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TMNVis: Visual Analysis of Evolution in Temporal Multivariate Network at Multiple Granularities

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Abstract

Temporal (Dynamic) multivariate networks consist of objects and relationships with a variety of attributes, and the networks change over time. Exploring such kind of networks in visualization is of great significance and full of challenges as its time-varying and multivariate nature. Most of the existing dynamic network visualization techniques focus on the topological structure evolution lacking of exploration on the multivariate data (multiple attributes) thoroughly, and do not cover comprehensive analyses on multiple granularities. In this paper, we propose TMNVis, an interactive visualization system to explore the evolution of temporal multivariate network. Firstly we list a series of tasks on three granularities: global level, subgroup level and individual level. Secondly three main views, which rely mainly on timeline-based method while animation subsidiary, are designed to resolve the analysis tasks. Thirdly we design a series of flexible interactions and develop a prototype system. At last we verify the effectiveness and usefulness of TMNVis using a real-world academic collaboration data.

Keywords: Temporal multivariate network, network evolution, visual analysis, timeline-based method, topological structure

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