

## Correlation of Complex Evidence in Forensic Accounting Using Data Mining

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The classical statistical correlation is an efficient technique for linking simple numerical data sets via a single correlation coefficient. The modern schemes for money laundering and financial fraud are becoming very sophisticated and are changed all the time. To be able to discover such schemes we need to deal simultaneously with a diverse set of numeric and non-numeric data types that include different numeric data types, ordered sets, graph structures, texts, schemes, plans, and other information. Often any individual evidence does not reveal a suspicious pattern and does not guide investigation in forensic accounting. In contrast, correlation of two or more evidences with each other and background knowledge can reveal a suspicious pattern. The area of Link Discovery (LD) has emerged recently as a promising new approach for such tasks. This paper outlines design of such a new technique called Hybrid Evidence Correlation (HEC). It combines first-order logic (FOL), probabilistic semantic inference (PSI) and negative rules for designing HEC to deal with rare suspicious patterns. The approach is illustrated with an example of discovery of suspicious patterns. Computational efficiency of the algorithm is justified by a computational experiment. Conceptual advantages of the algorithm such as completeness have been reported in previous mathematical analysis of the base concepts of the algorithm. The approach was successfully tested for detecting fraudulent transactions in synthetic data. Data contained several attributes of a transaction such as seller, buyer, types of buyer and seller, sold item, amount, price and date.

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### INTRODUCTION

Prior to recent developments in technology, managers, tips from employees and internal auditors detected most occupational frauds. Another current focus in forensic accounting is the analysis of funding mechanisms for terrorism [Prentice, 2002] where *clean money* (e.g., charity money) and *laundered money are both used* for a variety of activities including acquisition and production of weapons and their precursors. This is in contrast with traditional illegal businesses and drug trafficking that *make dirty money appear clean*.