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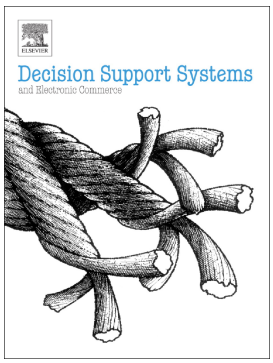

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A Visual Analytics System to support Tax Evasion Discovery

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Abstract

This paper describes TaxNet, a decision support system for tax evasion discovery, based on a powerful visual language and on advanced network visualization techniques. It has been developed in cooperation with the Italian Revenue Agency, where it is currently used. TaxNet allows users to visually define classes of suspicious patterns, it exploits effective graph pattern matching technologies to rapidly extract subgraphs that correspond to one or more patterns, it provides facilities to conveniently merge the results, and it implements new ad-hoc centrality indexes to rank taxpayers based on their fiscal risk. Moreover, it offers a visual interface to analyze and interact with those networks that match a desired pattern. The paper discusses the results of an experimental study and some use cases conducted with expert officers on real data and in a real working environment. The experiments give evidence of the effectiveness of our system.

Keywords: Tax Evasion, Network Analysis, Graph Visualization, Visual Analytics, Graph Pattern Matching, Graph Database

1. Introduction

Tax evasion represents one of the major problems of many governments, because of its strong economic, political, and social impact (see, e.g., Basta et al. 2009; González & Velásquez 2013; Goumagias et al. 2012; Matos et al. 2015; Tian et al. 2016; Wu et al. 2012). Italy is among the

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