

Visual Analytics on Multi-dimensional Data using Topic Maps

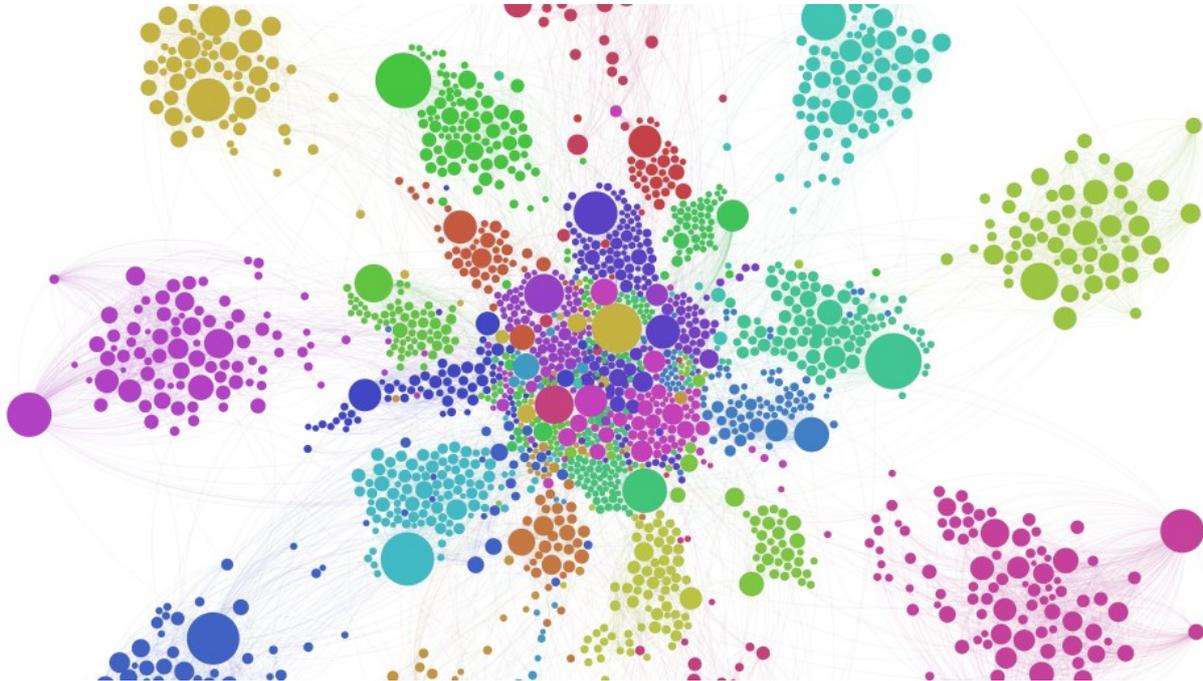


Illustration 1: A topic map of a network.

Background

Earlier work at the Computer Graphics Systems group introduced interactive tools (2.5D Treemaps and 2.5D Dust & Magnet for example) for visual analysis of multivariate, high-dimensional data. In this master project we want to extend our tool set by ai-based Topic Maps that allow for interactive exploration. We can draw on a variety of industry data sources, including financial, software system and sensor data. Since these types of abstract data have no intrinsic gestalt, we use Topic Maps to assign each n-dimensional data point a location in 2D (a map) and super-impose additional data onto their visual display (height, color, size, ...). Furthermore, Topic Maps encode relations between data points by means of distance and enable the exploration of clusters, patterns, and anomalies in the underlying data. The project will be based on technologies such as TypeScript, Python, Jupyter, Metaflow, WebGL, and more.

Description

This project's aim is an analysis of the applicability of topic maps for different domains and the development of interactive prototypes. Specific objectives will be discussed and detailed with the participants.

So far we have the following tentative goals:

- Implementation of a data processing pipeline, e.g., using Metaflow (Netflix).
- Increase visual quality/aesthetics of current Topic Map implementation using advanced real-time rendering techniques (e.g., progressive rendering, labeling).
- Exploration of cluster visualization techniques appropriate for Topic Maps.
- Exploration of 2.5D/3D capabilities for Topic Map visualization.
- Data and user management, data streaming, interaction, evaluation, and others.

The master's project refers to current research and software projects of the Computer Graphics Systems group. It is especially suited for further research in the context of a master's thesis or a future doctoral thesis. Further, the master's project can lay a foundation for working as a student assistant or software developer at our research partners.

Contact

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