Accepted Manuscript

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PII: S2405-9188(16)30023-X

DOI: 10.1016/j.jfds.2016.12.002

Reference: JFDS 15

To appear in: *The Journal of Finance and Data Science*

Received Date: 15 August 2016

Revised Date: 9 November 2016

Accepted Date: 14 December 2016

Please cite this article as: Anish CM, Majhi B, Majhi R, Development and evaluation of novel forecasting adaptive ensemble model, *The Journal of Finance and Data Science* (2017), doi: 10.1016/j.jfds.2016.12.002.

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ACCEPTED MANUSCRIPT

Development and evaluation of novel forecasting adaptive ensemble model

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Abstract : This paper proposes a new ensemble based adaptive forecasting structure for efficient different interval days' ahead prediction of five different asset values (NAV). In this approach three individual adaptive structures such as adaptive moving average (AMA), adaptive auto regressive moving average (AARMA) and feedback radial basis function network (FRBF) are employed to first train with conventional LMS, conventional forward-backward LMS and corresponding learning algorithm of FRBF respectively. After successful validation of each model the output obtained by each individual model is optimally weighted using Genetic algorithm (GA) as well as particle swarm optimization (PSO) based techniques to produce the best possible different days ahead prediction accuracy. Finally the results of prediction obtained of the NAV values are compared with the results obtained by individual predictors as well as by other four existing ensemble schemes. It is in general demonstrated that in all cases the proposed forecasting scheme outperforms other competitive methods.

Keywords : Net asset value (NAV) prediction, adaptive moving average (MA), adaptive ARMA, feedback radial basis function network, ensemble modelling and particle swarm optimization

1. Introduction

Mutual fund is an established investment scheme that employs the money of investors and invests those in various means such as stocks, bonds, real estate, precious metals etc. It provides attractive returns without paying high fees with minimum possible risk. It is difficult for the common investors, brokers, business man to forecast the changes that occur in the mutual fund. A well thought investment strategy is required to ensure benefit, capital appreciation and to meet the financial requirement. In the available related literature it is noticed that for efficient prediction of financial data many researchers have recently applied the machine learning techniques such as genetic algorithm (GA), support vector machine (SVM), artificial neural network (ANN) and so on. In recent years various types of neural network based techniques have been suggested to predict net asset value (NAV) of investment fund such as conventional neural network, neural network with back propagation (BPNN) and functional link artificial neural network (FLANN). For time series forecasting, combination of more than one forecast models, shows superior performance compared to that of a single forecast model.

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