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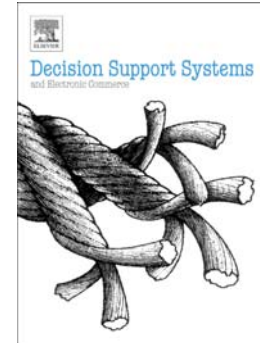
Visual Analytics for Supply Network Management: System Design and Evaluation

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Visual Analytics for Supply Network Management: System Design and Evaluation

Hyunwoo Park[1], Marcus A. Bellamy[2], Rahul C. Basole[3]

Abstract

We propose a visual analytic system to augment and enhance decision-making processes of supply chain managers. Several design requirements drive the development of our integrated architecture and lead to three primary capabilities of our system prototype. First, a visual analytic system must integrate various relevant views and perspectives that highlight different structural aspects of a supply network. Second, the system must deliver required information on-demand and update the visual representation via user-initiated interactions. Third, the system must provide both descriptive and predictive analytics functions for managers to gain contingency intelligence. Based on these capabilities we implement an interactive web-based visual analytic system. Our system enables managers to interactively apply visual encodings based on different node and edge attributes to facilitate mental map matching between abstract attributes and visual elements. Grounded in cognitive fit theory, we demonstrate that an interactive visual system that dynamically adjusts visual representations to the decision environment can significantly enhance decision-making processes in a supply network setting. We conduct multi-stage evaluation sessions with prototypical users that collectively confirm the value of our system. Our results indicate a positive reaction to our system. We conclude with implications and future research opportunities.

Keywords: visual analytics, supply chain management, coordinated views, interactive DSS, predictive analytics

1. Introduction

In an increasingly global, complex, and information-rich economy, decision makers are continuously challenged to effectively manage their supply chains. While there are many analytical

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