Hybrid genetic algorithm and fuzzy clustering for bankruptcy prediction

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Abstract

In the design of a financial bankruptcy prediction model, financial ratio selection and classifier design play major roles. Methodology based on expert opinion, statistical theory and computational intelligence technique has been widely applied. In this study, a hybrid structure integrating statistical theory and computational intelligence technique was developed using genetic algorithm (GA) with statistical measurements and fuzzy logic based fitness functions for key ratio selection. A fuzzy clustering algorithm was used for the classifier design. In the experiments, two financial ratio sets, one extracted from the suggestions of other studies and the other obtained by using the GA toolbox in the SAS statistical soft-ware package, were applied to examine the proposed ratio selection schemes. For classifier design, the developed fuzzy classifier was compared with the well known BPNN classifier frequently used in other studies. Besides, comparison between the developed hybrid structure and other well applied structures was also given. Experimental results based on one to four years of financial data prior to the occurrence of bankruptcy were used to evaluate the performance of the proposed prediction model.

Keyword：Bankruptcy, Financial ratios, Prediction model, Genetic algorithm, Fuzzy clustering, Fitness function