IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 12, Issue 4, April 2023

DOI: 10.17148/IJARCCE.2023.124160

Stock Price Prediction for IT Companies Using LSTM

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Abstract: The computation of longer-term share prices requires a strong algorithmic foundation for the complicated process of stock value prediction. Due to the structure of the market, stock prices are connected, making it challenging to estimate expenses. The suggested algorithm employs machine learning methods like a recurrent neural network called Long Short Term Memory to estimate the share price using market data. Weights are corrected for each data point using stochastic gradient descent during this process. In contrast to the stock price predictor algorithms that are now accessible, our system will produce accurate results. To drive the graphical results, the network is trained and assessed with a range of input data sizes.

Keywords: Stock Market, Long Short- Term Memory, Machine Learning, Artificial Neural Networks, National Stock Exchange

I. INTRODUCTION

Shares of publicly traded corporations are traded on the stock market, however due to its volatility, extensive historical data research is necessary. In this study, we construct a stock data predictor programme that learns from historical stock prices and data to forecast stock prices for a specific share.

Our model uses a Recurrent Neural Network (RNN) method called Long Short Term Memory (LSTM) and takes into account the previous equity share price of a company. The suggested method takes into account the historical data that is currently accessible for a share and makes forecasts on particular elements such the opening price, day high, day low, previous day price, close price, trading date, total volume of trades, and turnover.

The suggested model will take into account the National Stock Exchange of India Limited (NSE) and utilise time series analysis to forecast a share price for the desired time period.

The NSE is the organisation of the Indian stock exchange that offers investors all throughout India the newest amenities. It plays a crucial part in changing the Indian equities market so that the capital market is more transparent, convergent, and efficient. Investors from all throughout India and the world utilise the NSE's Common Index, The CNX NIFTY. It allows for the exchange, settlement, and clearing of securities in the debt and equities markets as well as derivation.

To forecast stock prices, we employ Long Short Term Memory (LSTM) networks, a type of recurrent neural network that can solve linear problems. Because LSTMs address the evanescent gradient problem that other deep learning methods have, they are less harmful than other deep learning techniques like RNN or conventional feedforward.

II. RELATED WORK

predicting stock market returns has become a significant field of research. Researchers have attempted to establish a direct relationship between macroeconomic factors and stock returns. However, with the discovery of non-linear trends in the stock market, there has been a shift towards non-linear prediction models. Non-linear models have been developed using various functions, including binary threshold, linear threshold, hyperbolic sigmoid, and brown.

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One such method of predicting stock prices is the use of machine learning approaches. The impact of financial ratios and technical analysis on stock price forecasting using random forests has been studied. There is a growing trend of using AI and human-made awareness frameworks to predict stock prices. Researchers are continually exploring ways to improve the accuracy of stock prediction models. The output varies for each method, and different factors influence stock prices, such as financial authority assumptions, general assessment of the company, news from various outlets, and even events that cause the entire trade protection to change.

Multi-Source multiple instance learning has been used to predict stock prices by extracting certain biases and establishing relationships between different variables. The use of a sentiment analyzer is used to suggest a unique relationship between the emotions of individuals and how they are influenced by the interest in specific stocks. Extracting significant events from web news to see how they affect stock prices has also been studied.

Supervised learning classifiers have been used to forecast stock price movements based on financial index data, and their ability has been determined. Computational analytical approaches have been portfolio modeling. Statistical AI methodology has been addressed, and the use of SVM methodology has been shown. Tactical methodologies can also be applied to predict stock prices.

Long Short Term Memory (LSTM) networks have been investigated as a type of recurrent neural network capable of solving in volute data problems. The use of LSTM networks for predicting stock prices has shown promising results. LSTM networks can capture long-term dependencies in data and overcome the vanishing gradient problem.

