consensus
Multi-Objective Decision Making Tools through Citizens Engagement

LEAF GLYPHS: STORY TELLING AND DATA ANALYSIS USING ENVIRONMENTAL DATA GLYPH METAPHORS

In exploratory data analysis, important analysis tasks include the assessment of similarity of data points, labeling of outliers, identifying and relating groups in data, and more generally, the detection of patterns. Specifically, for large data sets, such tasks may be effectively addressed by glyph-based visualizations. Appropriately defined glyph designs and layouts may represent collections of data to address these aforementioned tasks. Important problems in glyph visualization include the design of compact glyph representations, and a similarity- or structure-preserving 2D layout. Projection-based techniques are commonly used to generate layouts, but often suffer from over-plotting in 2D display space, which may hinder comparing and relating tasks.

Inspired by contour and venation shapes of natural leafs, and their aggregation by stems, we introduce a novel glyph design for visualizing multi-dimensional data. Motivated by the human ability to visually discriminate natural shapes like trees in a forest, single flowers in a flower-bed, or leaves at shrubs, we design a flexible leaf-shaped data glyph, where data controls main leaf properties including leaf morphology, leaf venation, and leaf boundary shape. Our basic leaf glyph can map to more than a dozen of numeric and categorical variables. We also define custom visual aggregation schemes to scale the glyph for large numbers of data records, including prototype-based, set-based, and hierarchic aggregation. We show by example that our design is effectively interpretable to solve multivariate data analysis tasks, and provides effective data mapping. The design provides an aesthetically pleasing appearance, and lends itself easily to storytelling in environmental data analysis problems, among others. The glyph and its aggregation schemes are proposed as a scalable multivariate data visualization design, with applications in data visualization for mass media and data journalism, among others.

J. Fuchs, D. Jäckle, N. Weiler, T. Schreck, "**Leaf Glyphs: Story Telling and Data Analysis Using Environmental Data Glyph Metaphors**", Computer Vision, Imaging and Computer Graphics Theory and Applications, 10th International Joint Conference, VISIGRAPP 2015, Berlin, Germany, March 11-14, 2015, Revised Selected Papers, Volume 598 of the series Communications in Computer and Information Science, Springer International Publishing, 2016, pp. 123-143, DOI: 10.1007/978-3-319-29971-6_7