19CSE367 Digital Image Processing

SARATH TV

Last lecture

- Sampling and Quantization
- Image model
- Image representation

Image representation

- Continuous image to Digital image.
- f(s,t) -> f(x,y)
- Matrix representation- M rows & N columns.
- For Image digitization –values of M,N and L (the number of discrete intensity levels) need to be chosen.
- M,N –positive integers.
- L value- depends on digital storage and quantizing hardware considerations
- L is taken as integer power of 2

- Terms - Dynamic range.
- Ratio of maximum measurable intensity to the min detectable intensity level.
- Saturation and noise.
- Highest value beyond which all intensity values are clipped.

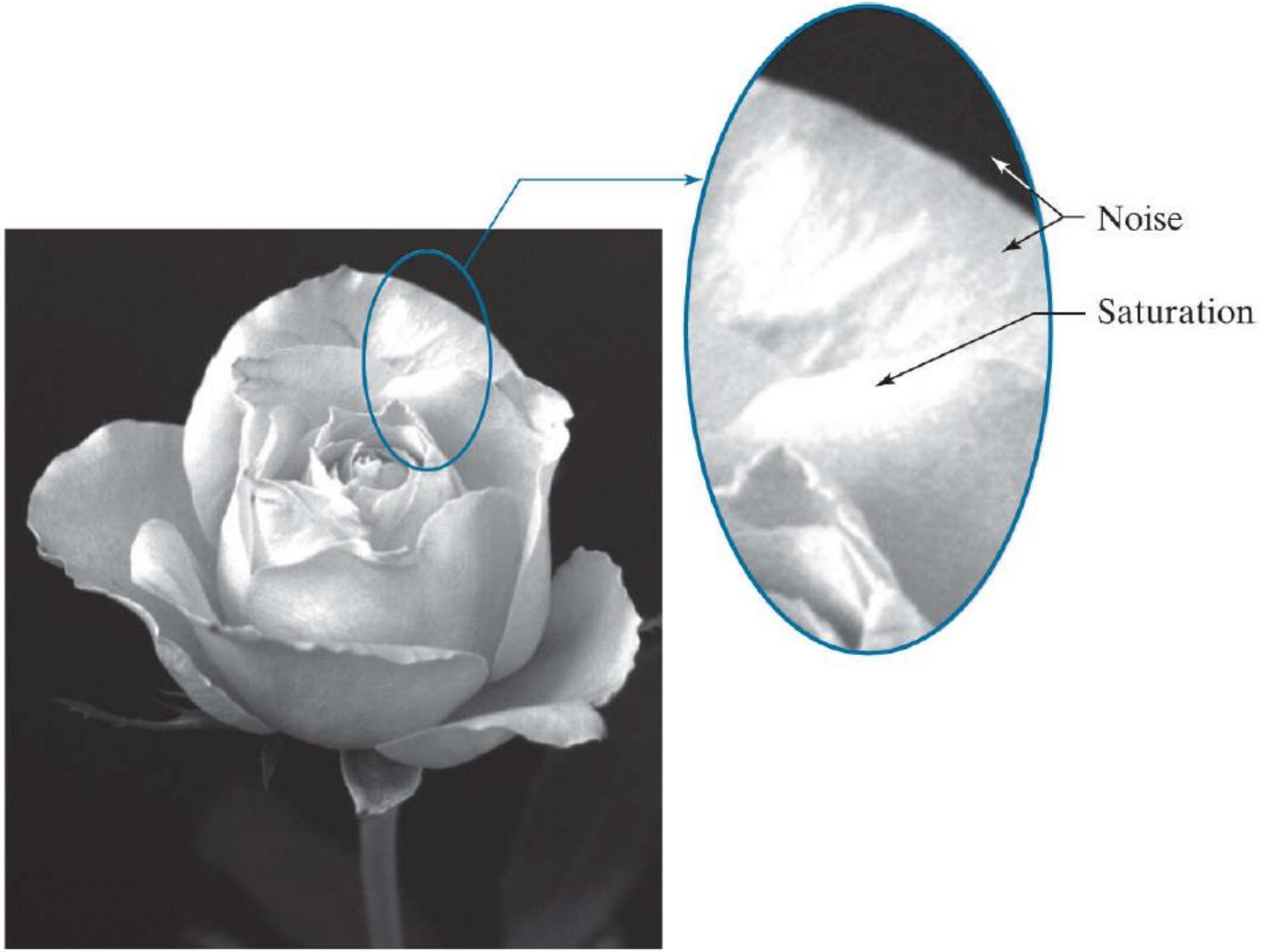
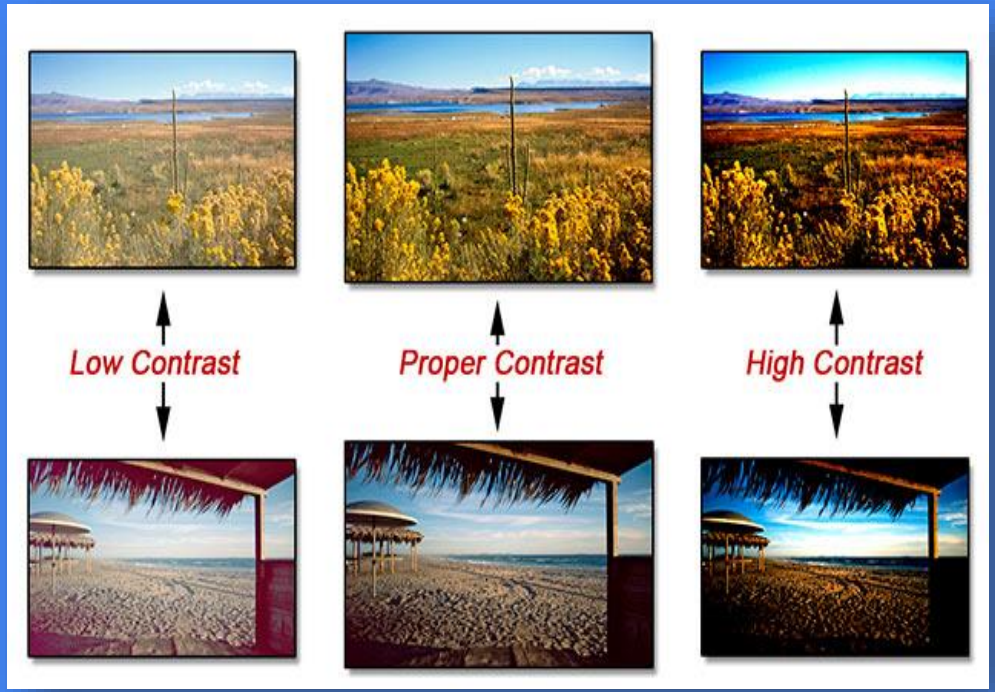

