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# FEATURE EXTRACTION OF FRAUDULENT FINANCIAL REPORTING THROUGH UNSUPERVISED NEURAL NETWORKS

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**Abstract:** The objective of this study is to apply an unsupervised neural network tool to analyze fraudulent financial reporting (FFR) by extracting distinguishing features from samples of groups of companies and converting them into useful information for FFR detection. This methodology can be used as a decision support tool to help build an FFR identification model or other financial fraud or financial distress scenarios. The three stages of the proposed quantitative analysis approach are as follows: the data-preprocessing stage; the clustering stage, which uses an unsupervised neural network tool known as a growing hierarchical self-organizing map (GHSOM) to cluster sample observations into subgroups with hierarchical relationships; and the feature-extraction stage, which uncovers common features of each subgroup via principle component analysis. This study uses the hierarchal topology mapping ability of a GHSOM to cluster financial data, and it adopts principal component analysis to determine common embedded features and fraud patterns. The results show that the proposed three-stage approach is helpful in revealing embedded features and fraud patterns, using a set of significant explanatory financial indicators and the proportion of fraud. The revealed features can be used to distinguish distinctive groups.

Key words: *Fraudulent financial reporting, growing hierarchical self-organizing map, unsupervised neural network, feature extraction*

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