Color Spaces

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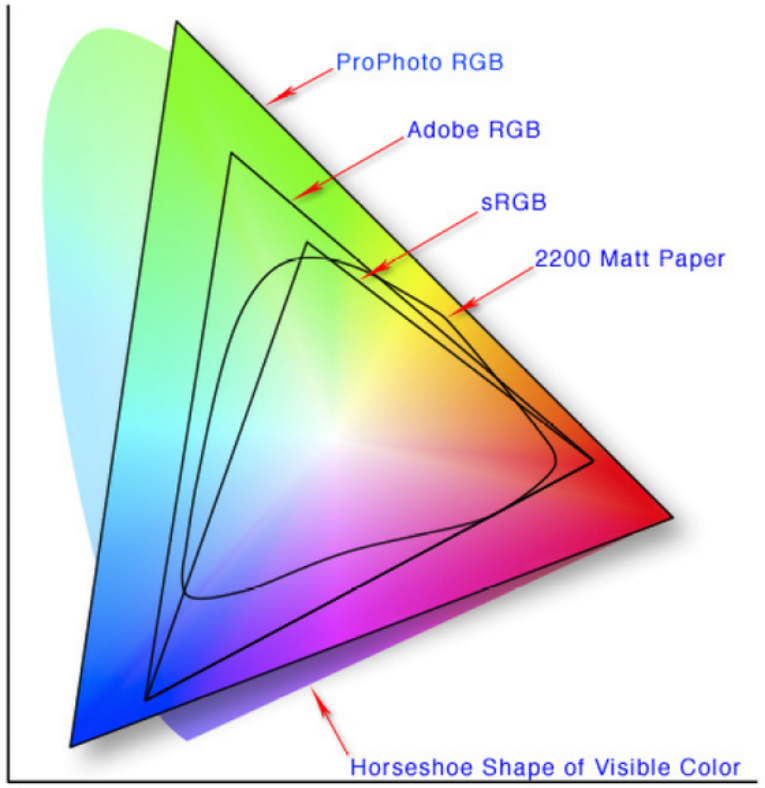
Color Spaces

"A device color space simply describes the range of colors, or gamut, that a camera can see, a printer can print, or a monitor can display" [1]

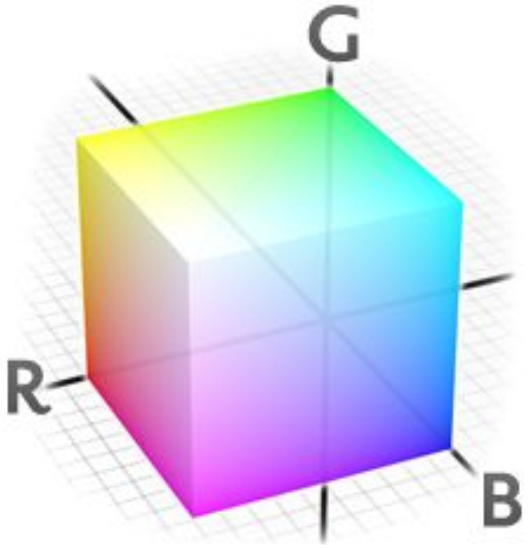
Typically Sensitive to Hardware/Device Components except for CIE color models



[2]

RGB Color Space

- More 'Typical' Colorspace
- sRGB
- Intensities of Red, Green, Blue



[3]

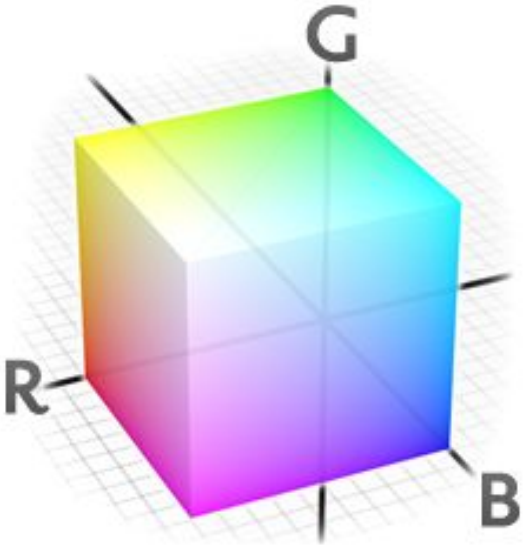
RGB Color Space

- 19th century Thomas Young and Hermann Helmholtz propose 'trichromatic color vision'

