Abstract

Enhancing the robustness and accuracy of time series forecasting models is an active area of research. Recently, Artificial Neural Networks (ANNs) have found extensive applications in many practical forecasting problems. However, the standard backpropagation ANN training algorithm has some critical issues, e.g. it has a slow convergence rate and often converges to a
local minimum, the complex pattern of error surfaces, lack of proper training parameters
selection methods, etc. To overcome these drawbacks, various improved training methods have
been developed in literature; but, still none of them can be guaranteed as the best for all
problems. In this paper, we propose a novel weighted ensemble scheme which intelligently
combines multiple training algorithms to increase the ANN forecast accuracies. The weight for
each training algorithm is determined from the performance of the corresponding ANN model on
the validation dataset. Experimental results on four important time series depicts that our
proposed technique reduces the mentioned shortcomings of individual ANN training algorithms
to a great extent. Also it achieves significantly better forecast accuracies than two other popular
statistical models.

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A Homogeneous Ensemble of Artificial Neural Networks for Time Series Forecasting


Index Terms

Computer Science
Artificial Intelligence

Key words

Time Series Forecasting
Artificial Neural Network
Ensemble
Backpropagation
Training Algorithm
ARIMA
Support Vector Machine