An adaptive learning radial basis function neural network for online time series forecasting

Abstract

Most of the neural network based forecaster operated in offline mode, in which the neural network is trained by using the same training data repeatedly. After the neural network reaches its optimized condition, the training process stop and the neural network is ready for real forecasting. Different from this, an online time series forecasting by using an adaptive learning Radial Basis Function neural network is presented in this paper. The parameters of the Radial Basis Function neural network are updated continuously with the latest data while conducting the desired forecasting. The adaptive learning was achieved using the Exponential Weighted Recursive Least Square and Adaptive Fuzzy C-Means Clustering algorithms. The results show that the online Radial Basis Function forecaster was able to produce reliable forecasting results up to several steps ahead with high accuracy to compare with the offline Radial Basis Function forecaster.