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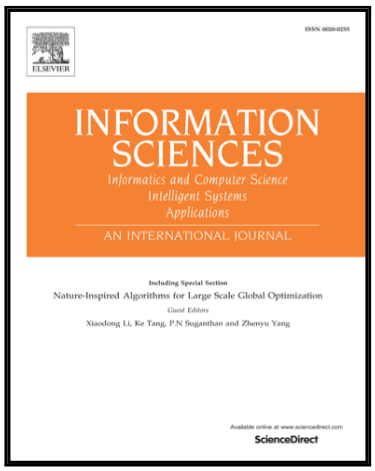

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A Task-Based Evaluation of Combined Set and Network Visualization

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Abstract

This paper addresses the problem of how best to visualize network data grouped into overlapping sets. We address it by evaluating various existing techniques alongside a new technique. Such data arise in many areas, including social network analysis, gene expression data, and crime analysis. We begin by investigating the strengths and weakness of four existing techniques, namely Bubble Sets, EulerView, KelpFusion, and LineSets, using principles from psychology and known layout guides. Using insights gained, we propose a new technique, SetNet, that may overcome limitations of earlier methods. We conducted a comparative crowdsourced user study to evaluate all five techniques based on tasks that require information from both the network and the sets. We established that EulerView and SetNet, both of which draw the sets first, yield significantly faster user responses than Bubble Sets, KelpFusion and LineSets, all of which draw the network first.

Keywords: Set visualization, graph visualization, combined visualization, clustering, networks.

1. Introduction

There has been a rapid rise in the volume of network data where the data items form overlapping groups. Data of this type arise in many situations such as in criminal investigations where networks represent relationships between those under investigation and groups represent organizations to which

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