Designing Cognitively Inspired Displays for Effective and Efficient Spatio-temporal Inference Making

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In this talk I first discuss an empirical, perception-based evaluation approach for assessing the effectiveness and efficiency of longstanding cartographic design principles (i.e., visual variables) applied to 2D map displays. This approach includes bottom-up visual saliency models that are compared with eye-movement data collected in human-subject experiments on map stimuli embedded in the so-called flicker paradigm. In the second portion of this talk I present empirical data that assesses the relationship of perceptual salience (bottom up) with thematic relevance (top down) in static weather map displays. While we chose weather map displays, as one typical example of commonly used maps for our study, the evaluation methods employed are generic enough to be applicable to any spatial display (static or interactive) that may be produced by GIScientists, cartographers, GIS practitioners, and others. With the presented approach we hope to provide designers a systematic assessment method to develop effective and efficient visuo-spatial displays.

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