512/E1

Artificial Neural Network and ARIMA based new hybrid statistical approach for stock market predictions

R.M. Kapila Tharanga Rathnayaka[1*]and D. M. K. N. Seneviratna [2]

[1]*Department of Physical Sciences & Technology, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya.*

[2] *Department of Interdisciplinary Studies, Faculty of Engineering, University of Ruhuna, Galle.*

Forecasting volatility represents one of the most appreciable topics in fields of science, finance and engineering, both from theoretical and practical perspectives; especially, stock price prediction is considered one of the most difficult tasks to achieve in the financial field due to the complex nature of stock prices. As a result of the complications and difficulties with regardto the traditional time series approaches, the main purpose of this study is to propose an Artificial Neural Networks (ANNs) and Autoregressive Integrated Moving Average (ARIMA) based new hybrid statistical approach for stock market forecasting, to assist investors as well as stockbrokers to predict future behavior. The results were implemented on Colombo stock exchange (CSE), Sri Lanka, over the six year period from June 2009 to November 2017. The model selection results of Akaike info criterion (10.62501), Schwarz criterion (10.63618), and Hannan-Quinn criterion (10.62918) suggested that ARIMA (2, 1, 1) is more suitable for predicting ASPI demands. Furthermore, model accuracy testing results suggested that new proposed ARIMA-ANN method (Mean Absolute Percentage Error (0.0524) < 10%) is more suitable for forecasting price indices under high volatility than traditional time series forecasting methodologies. In general, this proposed forecasting mechanism has been widely applied for identifying the meaningful characteristics, to make future adjustments in the fields of science, finance, and engineering, from both theoretical and practical perspectives.

Keywords: Time series forecasting, artificial neural networks (ANN),autoregressive integrated moving average (ARIMA).

E-mails: [*]kapiar@appsc.sab.ac.lk, seneviratna@is.ruh.ac.lk