Noise
Saturation

Image Contrast

- Difference in intensity between the highest and lowest intensity level in an image.
- Contrast ratio – highest/lowest intensity level in an image.
- Image with high dynamic range→ expect high contrast.
- Image with low dynamic range→ dull washed out gray look.



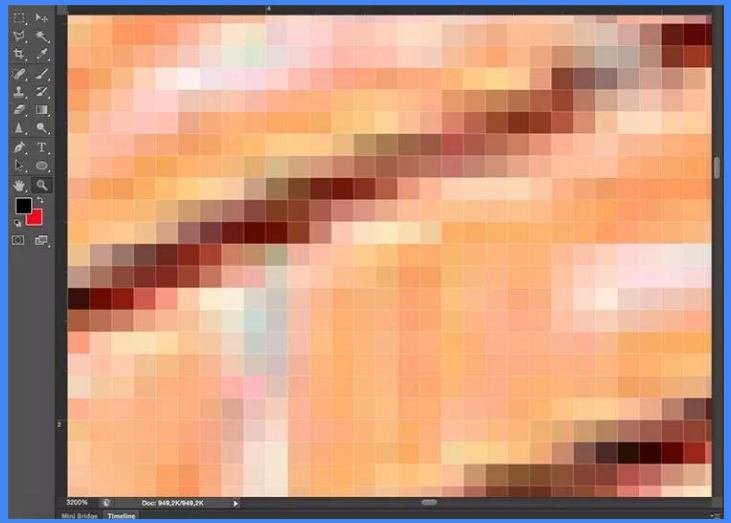
Spatial resolution

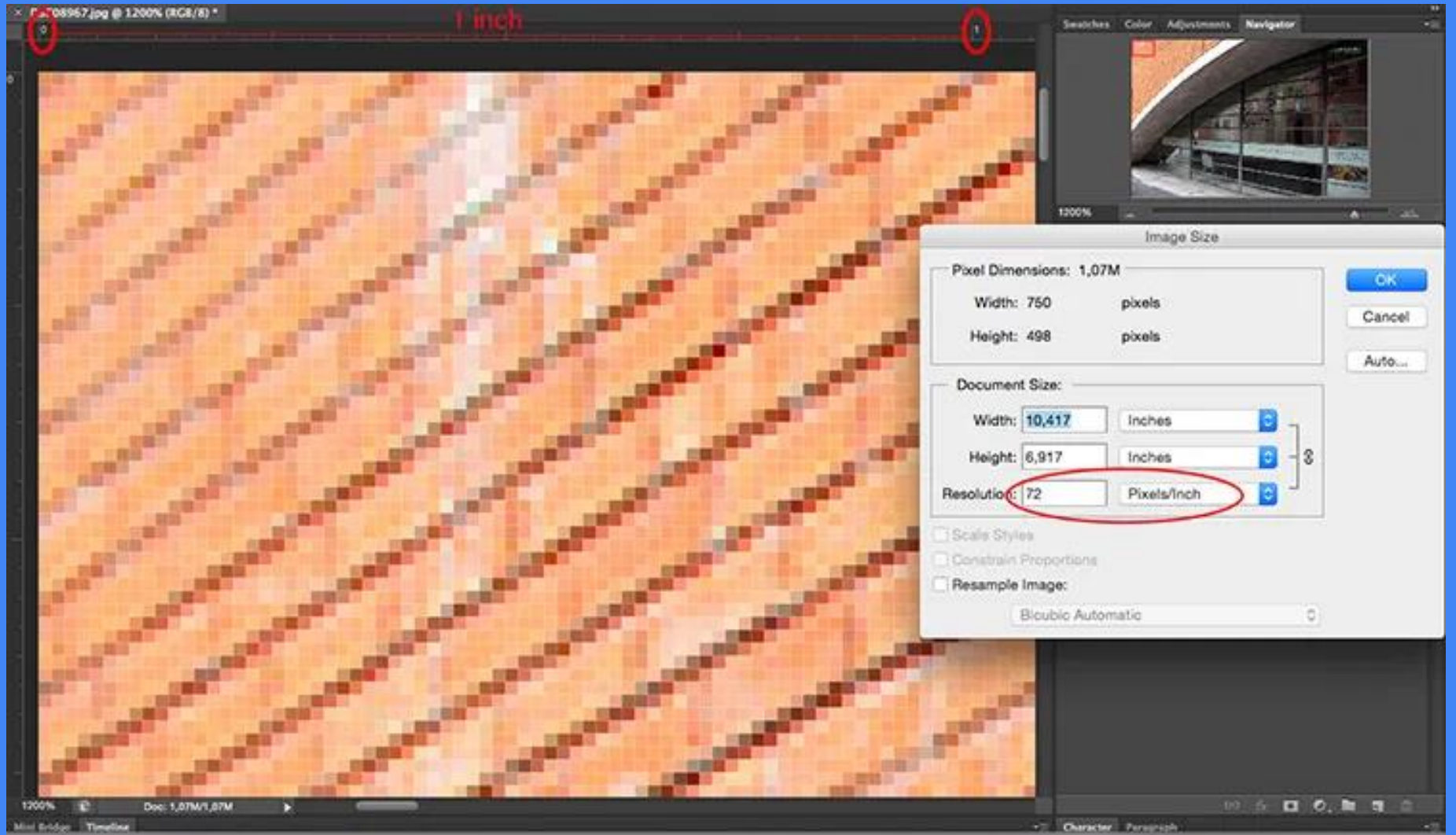
- Spatial resolution :
  - measure of smallest observable detail in an image.
  - Line pairs per unit distance
  - Pixel (dots) per unit distance.
- dpi (dots per inch) unit in printing and publishing industry.
  - Newspaper -75dpi
  - Magazines - 133 dpi
  - Glossy brochure -175dpi
- Higher Image size means better image ??
  - 1024x1024 image vs 512x512

