

LSTM-Based Stock Market Performance Prediction: A Case of Colombo Stock Exchange

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Abstract

The stock market is a prime capital generator for a country that connotes overall economic health. Thus, an accurate prediction of stock prices and market performances is necessary for foreseeing the shifts. Macroeconomic variables are presumed to play a vital role among the determinant factors. However, the contradictory findings of the prior studies place vast importance on the increased accuracy of stock price predictions with macroeconomic influences. Further, it is vital that the Colombo Stock Exchange (CSE), the prime capital generator of Sri Lanka, revives from its stagnant growth exhibited through the years via improved distinctive investor behaviour and efficient policymaking. Consequently, stock price prediction is imperative. Thus, the paper aimed to determine the stock prediction accuracy of the deep learning method of Long Short-Term Memory (LSTM) modeling. Therein, the study aimed to identify the applicability of the LSTM in stock performance prediction of CSE based on macroeconomic variable influences compared to the contemporary estimation models. The study used monthly log closing prices of the All Share Price Index (ASPI), the broad market index of CSE, from 2010 to 2020. Further, the study used the macroeconomic fundamentals of the exchange rate, inflation rate, interest rate, national foreign reserve balance, and the real gross domestic product as exogenous variables in predicting the stock closing prices of ASPI. The study findings identified that LSTM has the stock price prediction with macroeconomic variables chosen with an RMSE of less than one percent error. Further, the lower levels of error in the three models compared confirm the macroeconomic influence of the selected exogenous variables on the log monthly closing prices of the ASPI. Further development of the model through developing the parameters and data frequency can further develop the LSTM model precision.

Keywords: ASPI, deep learning, LSTM, stock prices