- Add R + G + B to make color

-24 Bit used to encode color in modern times

[3]



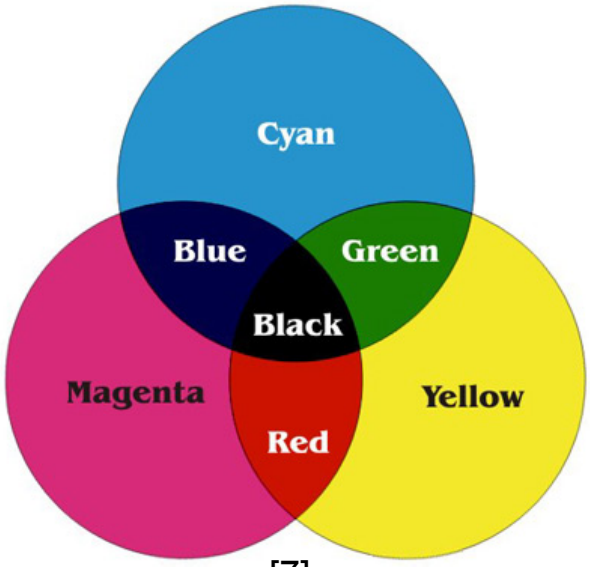
[3]

CMYK Color Space

Subtractive Color Model

Printing Process

Includes black because combination of CMY does not give black with appropriate saturation



[7]

Saturation

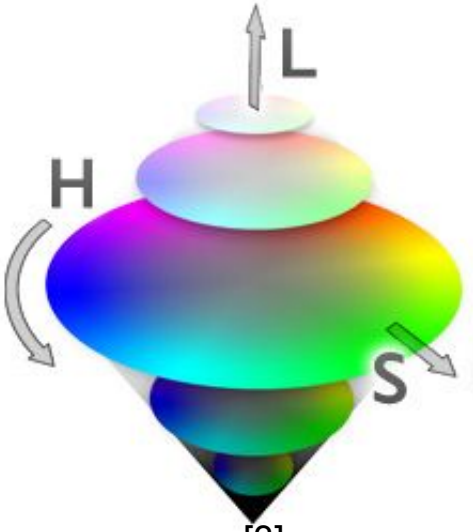
"*saturation is the colourfulness of an area judged in proportion to its brightness"* [8]

"You can desaturate a colour by adding light that contains power at all wavelengths" [8]

HSL Color Space

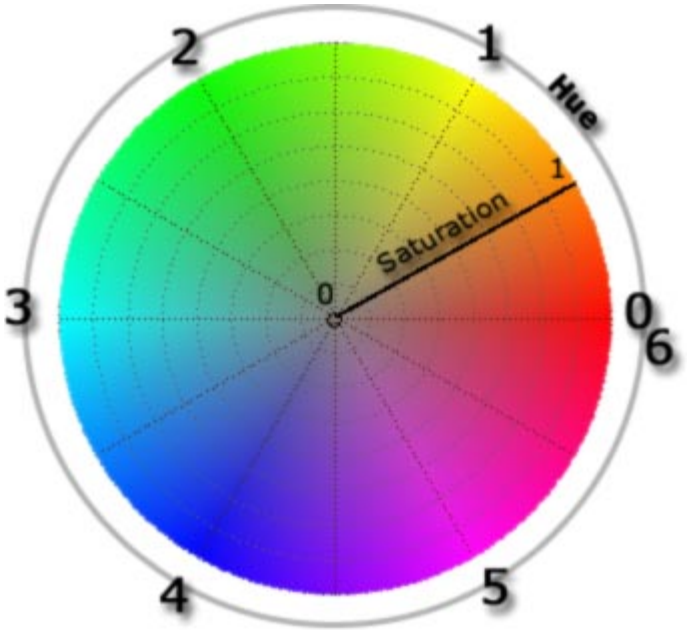
- Alvy Ray Smith
- 3d color model
- Hues at different levels