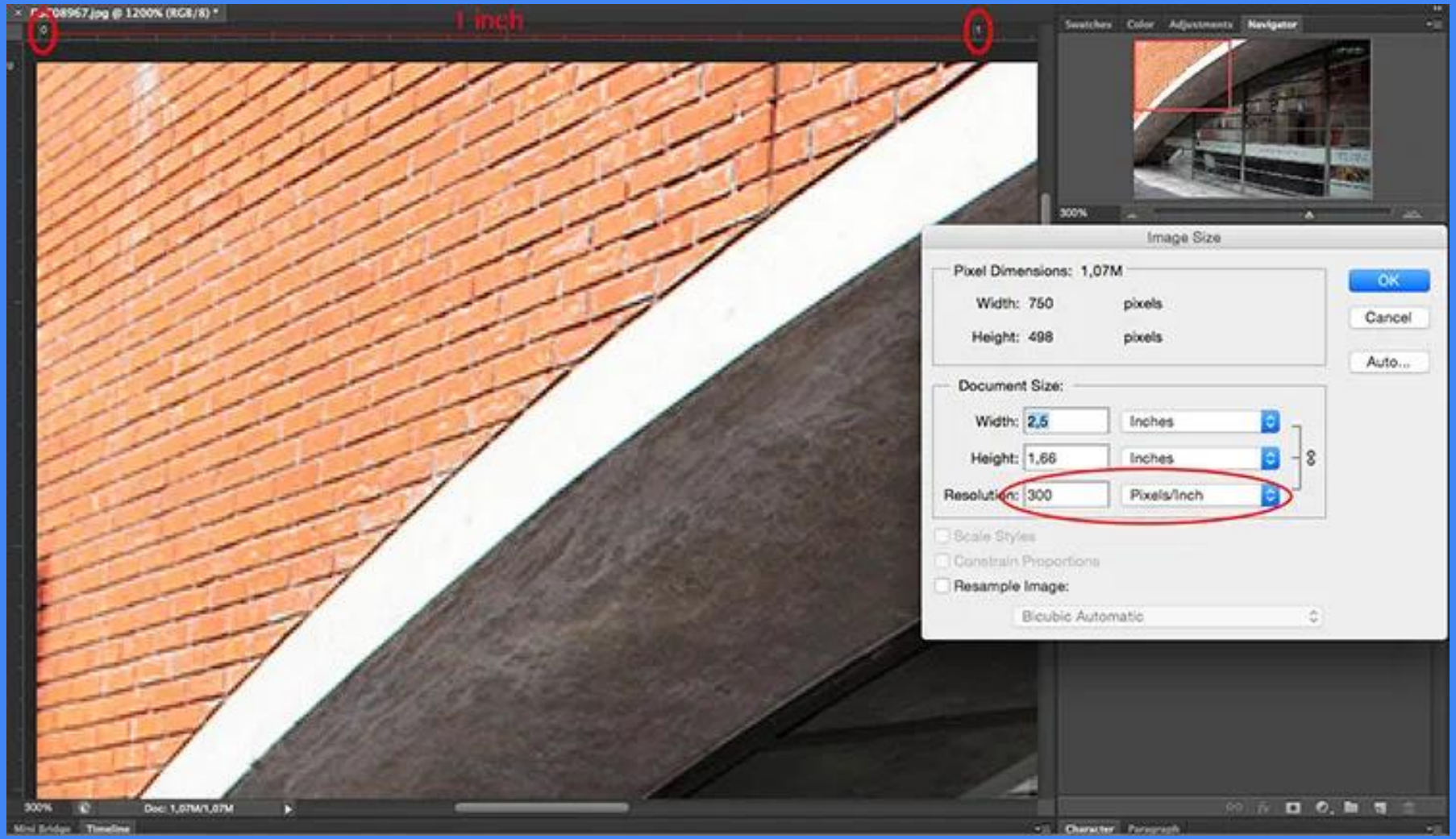
- Image size alone doesn’t mean ,it is a better image. The spatial resolution has to be considered also.

Understanding resolution

- Pixels
- The amount of these pixels and the way they are distributed are the two factors that you need to consider to understand resolution.
- Pixel count
- Pixel density
- “a rubber band, you can stretch it or shrink it but you’re not changing the composition of the band, you’re not adding or cutting any of the rubber.”




1 inch
Swatches
Color
Adjustments
Navigator
1200%
Image Size
Pixel Dimensions: 1,07M
Width: 750 pixels
Height: 498 pixels
OK
Cancel
Auto...
Document Size:
Width: 10,417 Inches
Height: 6,917 Inches
Resolution: 72 Pixels/Inch
Scale Styles
Constrain Proportions
Resample Image:
Bicubic Automatic
Doc: 1,07M/1,07M
Character
Paragraph


1 inch
Image Size
Pixel Dimensions: 1,07M
Width: 750 pixels
Height: 498 pixels
OK
Cancel
Auto...
Document Size:
Width: 2,5 Inches
Height: 1,66 Inches
Resolution: 300 Pixels/Inch
Scale Styles
Constrain Proportions
Resample Image:
Bicubic Automatic

Effect of reducing spatial resolution

- 1250,300,150 and 72 dpi.
- Slight distortion in the large black needle in the first two images.
- As the resolution reduces the difference in quality or degradation of the image is more visible.


THANKYOU!