

UNESCO UNITWIN Online Course

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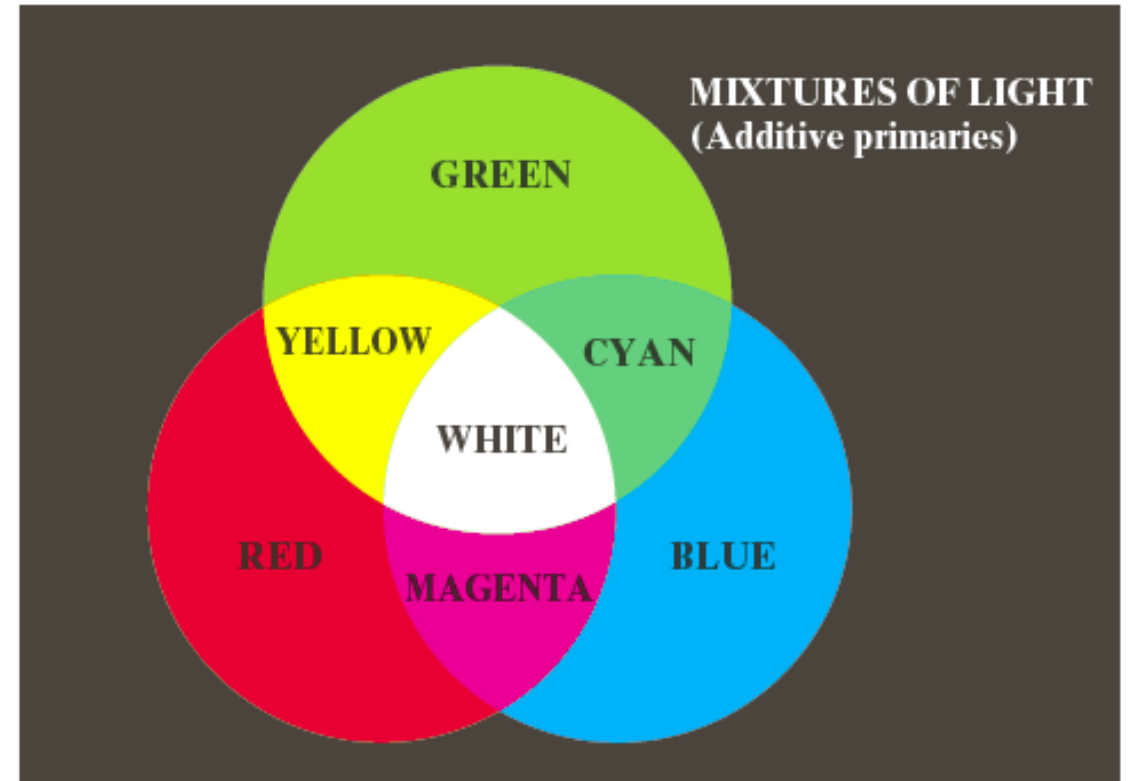


Basics of Color

Sung Soo Hwang

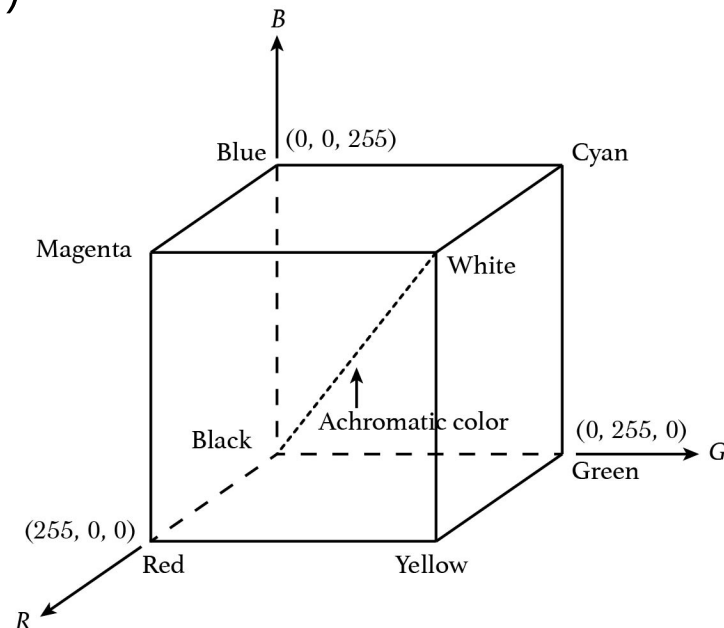
Basics of Color

- Primary colors of light
 - Blue
 - Green
 - Red
- Secondary colors of light
 - Magenta (red plus blue)
 - Yellow (red plus green)
 - Cyan (green plus blue)
- Achromatic color
 - Without color
 - The ratio of each color component is same



Color Models

- RGB
 - Consists of R-channel, G-channel, B-channel
 - When the intensity level of each channel is $[0, 255]$
 - Red = $(255, 0, 0)$
 - White = $(255, 255, 255)$
 - Black = $(0, 0, 0)$

