

Coloring interactive compositional dot maps

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Motivation

Visualize the spatial distribution of a population, that reflects both density and composition.

Related Work

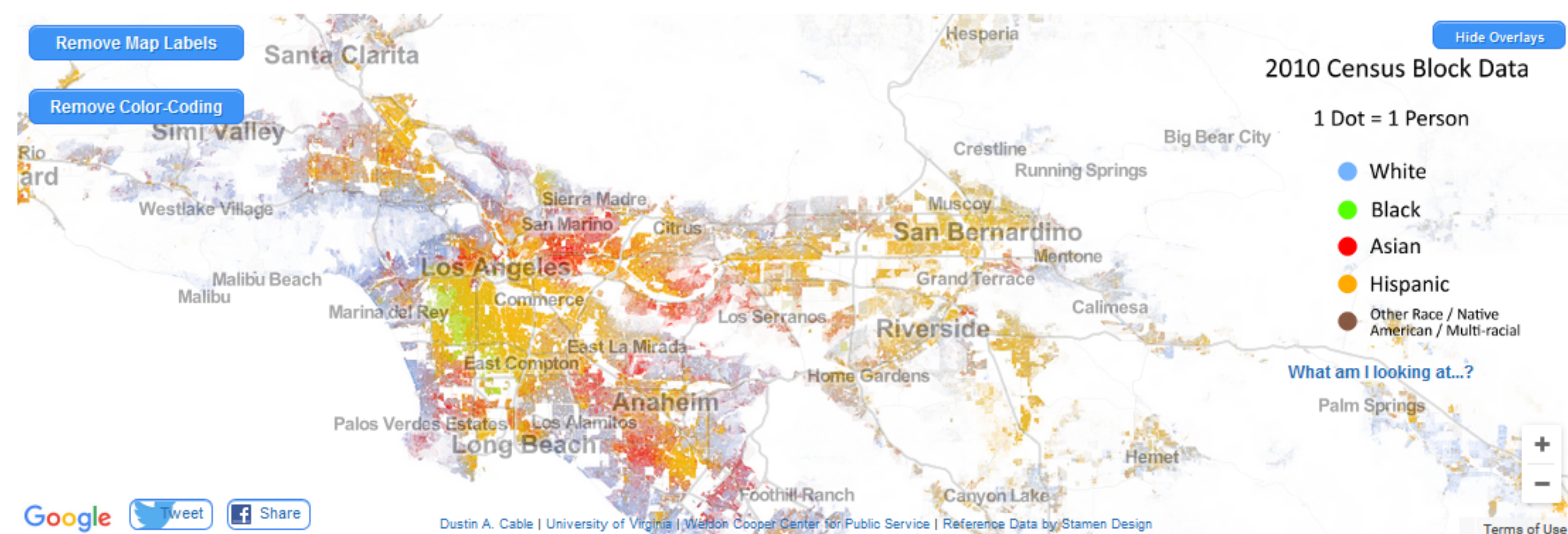


Figure 1. Screenshot of the Racial Dot Map [1]

Method

- * For each population unit, a location is retrieved or generated.
- * Each pixel at (detailed) zoom level z^b is assigned a tuple (n^1, \dots, n^k) where n^i is the number of units in category i .
- * Each pixel in zoom level $z^a < z^b$, is assigned the sum of tuples of the corresponding pixels at z^b .
- * For $z^c > z^b$, a digital zoom is applied to z^b to make the dots better visible (especially useful for small devices).
- * Each pixel is colored based on tuple (n_1, \dots, n_k) and density $N = \sum_i n_i$ using the HCL color space.

