

ABSTRACT

Stock forecasting is conducted to minimize investment risk and achieve the best possible outcomes. Given the central role of NVIDIA Corporation in the technology sector, particularly in the artificial intelligence revolution, forecasting its stock price becomes highly relevant. This study aims to analyze and forecast the daily stock price of NVIDIA from October 21, 2022, to October 22, 2024, using the Autoregressive Fractionally Integrated Moving Average (ARFIMA) model. The ARFIMA approach was chosen for its ability to capture the long-memory property, or long-term dependence, often found in financial data. The presence of long memory in the data was confirmed through a visual identification of a slowly decaying ACF plot and formal testing using the Hurst Exponent, which yielded a value of 0.8534. After the data underwent stationarity tests for both variance and mean, the fractional differencing parameter (d) was estimated using the Geweke Porter-Hudak (GPH) method. The analysis resulted in the ARFIMA(4, d ,0) model as the best fit, with a d value of 0.49931. This model demonstrated excellent forecasting ability with a Mean Absolute Percentage Error (MAPE) of 5.390%. According to the research criteria, a MAPE value below 10% indicates that the model has a very good performance for predicting future movements of NVIDIA's stock price. The entire analysis process was also successfully implemented into an interactive Graphical User Interface (GUI) built using the Shiny package in R-Studio, designed to simplify the user's workflow from start to finish.

Keywords: *NVIDIA, ARIMA, ARFIMA (Autoregressive Fractionally Integrated Moving Average), Forecasting, Long Memory Effect, Time series, Stock.*