Other techniques for predicting stock prices include traditional time-series analysis, machine learning, and deep learning models. Traditional time-series models include autoregressive integrated moving average (ARIMA), exponential smoothing, and seasonal decomposition. Machine learning models include support vector machines (SVMs), random forests, and decision trees. Deep learning models include convolutional neural networks (CNNs) and recurrent neural networks (RNNs).

In conclusion, predicting stock prices is a complex task that requires various techniques and models. The use of machine learning and deep learning models has shown promising results. The LSTM network is a type of RNN that can capture long-term dependencies in data and overcome the vanishing gradient problem. Other models such as SVM, random forests, and decision trees have also been used to predict stock prices. Traditional time-series models such as ARIMA, exponential smoothing, and seasonal decomposition have also been used. However, the accuracy of these models depends on various factors, such as the quality and quantity of data, external factors, and the specific model used.

The importance of setting goals is not just limited to personal success, but it's also important for organizations and businesses. Setting clear goals helps companies to align their resources, prioritize their activities, and measure their progress. By setting goals, companies can focus their efforts and avoid wasting time, money, and other resources on unproductive activities.

Moreover, setting goals helps companies to communicate their expectations to their employees and stakeholders. When employees know what their goals are, they are more motivated to work towards achieving them. This leads to improved employee engagement and productivity, which in turn, leads to better organizational performance.

However, setting goals is not enough. To achieve these goals, companies need to create a plan of action and implement it effectively. The plan should include specific tasks, timelines, and resources required to achieve the goals. It should also identify potential challenges and risks that could arise during the process and provide contingency plans to mitigate them. Another important aspect of goal setting is measuring progress. Companies need to track their progress regularly and adjust their plan of action if necessary. Measuring progress helps to identify areas of improvement and make necessary adjustments to achieve the goals. It also helps companies to stay focused and motivated towards achieving their goals.
In addition to these benefits, goal setting also helps companies to stay competitive. By setting ambitious goals, companies can push themselves to innovate and improve their products and services. This can give them a competitive advantage over their competitors and help them to stand out in the market.

Overall, setting goals is an important aspect of personal and organizational success. It helps individuals and companies to stay focused, motivated, and competitive. By setting clear and measurable goals, individuals and companies can achieve their desired outcomes and make a positive impact in their lives and in the world around them.

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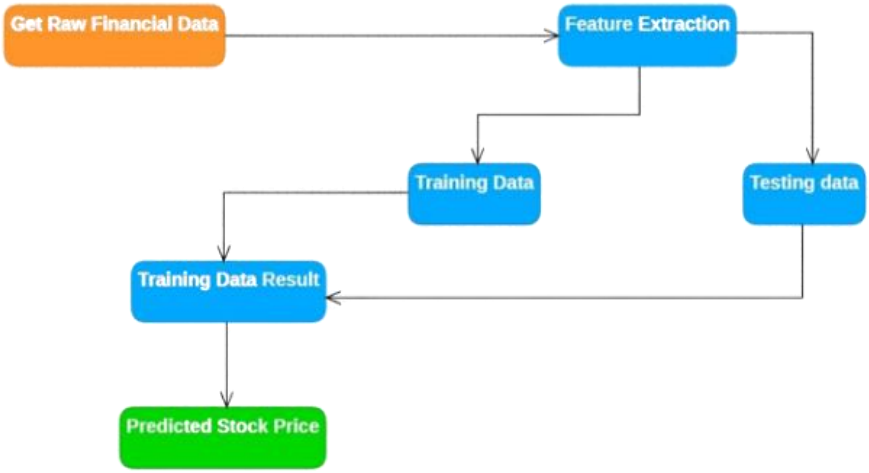
III. PROPOSED SYSTEM

As stated in the preceding section, the first step is to obtain historical market data. The next step is to extract the feature that is needed for data analysis, then divide the data into training and test sets, train the algorithm to forecast prices, and finally visualise the results. The proposed system's architecture is shown in Fig.