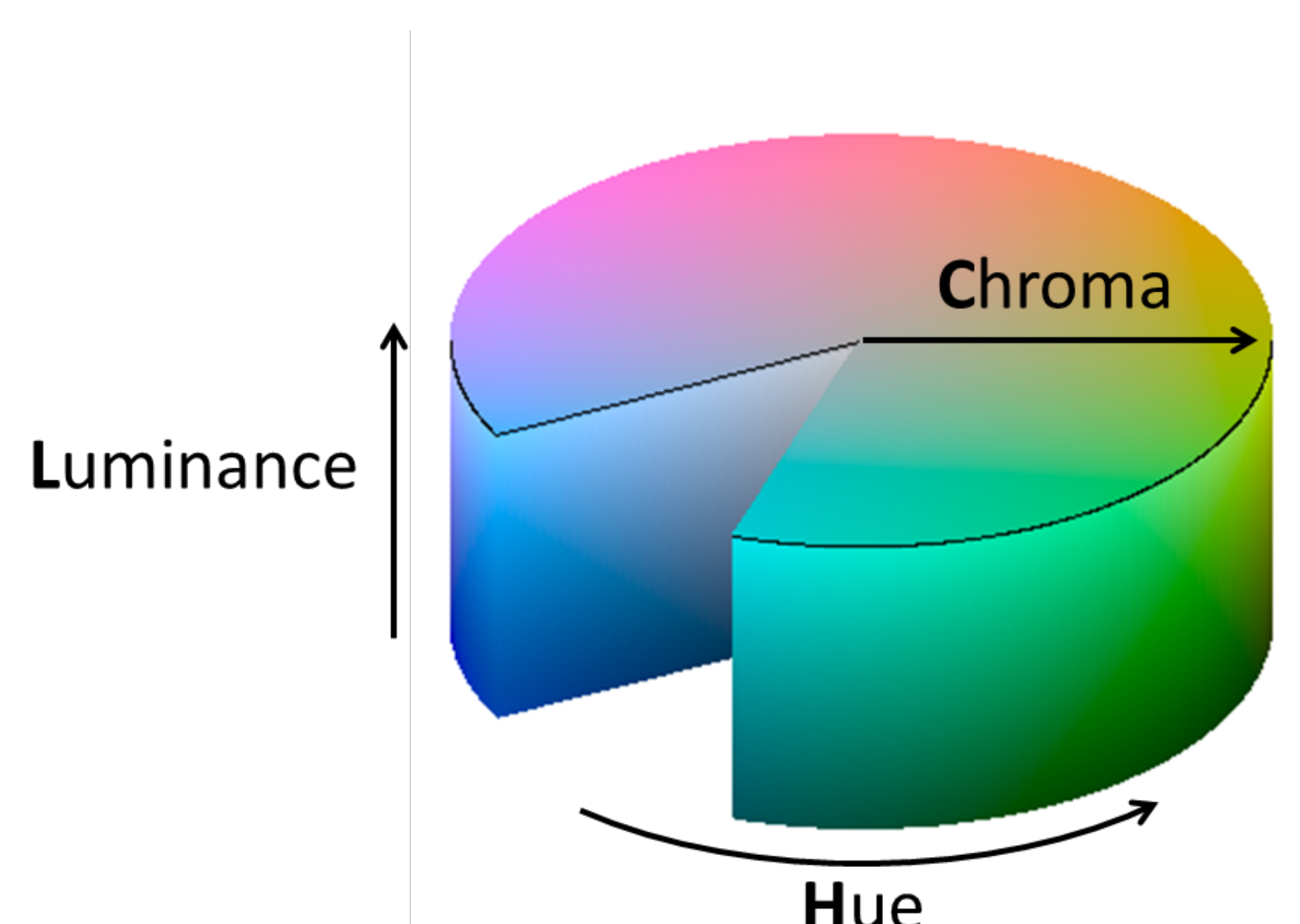


Figure 2. HCL color space designed to control human perception. [2, 3]

- * Luminance: pixels with high density get darker colors.
- * Hue and chroma: each category is assigned a point on border of the circle shown in Figure 3. The hue and chroma are determined by the weighted mean of category points with weights $(n_1/N, \dots, n_k/N)$.

