MULTIAGR: A Technique for Aggregating Multivariate Networks

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Abstract

Data analysts and researchers in domains ranging from biology to electrical engineering are using multivariate networks (MVNs) to study the relationships and topology between individual data points and their associated attributes to develop new insights about the relationships and properties in their network data. To visually represent MVNs, two methods are commonly used: 1) Node-Link diagram representation 2) Adjacency Matrix representation. In order to visualize MVN data using these methods, data analysts and researchers perform a series of network wrangling operations to reshape their data to visually analyze a particular question of interest. This process requires familiarity with data wrangling tools such as Python, R, or Excel which presents a barrier to those unfamiliar with these tools and the operations needed to visualize particular features of an MVN dataset. Currently, there are limited available tools that enable users to perform network wrangling operations concurrently with visualizations for multivariate network analysis. In this thesis, we explore a proof of concept technique for the aggregation data wrangling operation on the adjacency matrix representation of an MVN. We develop a new visual aggregation method inspired by PivotGraph [25], called MultiAggr, for aggregating an adjacency matrix representation of an MVN using categorical node attributes.