Stock Price Prediction Using LSTM

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Abstract:

The prediction of stock value is a complex task which needs a robust algorithm background in order to compute the longer term share prices. Stock prices are correlated within the nature of market, hence it will be difficult to predict the costs. The proposed algorithm using the market data to predict the share price using machine learning techniques like Recurrent Neural Network (RNN) named as Long Short Term Memory, in that process weights are corrected for each data points. This system will provide accurate outcomes in comparison to currently available stock price predictor algorithms. The network is trained and evaluated with various sizes of input data to urge the graphical outcomes. However, with the advent of deep learning techniques, particularly Long Short-Term Memory (LSTM) neural networks, there has been significant progress in accurately predicting stock prices. This proposes an LSTM-based approach for stock price prediction, which uses historical stock data to predict future stock prices. The proposed system is trained on historical data and tested on unseen data to evaluate its performance.

Keywords: LSTM (Long Short-Term Memory), Stock Market, CNN, Machine Learning,Deep Learning.

1. INTRODUCTION

Through virtual platforms supported by brokers, individuals can buy and sell currencies, stocks, shares, and derivatives on the financial market, which is a dynamic and composite system. Investors can purchase shares of publicly traded companies through the stock market by trading on exchanges or off-exchange markets. In contrast to creating a new business or needing a high-paying work, investing in this market carries very little risk, giving investors the chance to become wealthy. Stock markets are affected by a variety of factors, which adds to the market's irrational volatility and unpredictable nature. Humans can place and submit orders to the market, but automated trading systems (ATS) that are powered by computers cannot. faster and more efficiently than anybody else,

Orders can be sent by programs. To evaluate and manage the performance of ATSs, however, risk management strategies and safety procedures based on human assessments are required. The trading strategy to be used, intricate mathematical functions reflecting the status of a specific stock, machine learning algorithms allowing for the prediction of the future value of the stock, and specific news pertaining to the stock being analyzed are all factors that are incorporated and taken into account when creating an ATS.Time-series prediction is a widely used technique in many real-world applications, such as forecasting the weather and the financial markets. It makes use of ongoing data gathered over time to predict the results of a subsequent test. Numerous time series forecasting systems have demonstrated their will be efficient in practical circumstances. The bulk of algorithms used today are built on recurrent neural networks (RNN), along with its specialized forms of long-short-term memory (LSTM) and gated recurrent unit (GRU). The stock market commonly uses time-series data, and many academics have investigated this area and created several models. In this research, an LSTM model is used to forecast the stock price.

2. LITERATURE SURVEY

The most important step in the software development process is the literature review. This will describe some preliminary research that was carried out by several authors on this appropriate work and we are going to take some important articles into consideration and further extend our work.

[1] Stock Market Prediction Using Machine Learning

V Kranthi Sai Reddy's research was conducted at the Hyderabad, India-based Sreenidhi Institute of Science and Technology. One of the most significant activities in the world of finance is stock trading. Trying to anticipate the future value of a stock or other financial instrument traded on a financial exchange is known as stock market prediction. The prediction of a stock using machine learning is explained in this study. When forecasting stock prices, the majority of stockbrokers use technical, fundamental, or time series analysis. Machine learning stock market predictions are made using the Python programming language. In this study, we propose a machine learning (ML) approach that will be trained using the readily available stock market data and then generates a precise forecast utilising the learnt data. In this context, this study forecasted stock values for both large and small capitalizations using the Support Vector Machine (SVM) machine learning technique. and in the three separate markets, using prices with both daily and up-to-the-minute frequencies.

[2] Forecasting the Stock Market Index Using Artificial Intelligence Techniques

The study conducted by Ronald Lufuno Marwala a thesis presented to the University of the Witwatersrand's Faculty of Engineering and the Built Environment in Johannesburg in order to meet the requirements for the Master of

Science in Engineering degree. According to the weak version of the efficient market hypothesis (EMH), it is impossible to predict the future price of an asset using data from its past prices. In other words, the market operates as it is on a random walk, which makes predicting difficult. Furthermore, because of the financial system's inherent complexity, financial forecasting is a challenging undertaking. The purpose of this effort was to model and forecast the future price of using artificial intelligence (AI) technology. Based on past price data, three artificial intelligence techniques—neural networks (NN), support vector machines, and neuro-fuzzy systems—are used to predict the price of a stock market index in the future. Artificial intelligence approaches are employed as financial time series forecasting tools because they have the capacity to account for the complexity of financial systems

[3] Forecasting directional movements of stock prices for intraday trading using LSTM and random forests

The study carried out by Pushpendu Ghosh, Ariel Neufeld, and Jajati Keshari Sahoo Department of Mathematics, BITS Pilani K.K.Birla Goa campus, Department of Computer Science & Information Systems, and Division of Mathematical Sciences, Nanyang Technological University, Singapore. We examine the performance of the two methods in forecasting intraday directional movements of the stocks that make up the S&P 500 from January 1993 to December 2018 utilising out-of-sample data employing both random forests and LSTM networks (particularly CuDNNLSTM) as training procedures. Our multi-feature design provides intraday returns, returns compared to closing prices, and returns related to opening prices. For our trading strategy, we use Fischer & Krauss (2018) and Krauss et al. (2017) as benchmarks. purchase the ten shares. With equivalent daily returns of 0.41% and 0.39% relative to LSTM and random forests, respectively, we surpass Fischer & Krauss (2018) and Krauss et al. (2017)'s single feature settings, which only provide daily returns relative to closing prices. 1 Keywords: Machine Learning, Statistical Arbitrage, Forecasting, Random Forest, LSTM, Intraday Trading

[4] Automated Stock Price Prediction Using Machine Learning

The study was conducted by Mariam Moukalled Wassim El-Hajj Mohamad Jaber of the American University of Beirut's Computer Science Department. Investors have historically examined stock prices, stock indicators, and news pertaining to these stocks in order to forecast market movement. Consequently, news has a significant impact on stock price fluctuation. The majority of earlier research in this field concentrated on either categorising recently disclosed market news as (positive, negative, or neutral) and illustrating how it affected stock price or on analysing historical price movement and forecasting future movement. In this paper, we offer an automated trading system that combines machine learning, sentiment analysis of news, and mathematical functions to improve stock performance.