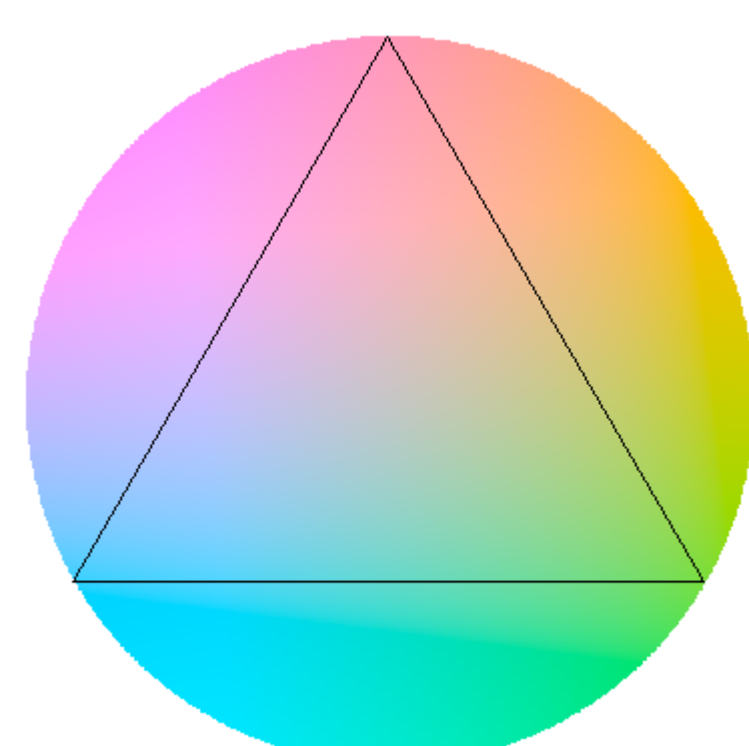


Figure 3. Circle from the HCL space with constant luminance. The triangle illustrates color mixing with three

Application

Ethnic origin of the Dutch population.



Figure 4. Urban areas in the Netherlands (Randstad) at zoom level 8



Figure 5. Amsterdam at zoom level 13

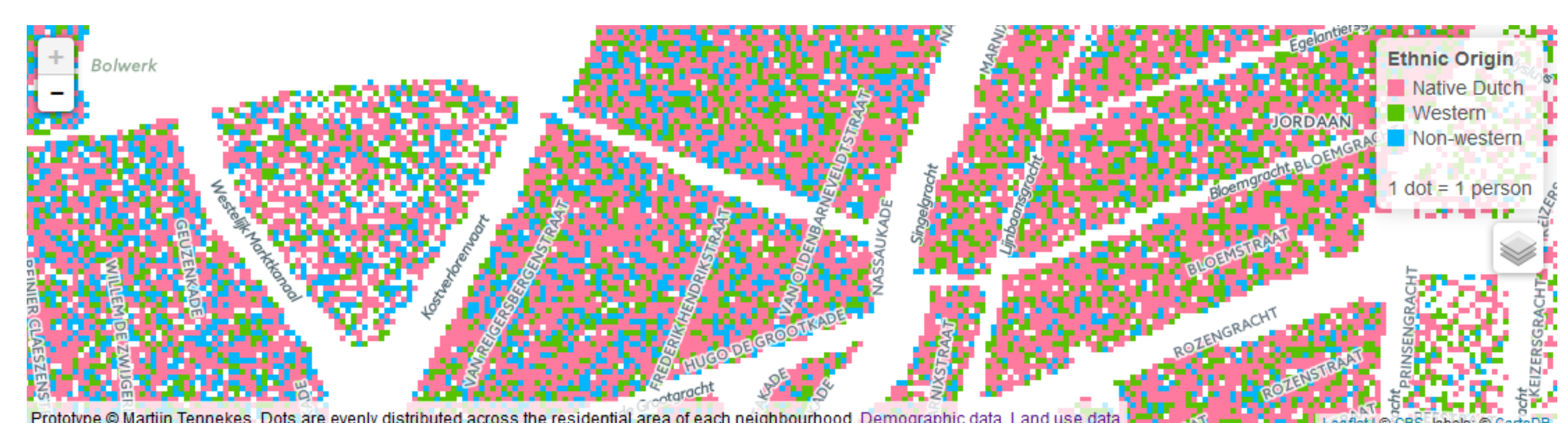


Figure 6. Digital zoom applied to Amsterdam (zoom level 16)

<http://research.cbs.nl/colordotmap>

Conclusion

- * Color mixing method reflects both density and composition.
- * Further research needed to tune algorithm
- * User study recommended to compare with other methods

References

- [1] D. Cable. The Racial Dot Map. <http://www.coopercenter.org/demographics/Racial-Dot-Map>, 2013
- [2] R. Ihaka. Colour for presentation graphics. In Proceedings of the 3rd International Workshop on Distributed Statistical Computing, Vienna Austria, 2003.
- [3] A. Zeileis, K. Hornik, and P. Murrell. Escaping rgbland: Selecting colors for statistical graphics. *Comput. Stat. Data Anal.*, 53(9):3259–3270, July 2009.