HafenCity University Hamburg

University Of The Built Environment And Metropolitan Development

Seminar GIT

Topic 2: Story Maps

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1 Introduction

From a designer's perspective, colors play an essential role in cartography. Nevertheless, according to Brychtová and Çöltekin (2017), there is little research to empirically determine the minimum effective color distance to safely and correctly distinguish cartographic symbols.

The ability to distinguish colors and shades of the same color plays an important role in cartography (Brychtová & Çötekin, 2017)

1.1 Choropleth maps

2 Basic color information

2.1 Human' color perception

Although our current understanding is that color vision results from the response of three photoreceptor cells in the retina to incident light, their perception cannot be fully understood. This may be due to both individual and environmental factors that influence color perception. (Lafer-Sousa et al. 2015; Xiao et al. 2016) (Gegenfurtner and Sharpe 2001). .

Some of these factors can be, for example, the amount of light in the environment, shadows, surrounding materials, and reflectivity. In addition, the viewer's prior knowledge and cognitive biases play a significant role in color perception. (Derefeldt et al. 2004; Foster 2011).

In addition, there is evidence that the number and distribution of photoreceptors in the eye influences what we see (Roy et al., 1991), and that our brain assumes a particular direction or light source e.g., Gegenfurtner et al. 2015; Lafer Sousa et al. 2015; Winkler et al. 2015.

Thus, it can be said that the color perception of an individual is not stable over space and time. The same is true not only for individuals but also for groups.

Nevertheless, there are many efforts to model and quantify color perception such as mathematical models that attempt to determine thresholds by which two colors or shades of the same color become distinguishable.

This color distance describes a metric that quantifies the human ability to visually distinguish differences between two colors see chapter 3.1 (Brychtová & Çötekin, 2017).

2.2 Color spaces

3 Criteria

3.1 Color distance

- RGB cause RGB represents how colors are created on most digital screens. - RGB values do not lead to a specific color if not related to an absolut color Space - As a color space sRGB is selected, since sRGB color space is supported by most digital screens. Other color Spaces such as Adobe RGB are not fully suported by most digital screens. When puplishing a digital map creators should choose colors which can be displayed by most screens, therefore sRGB is the color space to choose.

3.1.1 Equation

- transforming sRGB Colors to CIE XYZ Colors. - Was ist CIE XYZ Colors - For the transformation the sRGB values has to be in the range 0.0 - 1.0, therefore the most values have to be divided by 255 to nomalize them.

3.2 Number of classes

3.3 Further aspects

3.3.1 Spatial distance

3.3.2 Brightness of colors

4 Examples

Brewer and her colleagues (Brewer eta!. 2003; Brewer 1986, 1992, 1994, 1996, 1997, 1999; Harrower and Brewer 2003) did research on color, developing color schemes to viualize both quantitative and qualitative data. In the process, the online software ColorBrewer 2.0 was developed, which can be very helpful for many applications.

They used Munsell diagrams to design color schemes that would maintain consistency in perceived color distances between classes (Brychtová & Çöltekin, 2017).

The Munsell Color System is a color system that is the first complete, most widely used, and still in use today. It is based on three essential criteria: Hue, Chroma and Value, with Hue being the most important criterion. Munsell chose five main hues: red (R), yellow (Y), green (G), blue (B) and purple (P). Now he subdivides the perceptible color nuances into further color tones, which are to represent the intermediate color tones: YR (yellow-red), GY (green-yellow), BG (blue-green), PB (purple-blue) and RP (red-purple). These ten hues are further subdivided a few times into ten gradations. Numbers from 0 to 10 are also added to the hues. Towards the outside, the saturation of the color (chroma) increases. The vertical center axis, which ranges from white (value 10) to black (value 0), which can be represented with colorants, is represented by the value. This results in a 10-row gray scale.

5 Conclusion

(Brychtová, 2015) (Brychtová & Çöltekin, 2017) (Sharma et al., 2005) (Brychtova & Coltekin, 2015) (Brychtová & Çötekin, 2017)

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