Assessing the impact of self-organizing map on genetic fuzzy set hybrid intelligent systems for financial prediction

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Abstract:
In this paper, we assess the impact of self-organizing map (SOM) used as a discriminant analysis function in a hybrid intelligent system for multi-factor analysis financial prediction. The proposed method includes multiple steps. The first step is stepwise linear regression (SLR) for feature selection. The second step utilizes SOM to divide the training data into clusters of similar data points. The last step is a fuzzy set model that is trained by a genetic algorithm on each cluster. We use two performance metrics: mean absolute percentage error and mean return of top 10% ranking companies on a monthly basis. To asses the hybrid intelligent system with and without the use of SOM, four different lengths of training data are tested over eight overlapping test periods, skewed by three months, for three different lengths of prediction horizon. Results reached by statistical analysis lead to conclude that the use of SOM in this hybrid intelligent system approach is beneficial and the difference in length of training data does not significantly impact either performance metric considered.

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Contents