

Color Image Processing

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Color Processing

- Intensity transformation, Histogram equalization and Spatial filtering on color images
 - It is not usual to apply these techniques on each channel in RGB color spaces
 - Instead, we decouple the intensity channel and apply intensity transformation/histogram equalization/spatial filtering on the intensity channel only
 - Converting color space into HSI or YUV(or YCbCr)

Color Processing

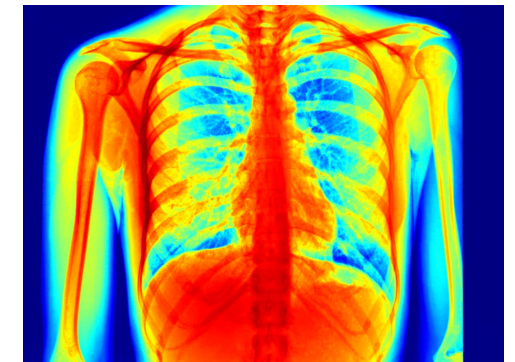
- Usage of HSI
 - Intensity images are decoupled
 - Can change the intensity of the image only
 - Color Slicing
 - Find the pixels in the range of the desired color in the **Hue**-channel
 - Set all the other pixels to 0 in the **Saturation**-channel
 - Color Conversion
 - By accessing the **Hue-channel**, we can change the regions of colors



Color Processing

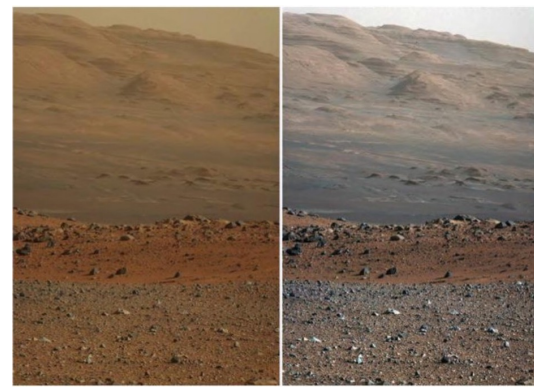
■ Pseudo Coloring

- The eye can distinguish between only about 30-50 different shades of gray.
- But can distinguish about 100k ~ 10m colors.
- Useful to display gray scale images using color to visualize the information better
- Important to include a color scale in the images to understand what the colors illustrate
- Example of pseudo-coloring :
 - Intensity Slicing
 - Each intensity is assigned a color



White Balancing

- Definition
 - Global adjustment of the intensities of the colors



- Simple way of white balancing
 - Scale R,G,B components so that objects which are believed to be neutral appear so

$$\begin{bmatrix} R \\ G \\ B \end{bmatrix} = \begin{bmatrix} 255/R'_w & 0 & 0 \\ 0 & 255/G'_w & 0 \\ 0 & 0 & 255/B'_w \end{bmatrix} \begin{bmatrix} R' \\ G' \\ B' \end{bmatrix}$$

White Balancing

- Using color checker



- Estimate white color in an image
 - Gray world assumption
 - In a normal well color balanced photo, the average of all the colors is a neutral gray