

Map-nostics for Guiding Cartographic Exploration

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ABSTRACT: Cognostics are computer-aided diagnostics that can be used to help strategically pare down a large set of visualizations and select the ones likely to be most interesting and relevant. While this topic has been explored in depth for scatterplots (i.e., scagnostics), there has been limited discussion of application to cartographic visualizations (e.g., Carr et al., 2005; Zhang, 2012). When dealing with complex spatio-temporal data series, analysts often produce and read numerous maps to identify broad trends, outliers, regional variation, and other properties of the phenomena they are interested in. The visual comparison of similar maps, however, is cognitively intensive, and as the number of possible representations grows rapidly, the identification of important trends is challenging even for experts. Even with less complex datasets, cartographers are faced with a seemingly infinite number of potential map images, even when considering “simple” aspects of the map such as classification method and number of classes. Again, even in these everyday cases, it would be impossible to visually compare all permutations of the possible representations. In this paper, we explore the potential of “map-nostics” to guide users of analytics tools towards more interesting maps amongst a large set of options. In the exploration we focus on conflicts in what makes one map more or less interesting than another given the variability of how “interesting” may be defined for spatial patterns. We approach the topic from both a computational and cognitive perspective, and explore several research foci in the cartographic and visualization literature including map complexity, attempts to automate identification of optimal map classification, multivariate mapping, and cartographic design goals for map exploration and communication. While our focus is largely on choropleth maps, we look at extensions to consider other map types.

KEYWORDS: Spatial visualization, Exploratory data analysis, Cognostics

References

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