Speculation of Stock Marketing Using Advanced Recursive Techniques

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ABSTRACT

In the current scenario, the economic status of countries is dependent on stock markets. However, predicting the future prices of any stock is a multifaceted task, as the nature of data is complex and unstructured in nature, which is difficult understand. The focus of the study relies on applying deep neural techniques with regression-based application to discover knowledge from financial databases. The authors have applied LSTM, an advanced version of RNN, and regression-based methods such as ARIMA for predicting future prices of stocks. The study was supported by implementing the techniques on real-world data that was captured from SBI for 6 years. The data has significant opening and closing prices of stock markets. To implement the current study approach, the authors have utilized Python language, where result predicts various performance parameters such as MAE, MSE, RMSE, and bias for both LSTM as well as ARIMA. The performance matrix of LSTM and ARIMA were compared for MAE (mean absolute error) for LSTM, which is 4.32, whereas for ARIMA is 3.83. Also, MSE (mean squared error) value for LSTM is 29.52, for ARIMA was 24.53, and RMSE (root mean squared error) for LSTM and ARIMA are 5.43 and 4.95. The overall accuracy of both of the algorithm were widely applied for real-world prediction among the stock market analysis.

KEYWORDS

ARIMA, LSTM, Prediction Model, Stock Market

INTRODUCTION

Stock market tends to be a strong financial infrastructure of a nation where it can be reliable quoted as backbone or economic indicator of a country (Idrees, 2019). In similar, context the stock market is proportionally linked with the prices of credible companies which are linked with the country setup. Moreover, growth rate of nation is escalated when the companies associated stock price goes higher in the market. So, predicting the stock price plays a very crucial role for overall development of a country and for the citizens of that country, who willingly tries to invest their money in share market. Although, still there is no full proof system existing which can guarantee exhaustively correct prediction for share market. We can say that, share market tends to be very volatile in nature, where the prediction of share price can extensively go up and down instantaneously in short duration of

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time. Undoubtedly, if you overview any particular stock, you may perceive a lot of fluctuation in the data moment of time (Di Persio & Honchar, 2006). Certainly, investors try to take the advantage of volatile nature of share market and makes lot of money but, if any investor has less knowledge about the stock market data, then the chances are higher to risk the amount he has embarked in the market.

Moreover, share market data is complex in nature where the data is gathered in time series format. The data is usually a real world where it is gathered by varied high end potential companies for disseminating the knowledge to the end users. These potential companies are involved in deciding the stock market index of any country just like in India we have two stock exchanges BSE(Bombay stock exchange) & NSE(National stock exchange) and we also have two separate indexes for these stock exchanges. Sensex is the index used for BSE and Nifty is the index used by the NSE. BSE is the oldest stock exchange as compare to NSE, it started its operation in 1875 (Zhou et al., 2019) and NSE comes into the picture around 1994. There are approximately 5000 companies registered in BSE (Chauhan & Kaur, 2017) on the other end in NSE there are approximately 1600 companies registered (Chauhan et al., 2010). Top 30 companies of BSE decide Sensex and top 50 companies of NSE decides Nifty (Idrees, 2019).

In similar, a stock market index can help an investor to pick the right stock for investment. Comparably, we can say that, that there are many factors which can decide the fate or price of stocks. In, current scenario of share market, an investor must be aware about these facts before investing. In this paper we are going to discuss few fundamental factors which can decide upon the future the price of any stock or predict the price of new stock. In general share prices are affected with economical fundamental factors of an organization. Few of them are as follow such as: plans and policies of any company, technical structure of company, staffing policies, change in government policies for certain industries, positive or negative news in market, customer satisfaction with the products and may more similar things. So, an investor must keep a vigilant mind to apply these fundamental factors while investing in stock market. In current study of approach, the emphasis is to predict the future stock price of organization while implementing machine learning techniques so investors can get an appropriate knowledge of stock price before investing. By using these machine learning techniques an investor can increase its profitability and reduce the chances to lose money (Alzaman, 2023; Dai et al., 2020; Dai & Zhu, 2020; Weng et al., 2018).

In past there exists several machine learning algorithms which are implemented with time series data. Moreover, time series data has certain complexity where all machine learning algorithms are unable to handle this complex nature of data. Certainly, few algorithms such as Support vector machine, ARCH (Autoregressive Conditional Heteroskedasticity), GARCH (Generalized Autoregressive Conditional Heteroskedasticity), Random-Forest tends to be appropriate for time series model.

Fortunately, the machine learning algorithms has changed the scenario from past decade while evolving itself from large to big data in wide application domain. In the current study of approach, we have designed and implemented a framework for time series data, where the focus of study is to retrieve patterns for future prediction. The study is based on a regression-based technique which is an ARIMA model and LSTM model applies deep learning technique, we can say that it is an enhanced version of Recurrent Neural Network with inbuilt memory buffer (Jain et al., 2018). Moreover, ARIMA model can be discussed as a combination of two different timeseries forecasting models AR & MA (Li & Chiang, 2013), where AR stands for Autoregressive and MA stands for Moving Average. 'I' stands for Integrated and it is used as a differencing term in this model (Li & Chiang, 2013).

To implement the current study of approach we have utilized python language on Jupyter lan. The hardware chosen for prototype development was on operating system windows 10 with 8GB RAM. Several packages were installed to instantiate the development of framework such as scikitlearn, Plotly, matplotlib, pandas and Jupyter dash for visualization of data. Further, the dataset was captured from State Bank of India (SBI) from January 2013 to December 2018, where each data has significant opening and closing price of stock market (Finance, n.d.). The result predicts the overall accuracy of the algorithm which can be widely applied for real world prediction among the stock market analysis

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