

Time Series Prediction using Hierarchical Fuzzy Systems

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Abstract:

Fuzzy systems have long been accepted as a promising robust tool for predicting time-series data and shown to be very powerful in nonlinear mapping. This potential is based on its capability in human knowledge integration and universal approximation. Despite of its wide capability, curse of dimensionality is often the most prohibitive and limiting segment of fuzzy systems. A novel hierarchical fuzzy tools and multi-phase training procedure is proposed here in order to overcome dimensionality curse. In comparison with standard lookup-table scheme, statistical analysis confirms that the proposed approach demonstrates an ability to reduce the computational complexity of the fuzzy rules by 42% with increased performance of 95% in peaks prediction and 97% in mean square error.

Keywords:

Chaotic Time Series, Prediction, Hierarchical Learning

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