[3]



[3]

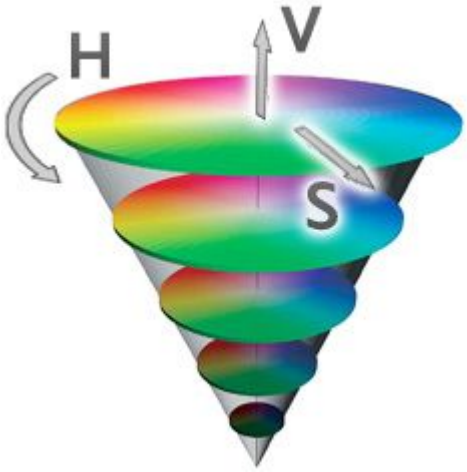
HSL Color Space



[4]

HSV Color Space

- Attempted Improvement on RGB



[3]

Why Other Color Spaces?

-Identify certain colors better in Computer Vision

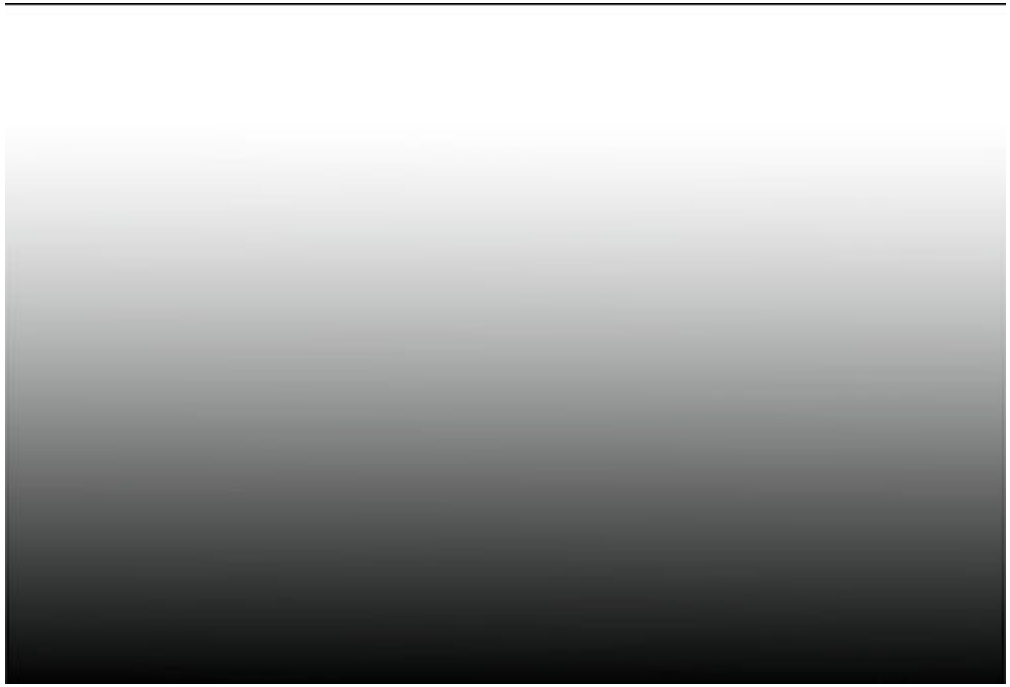
-More accurate

-Less hardware dependent

-Easier to understand and calculate (HSV/HSL) compared to RGB

Color Space Bits

1 bit
2 bit
4 bit
8 bit
16 bit
32 bit
48 bit
96 bit
[5]



[5]

Color Space Bits

1 bit

Black and White NOT grayscale

[5]

