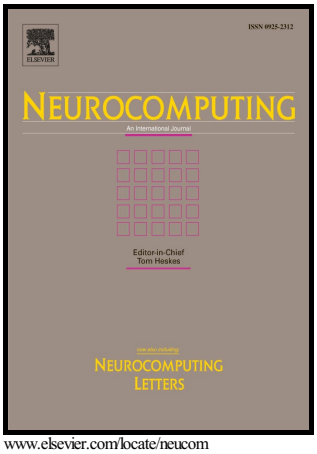

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Dynamic Selection of Forecast Combiners

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Abstract

Time series forecasting is an important research field in machine learning. Since the literature shows several techniques for the solution of this problem, combining outputs of different models is a simple and robust strategy. However, even when using combiners, the experimenter may face the following dilemma: which technique should one use to combine the individual predictors? Inspired by classification and pattern recognition algorithms, this work presents a dynamic selection method of forecast combiners. In the dynamic selection, each test pattern is submitted to a certain combiner according to a nearest neighbor rule. The proposed method was used to forecast eight time series with chaotic behavior in short and long term. In general, the dynamic selection presented satisfactory results for all datasets.

Keywords: time series forecasting, dynamic selection, chaotic time series, time series forecasting ensemble

1. Introduction

Time Series Forecasting (TSF) is one of the most traditional problems in statistics and machine learning. In this kind of problem, past values of a given measurement are collected and subsequently used in forecasting future values. Over the years, various machine learning techniques have been used for this purpose, e.g. Artificial Neural Networks (ANN) [1], Support Vector Machines (SVM) [2], fuzzy logic techniques [3] and hybrid systems of some of these techniques with evolutionary computation [4] or swarm intelligence [5]. Although older, statistical models are still studied and used with satisfactory results. Among these predictors, one can find linear models such as ARMA (Autoregressive Moving Average) and ARIMA (Autoregressive Integrated Moving Average) [6], and non-linear, as ARCH (Autoregressive Conditional Heteroscedasticity) and GARCH (Generalized ARCH) [7]. Literature shows various real-world applications of TSF in several areas of human activity: energy [8], financial market

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