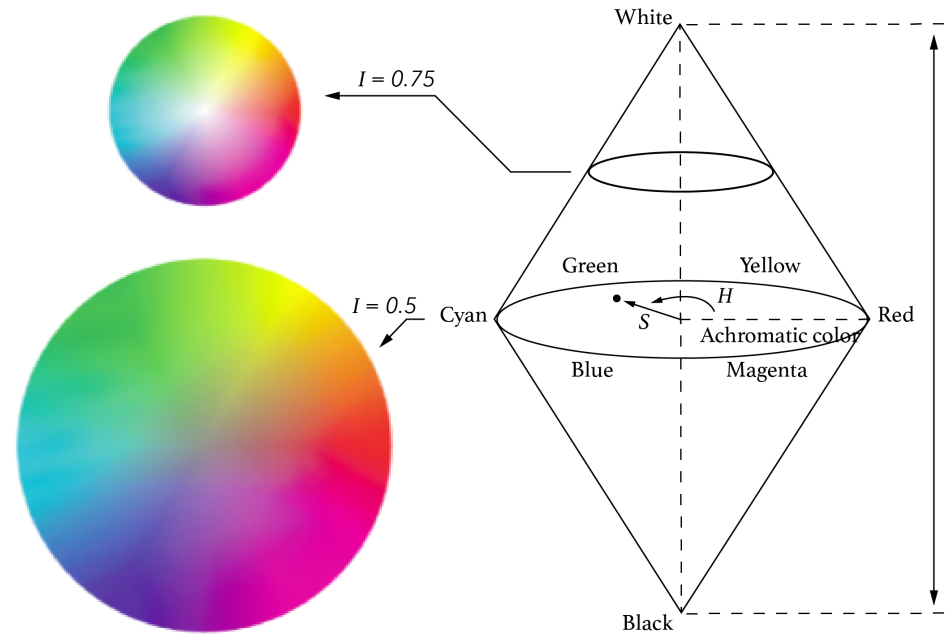


Color Models

- HSI
 - Consists of Hue-channel, Saturation-channel, and Intensity-channel
 - Intensity(Brightness): the achromatic notion of intensity
 - Hue: the dominant wavelength in a mixture of light waves
 - Saturation: the relative purity or the amount of white light mixed
 - $HSI \cong HSV$
 - Large value of S → clear color
 - Large value of I → bright color

Color Models

■ HSI



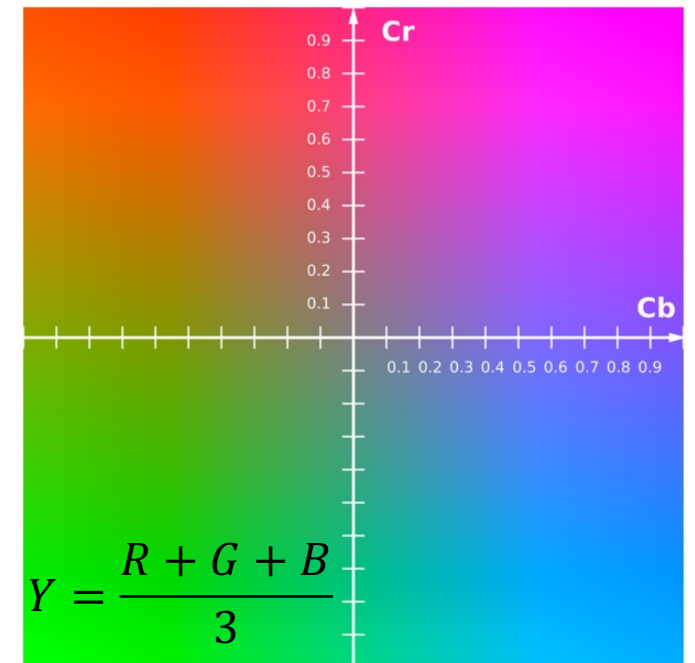
- Range of each channel?
 - $0 < H < 360$, OpenCV range $\rightarrow H/2 (0 < H < 180)$
 - $0 < S < 1$, OpenCV range $\rightarrow 255 * S (0 < S < 255)$
 - $0 < V < 1$, OpenCV range $\rightarrow 255 * V (0 < V < 255)$

Color Models

- YCbCr (or YUV)
 - Y: Brightness
 - Cb: Difference between blue value and brightness (B-Y)
 - Cr: Difference between red value and brightness (R-Y)



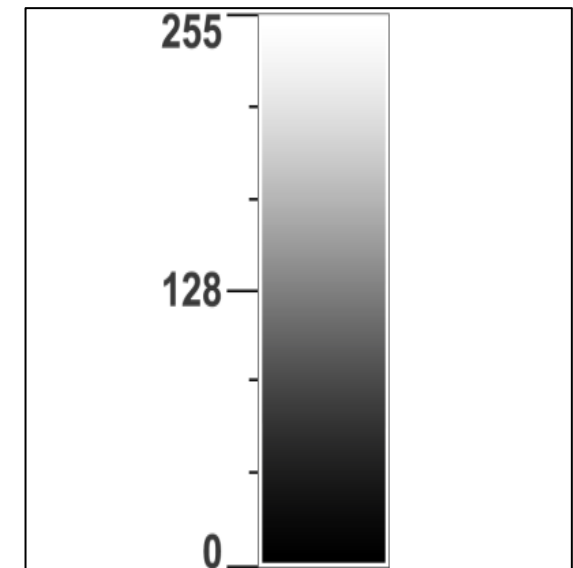
<https://en.wikipedia.org/wiki/YUV#/media/File:Barn-yuv.png>



https://en.wikipedia.org/wiki/File:YCbCr-CbCr_Scaled_Y50.png

Color Models

- Grayscale image
 - Hue and saturation of each pixel is equal to 0
 - The lightness(or brightness) is the only parameter of a pixel that can vary



Contact Info

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