NON-LINEAR COMBINATION OF FORECASTS USING NEURAL NETWORKS

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Neural networks have seen an explosion of interest over the last few years, and are being successfully applied across an extraordinary range of problem domains, in areas as diverse as finance, medicine, engineering, geology and physics. Indeed, anywhere that there are problems of prediction, classification or control, neural networks are being introduced.

Neural networks are very sophisticated modelling techniques, capable of modelling extremely complex functions. In particular, neural networks are non-linear. For many years linear modelling has been the commonly used technique in most modelling domains, since linear models had well-known optimisation strategies. Where the linear approximation was not valid (which was frequently the case) the models suffered accordingly. Neural networks also keep in check the curse of dimensionality problem, which bedevils attempts to model non-linear functions with large numbers of variables.

This paper examines a task of forecasting the stock exchange index that is an important indicator of business activity enabling one to a certain extent forecast the development of national economy as a whole. In the paper, forecasting this factor is carried out by three individual forecasts and linear and neural network combining methods. The first technique is widely known in statistics as the Box-Jenkins method and is used to analyse time series. The second one is exponential smoothing and the third employs multilayer neural networks using error back propagation as a learning algorithm.

The paper suggests that the neural network combination of forecasts can be used as an alternative to conventional linear combining methods to achieve greater forecasting accuracy. The above mentioned prediction methods are investigated and their comparative analysis is performed on the basis of the results of the Dow Jones RSE index forecasting for the Riga Stock Exchange.