

CLASSIFYING CONSTRUCTION CONTRACTORS USING UNSUPERVISED-LEARNING NEURAL NETWORKS

ABSTRACT:

The increased number of developed methodologies to select construction contractors and evaluate their performance reflects an increasing awareness towards improving procurement processes. However, a majority of these methodologies were perceived highly subjective and complicated. A new artificial-neural model for unsupervised learning was employed in this paper to classify contractors based on the financial ratios of liquidity, activity, profitability, and leverage. Contractors are represented in this method by patterns in four-dimensional space. Patterns usually tend to form clusters based on similarity in performance leaving regions of low pattern density in between. Neurons with weights were used as classifiers to set out decision boundaries. The method basically iterates the neuron weights to move the decision boundary to a place of low pattern density. The method was used hierarchically for multi-class classification. A two-sample t-test was used as a criterion to stop further classification when there is no significant mean-difference between two classes regarding a specific ratio. Based on each ratio, contractors were divided into classes of different means and ranked within classes. Finally, dimensional weighting technique was used to evaluate the contractors' overall performance.