Color Space Bits

4 bit

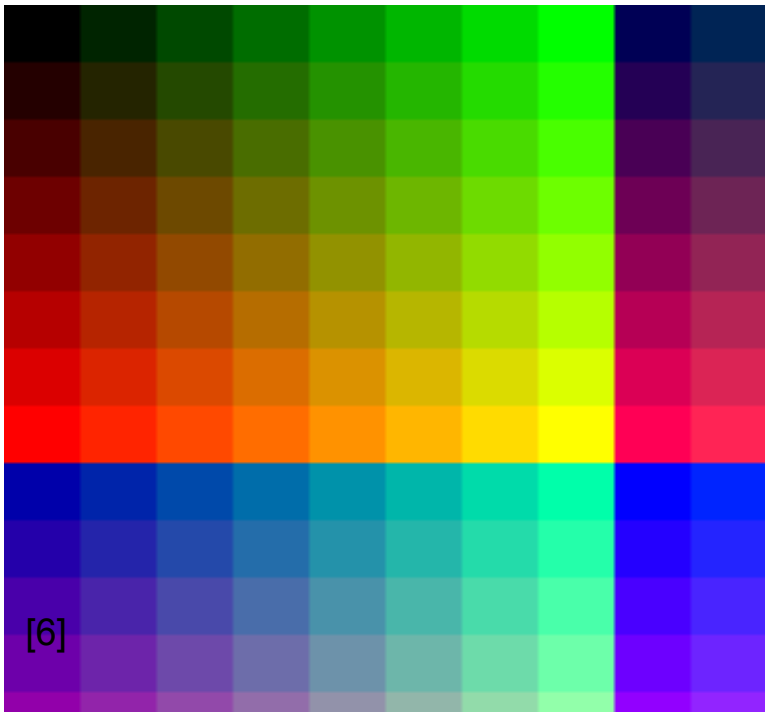
1 bit per color + 1 intensity bit

BLACK DARK GREY BLUE LIGHT BLUE
GREEN LIGHT GREEN CYAN LIGHT CYAN
RED LIGHT RED PURPLE LIGHT PURPLE
YELLOW LIGHT YELLOW LIGHT GREY WHITE

Color Space Bits

8 bit

8 bits per color - 256 colors



[5]

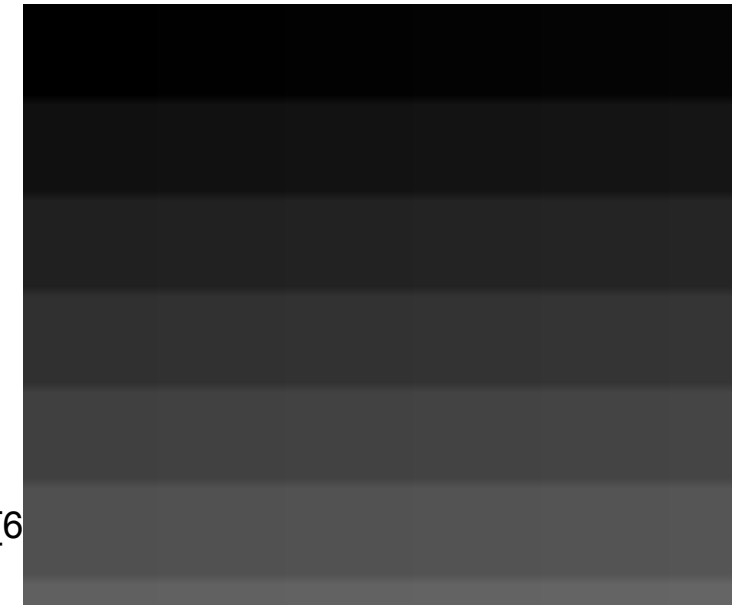
[6]

Color Space Bits

8 bit

8 bits for gray alone - 256 shades of gray

Monochrome



[5]

[6

Color Space Bits

16 bit

5 bits - red, blue
6 bits - green

Color Space Bits

16 bit

5 bits - red, blue
6 bits - green

Allows for increase in accuracy and intensity

[5]

[6]

