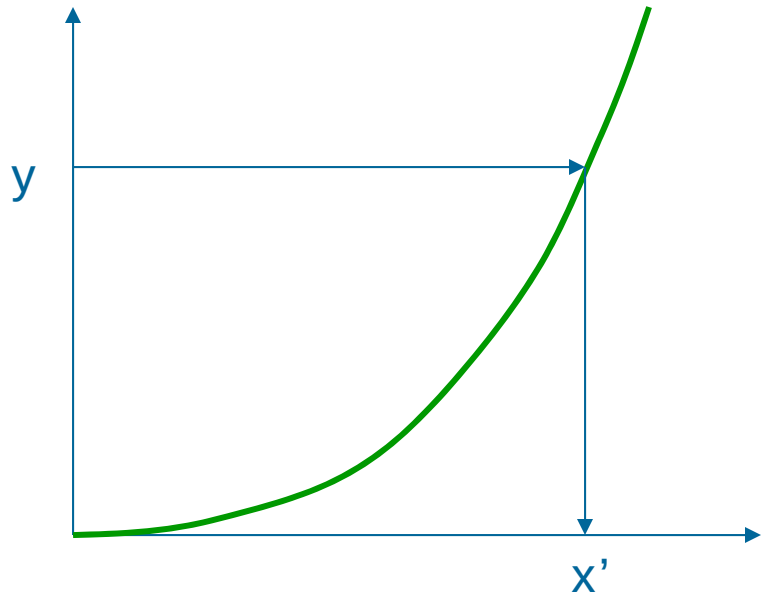
Histogram Matching

Histogram 1

Histogram 2

$$c(i) = \sum_{j=0}^{i} p(x_j)$$





Appearance Transfer