A cell, an information door, an entrance door, and a door with a view make up a standard LSTM unit. The three inputs control the flow of data into and out of the cell as it gathers values across arbitrary time intervals. The LSTM's ability to learn context-specific temporal dependency is its key benefit. Without explicitly applying the activation function within the recurrent components, each LSTM unit gathers data for either a lengthy or brief duration (thus the name). 2020 May to June

An important fact to keep in mind is that the output of any cell is specifically raised by the unnoticed entryway. which fluctuates between the values of 0 and 1. In other words, the LSTM cell's overhead door is in charge of both the loads and the ability to start the cell state. Consequently, loads can reach their ideal quality in a reasonable amount of time and data from a previous cell state can pass through a cell unchanged as opposed to expanding or contracting exponentially at each time-step or layer. As the value stored in the memory cell is not iteratively adjusted, the evaporating slope problem can be handled by LSTMs. The inclination does not disappear when prepared with back engendering, where markets like NSE and BSE are considered to be Indian trading entities for our analyses.

Parameters used

LSTM Stock Price Prediction

The suggested framework uses Long Short Term Memory (LSTM) to learn online by predicting the stock's close prices. In the field of deep learning, the Long Short Term Memory (LSTM) is a phoney intermittent neural system (RNN) design. In contrast to conventional feed forward neural networks, LSTM has input relationships. The process doesn't just ignore isolated pieces of information (like photos), but also complete information groupings (like a speech or a video). For tasks like unpartitioned, associated handwriting recognition, speech recognition, and recognition of abnormalities in organised traffic or IDS (interruption location frameworks), for instance, LSTM is useful.

Algorithm : LSTM

Input : Historic stock data (.csv files)
Output: utilising price variation to make stock price predictions

Step 1: First, get going.
Step 2: After obtaining the historical data from the market for a specific share, move on to step two, data preprocessing.
Step 3: Read the close price after importing the dataset into the data structure.
Step 4: apply 100MA and 200MA to csv for checking trend
Step 4: Apply feature scaling to the data to make the range of data values between 0 and 1 larger.
Step 5 : Create a data structure with 60 timestamps and 1 output.
Step 6: Building a recurrent neural network (RNN) for the Step 5 data set and initialising the RNN with a sequential repressor.

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step 7: the first LSTM layer is added, and some Dropout regularisation is used to remove undesirable values
step 8 : Add the output layer.
Step 9: Add Adam optimisation and the loss as mean squared error when compiling the RNN.
Step 10: employing charting tools to visualise the results and make predictions.

Getting information from the market is a crucial step before processing the data. The first phase in our suggested structure is information collection, which entails collecting data from advertise clearing organisations like the BSE (Bombay Stock Exchange) and NSE (National Stock Exchange). The dataset that will be used in the market expectation has to be used to be divided based on several viewpoints. Incorporating more external information into the information collection also upgrades the dataset. The majority of our data is made up of stock costs from prior years. NSEpy is one of the various Python packages for obtaining data from NSE.

Preprocessing the data is the next step. Information pre-processing is a crucial development in information mining at this stage since it transforms raw data into a basic configuration. The information that is gleaned from the source will be contradictory, disjointed, and erroneous. The preprocessing stage will clean up the data, and in the very end, highlights scaling is necessary to limit the factors.

Cross-approval is the execution of the model utilising the preparation data that is incorporated into the model preparation in a very well-founded and anticipated manner.The purpose of the tuning models is to specifically alter the calculation training and improve the computation by adding more details. The test sets are perfect since a model shouldn't be chosen based on inside information. To represent the costs of the actual offer, expand the information. The final stage must involve drawing the data. using a visualisation technique to help show the data variance in the outcomes of our algorithm.

IV. RESULTS

the use of Python to build the suggested LSTM model, which uses historical data to forecast the price of TCS shares in the future. a. The visualisation of TCS prediction is displayed in the image below .In our article, the application

The graph below from our algorithm shows the expected price of TCS share, which is a result of an algorithm that forecasts the stock price of a share for a particular length of time.