3. EXISTING SYSTEM

Conventional stock price prediction models employ statistical techniques including regression analysis, moving averages, and autoregressive models. These models' capacity to accurately predict stock values is constrained by their incapacity to adequately describe the intricate non-linear correlations between stock prices and the various contributing components.Due to the dynamic and volatile character of the stock market, these methodologies have limits when it comes to predicting stock values. Furthermore, they rely on presumptions that may not apply to stock prices, such as linearity and stationarity of the data.

Limitations of the Existing System:

1. Required Data Quantity: These approaches have restrictions on the volume of data that can be stored. This involves gaining access to unstructured data and data that may not be publicly available.
2. Less precision in Results: Depending on the Uptrend and Downtrend of the Stock Market, Results may differ from the Actual Results

4. PROPOSED SYSTEM

The suggested method uses LSTM (Long Short-Term Memory) neural networks to capture the non-linear relationships between stock prices and the various factors that influence them. When historical stock data is entered, the system forecasts stock prices for a specific time period. Using a big dataset of historical stock prices, the LSTM model is modified to decrease the error between expected and actual stock values.Getting access to historical market data is the first step. After separating the data into training and test sets, training the algorithm to predict prices.The proposed system additionally includes a feature selection stage to choose which features are most crucial for predicting stock price. This improves the model's precision and simplifies it.
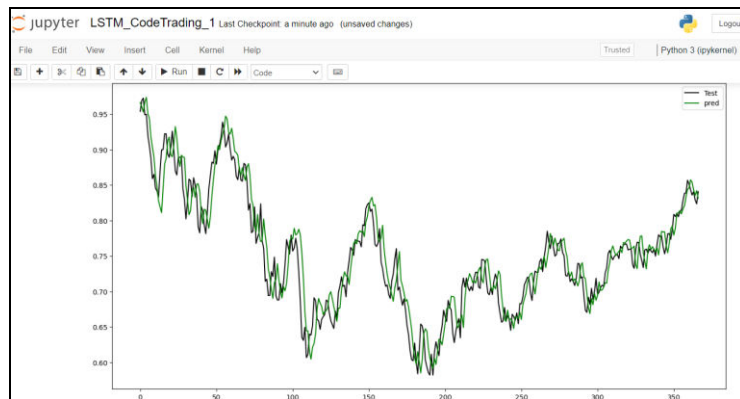
Advantages of the Proposed System:
1. High Accuracy
2. Low Error Rates
3. Minimizes you Losses
4. Assures Consistency.
5. Notify the Entry and Exit Points

5. EXPERIMENTAL RESULTS

From the below figures it can be seen that proposed model is more accurate in order to prove our proposed system.
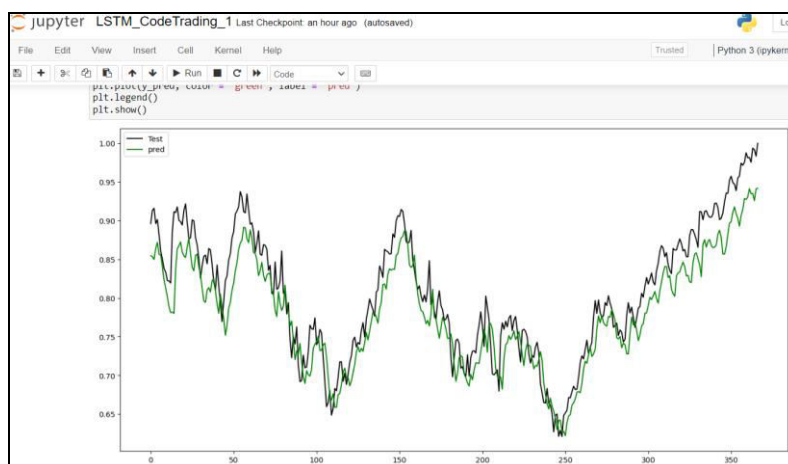
Prediction of TCS Stock:

Explanation: In the above window we can see prediction of TCS stock.

Prediction of HDFC Stock:

Explanation: In above window we can see HDFC Stock prediction using LSTM.

Prediction of Reliance Stock:

Explanation: In the above diagram we can clearly see prediction of Reliance Stock.

6. CONCLUSION

Stock prediction requires a model that will make use of Historic Data and retain the memory of past values. There are several methods such as Regression, SVR etc., but they have certain drawbacks. Therefore, the LSTM is suitable for forecasting the Stocks. In this project, an LSTM model was built to forecast stock prices on the basis of their past values. Accuracy of this model was checked by performing a train-test check. Using LSTM algorithm for prediction, we devised a method for predicting the closing stock price of any given organization in this project. With the help of datasets from Google, the Nifty50, TCS, Infosys, HDFC Bank and Reliance Stocks, we were able to attain above 95% accuracy.

Declaration

1. All authors do not have any conflict of interest.
2. This article does not contain any studies with human participants or animals performed by any of the authors.

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