multinet

A Tool for Supporting Reproducible Visual Analysis of Multivariate Networks

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As data continues to become an increasingly important driver of scientific discovery, network datasets have also become increasingly rich, complex, and prolific. Such multivariate networks capture not just information about relationships between entities, but also characterize attributes of the entities or connections themselves. Network visualization tools used in practice focus on showing connectivity, with very limited support for reasoning about a complex set of attributes and often also limited interaction capabilities. This lack of support leaves analysts and scientists to piece together workflows using separate tools, and usually significant amounts of programming, especially in the data preparation step.

MultiNet aims to change the landscape of visual analysis capabilities for reasoning about and analyzing multivariate networks. The web-based tool, along with an underlying plug-in-based framework, will support three core capabilities: (1) interactive, task-driven visualization of both the connectivity and attributes of networks, (2) reshaping the underlying network structure to bring the network into a shape that is well suited to address analysis questions, and (3) leveraging provenance data to support reproducibility, communication, collaboration, and integration in computational workflows. These capabilities will allow scientists to ask new classes of questions about network datasets, and lead to insights about a wide range of pressing topics. To meet this goal, we will ground the design of MultiNet in four deeply collaborative case studies with domain scientists in biology, neuroscience, sociology, and geology. With a proven record of creating successful, open- source software, our team ensures that MultiNet is robust, flexible, secure, and sustainable.

HIGHLIGHTS

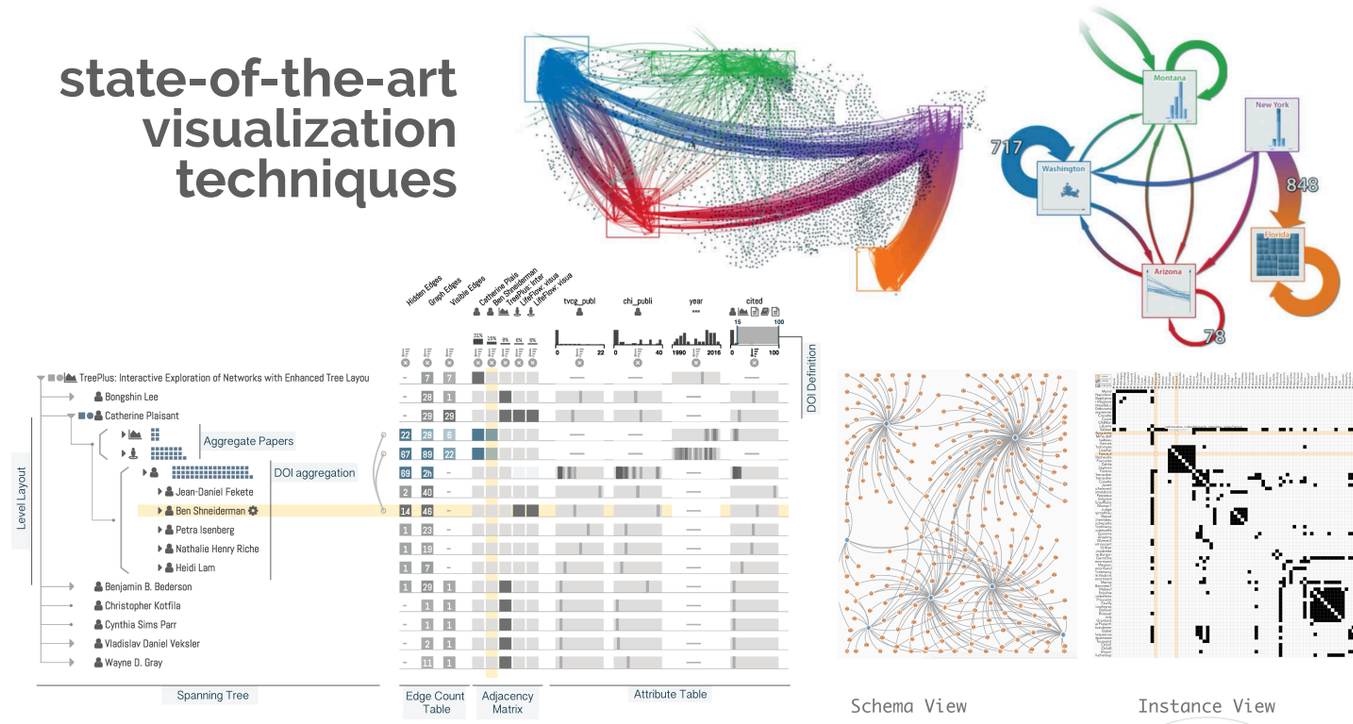
- uses Arango, an industrial strength, scalable noSQL database to manage network data.
- provides an API that can deliver network data to many types of multivariate network visualization applications
- available under a permissive open source license, allowing public access, instance hosting, and community contributions
- modern, modular code base for easy extensibility and code maintenance
- testing for the server code, frontend code, and integration tests for the client application itself

UPCOMING

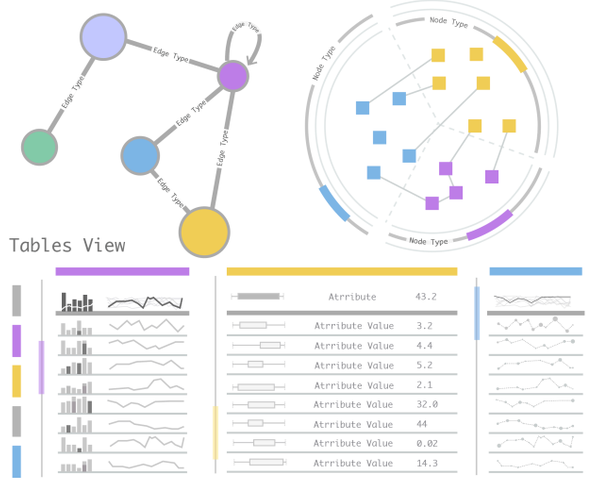
- focus on data security through user accounts and permissions
- scalable network computation using Arango's built in graph processing capabilities
- top-notch UI/UX, including user and developer documentation and material development

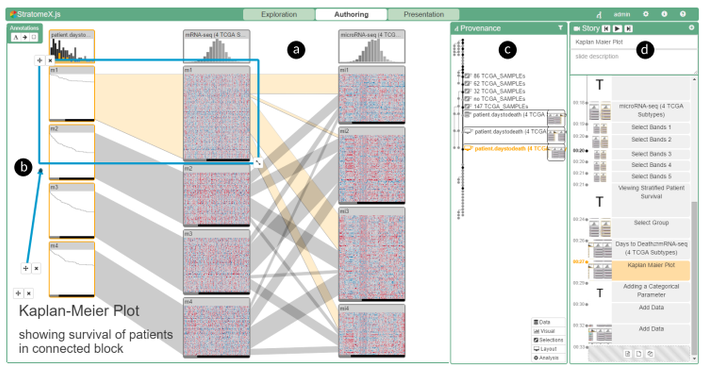
https://multinet.app

state-of-the-art visualization techniques



network wrangling & reshaping





provenance mechanisms

visualization design lab

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