

FORECASTING FINANCIAL TIME SERIES BY USING ARTIFICIAL NEURAL NETWORKS

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Time series analyses and in particular forecasting of financial data have been attracting some special attention in the last years. Unfortunately, the nonlinear nature and the complex behaviour of this type of data transform forecasting in a very hard task, and the classical statistical methods turn to be not anymore adequate. A new generation of methodologies, including neural networks and genetic algorithms has been used for the analysis of trends and patterns, classification and forecasting. In particular, the use of computational intelligence based techniques for forecasting has been proved extremely successful in recent time due to the ability of neural networks to approximate nonlinear functions.

In this paper, we show that neural networks can be used to uncover the non-linearity that exists in the financial field. First, we follow a traditional approach by analysing the deterministic/stochastic characteristics of the four stock series and some typical features. We also produce a BDS test to investigate the nonlinearity and the results were as expected, and none of the financial time series exhibit a linear dependence. Secondly, we trained four types of neural networks for the stock markets and used the models to make a forecast. The quite large number of parameters that must be selected to develop a neural network forecasting model involves some trial and as a consequence the error is not small enough. In order to improve this we use some heuristic nonlinear optimization algorithm with the purpose to minimize the prediction error. Finally, the output of the 4 models was quite similar, leading to qualitative forecasting results.

Keywords

stock returns; neural networks; ARIMA; nonlinear time series.

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