

Notetaking

Warm-up Activity:

An analysis about a visualization on movie posters.

Background: The blog post is a movie poster for each year analyzed by each pixel. The posters usually rely on blue and orange colors as they are complementary, and the visualization clearly depicts the usage of different colors. Green looks less while the orange-reds look prevalent.

The second visualization shows lesser saturation and values while having more hue. The black horizontal line in between represents the missing data.

Methods:

Data comes from the movie posters and is represented in stacked bar charts.

Strengths:

Easy to see the trend of changing colors over a period of time.

Weakness:

Hard to get specific or quantitative judgement of color. For example, when green changes to blue, etc.

Missing legend to give us a better understanding

Transformations

There are various kinds of transformations namely Euclidean transformation, Affine transformations. Affine transformations were discussed in today's class. Affine transformations basically maintain parallel lines and preserve translations, scaling and rotations.

Shifts/translations: moving from one point to another

Rotations: orienting by certain angle

Scaling: Sizing

An example of teapot was shown by performing all the above transformations

How do colors work?

Human eye has two types of receiving cells called rods and cones. Rods are used for brightness (low light) and cones are used to distinguish colors. There are 3 cones one for each red, green and blue.

When light comes onto an eye., it hits the rods and cones which then activates the optic nerves and helps in perceiving the object.

Color Matching Function

This was described using 3 curves with wavelengths on x-axis and color matching function on y-axis.

Blue tends to have shorter wavelengths, while red tends to have longer or higher wavelengths with green in between them. When all the 3 colors come together, we get to see white.

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Naming Colors:

Colors are usually encoded in RGB triplets and represented in hexadecimal codes. Each of R, G and B has 256 bytes making 256^3 (approximately 16 million unique colors).

There are different color spaces like HSV, CIELAB, sRGB & Adobe sRGB. Of all Hue-saturation-value is widely used as it is easy for design and to choose shades.

CIELAB analyzes what all colors a human eye can perceive.

sRGB & Adobe sRGB are used in printers and projectors

Naming Schemes:

HTML and matplotlib. The colors of both the schemes are given in the respective slide.

Color Picking Tools/ color palettes: Palettable, colorbrewer

Color maps:

Sequential Color maps: The hue does not change. Going from left to right, the value decreases and saturation increases.

Diverging color maps: These have the rainbow colors with different brightness. The center of the color map is brighter while both the ends look darker.

Qualitative color maps

These maps are better suited for categorical data and not continuous data.

Some tips

- Colors are highly sensitive with respect to cultures and situations. For example, Blackbody color map is an example map where the temperatures are plotted in kelvin scale. Usually red indicates fire interpreting the red values are hotter. But here, the blue values represent the hotter temperatures and red being the colder ones.
- Color meaning especially the skin tones.
- Magenta doesn't exist. It is just a perception
- Color mapping can be done by squaring or logarithmic scaling.
- Never rely on pure RGB as there can be color-blind audience.

Hands on demonstration using Python will be posted in the website.