

CAP5415 Computer Vision
Spring 2003

Khurram Hassan-Shafique

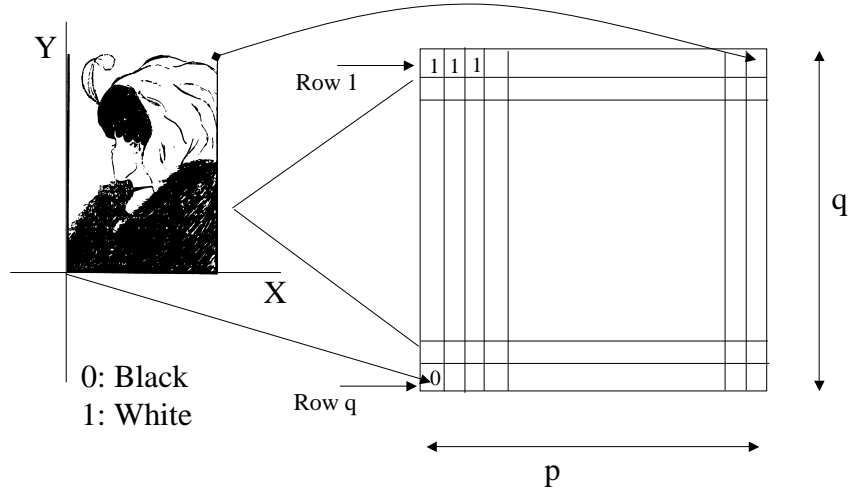


Dealing with Images

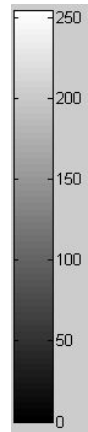
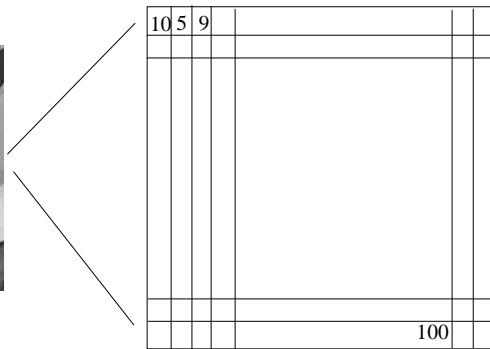
- Binary
- Gray Scale
- Color



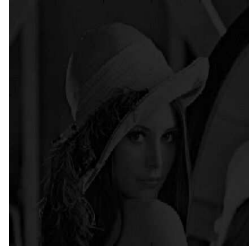
Binary Image



Gray Scale Image



Gray Scale Image



Color Image (RGB)

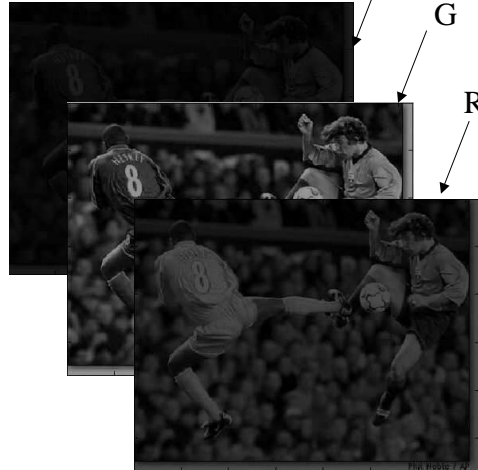


Image Histogram

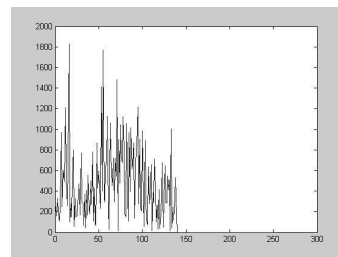
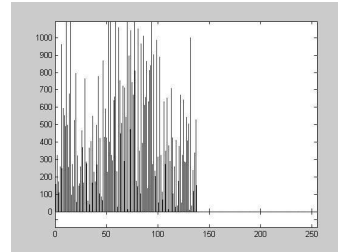


Image Noise

- Light Variations
- Camera Electronics
- Surface Reflectance
- Lens

Image Noise

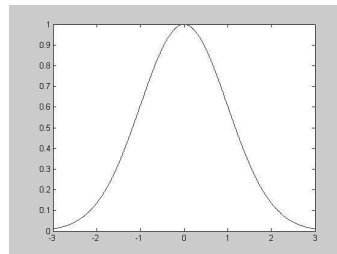
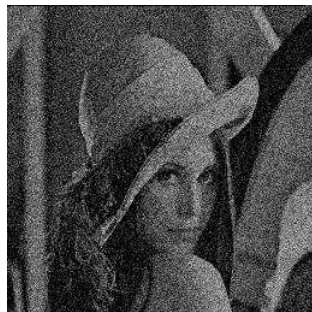
Let $I(i,j)$ be the true pixel values and $n(i,j)$ be the noise added to the pixel (i,j)

$$\hat{I}(i,j) = I(i,j) + n(i,j) \quad (\text{Additive Noise})$$



Gaussian Noise (White Noise)

$$n(i,j) = e^{\frac{-x^2}{2\sigma^2}}$$



Salt and Pepper Noise

$$\hat{I}(i, j) = \begin{cases} I(i, j) & p < l \\ s_{\min} + r(s_{\max} - s_{\min}) & p \geq l \end{cases}$$

$p, q \in [0, 1]$ (Uniformly distributed random variables)

$l = \text{Threshold}$