Color Space Bits

48 bit

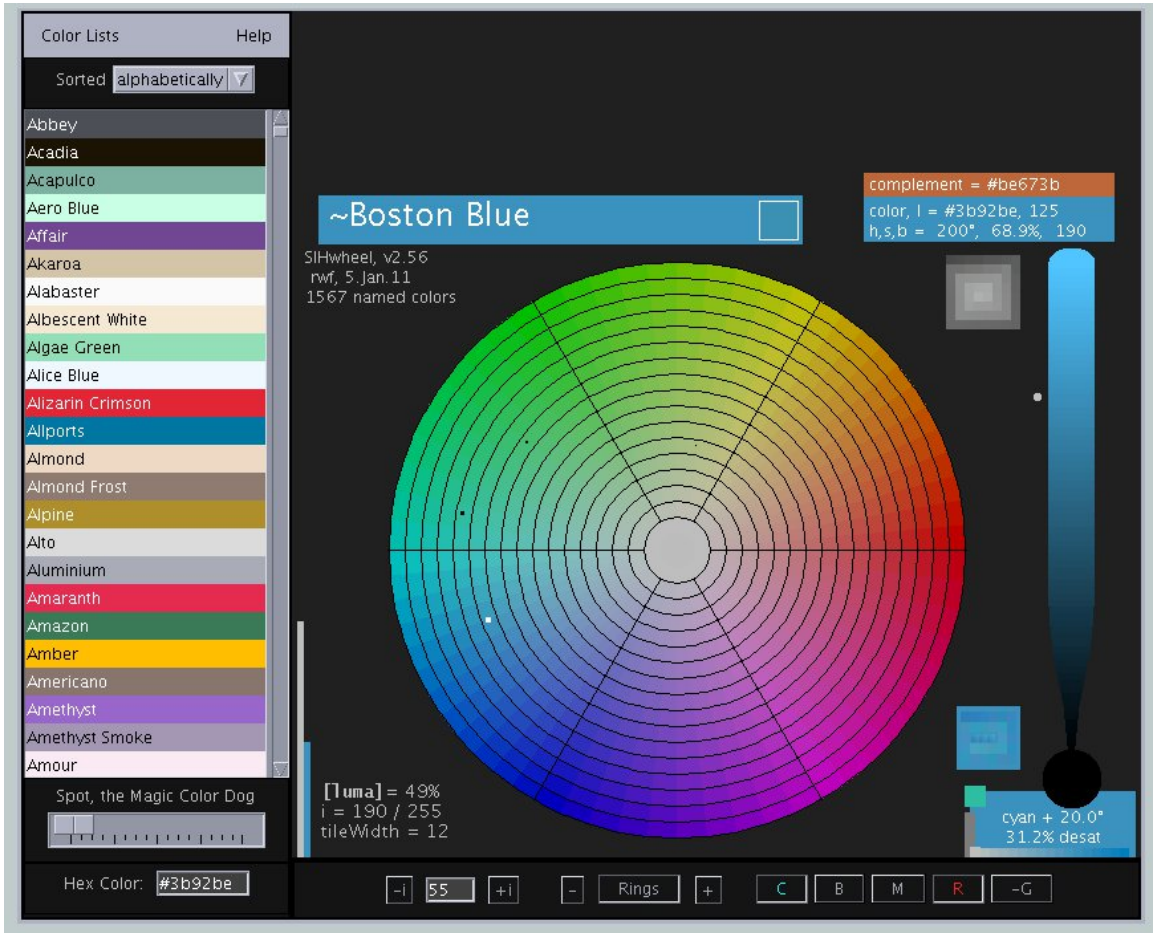
16 bits for R G B

In the realm of the 'deep color' along with 32 bit, 42 and the like. Not significant difference to human eye

[5]

[6]

Color Wheel!



at : http://r0k.us/graphics/SIHwheel.html java applet

References

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4 Pfingstl, Martin. "HSL Colorspace." *HSL Colorspace*. ChaosPro, 10 Feb. 2011. Web. 01 June 2012. <http://www.chaospro.de/documentation/html/paletteeditor/colorspace_hsl.htm>.

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7 BPI Inc. "BPI Inc." *CMYK*. BPI Inc, 16 Nov. 2011. Web. 01 June 2012. <http://bpiinc.wordpress.com/tag/cmyk/>.

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