Plotted from the output of our method using LSTM units to achieve accuracy is the result shown in the graph below.

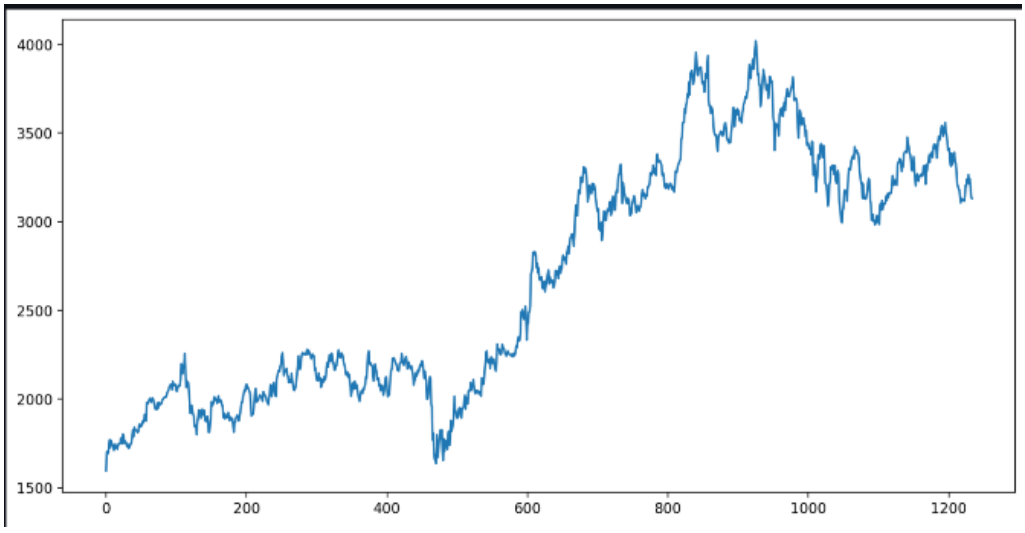

Fig 1 : close price data visualization

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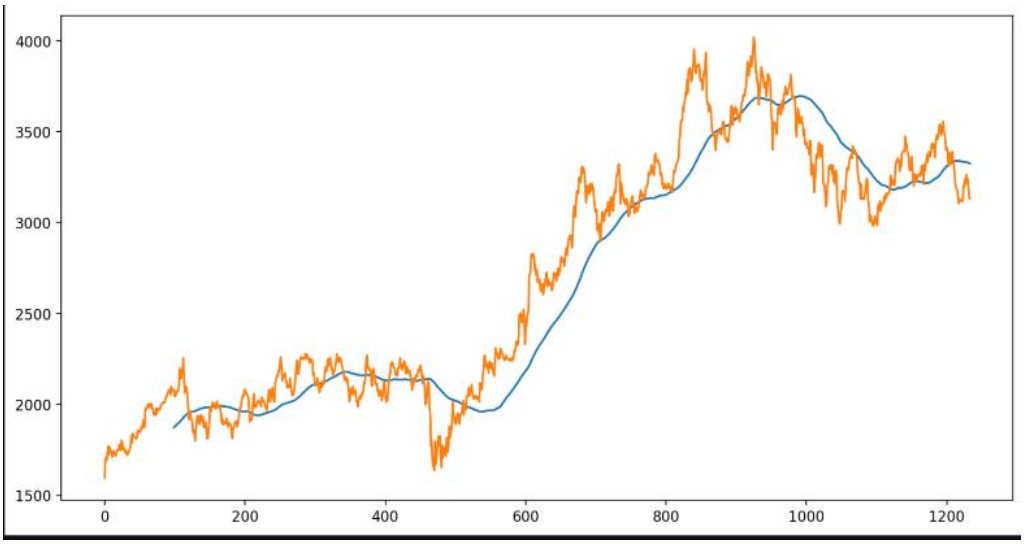

Fig 2 : 100MA data visualization

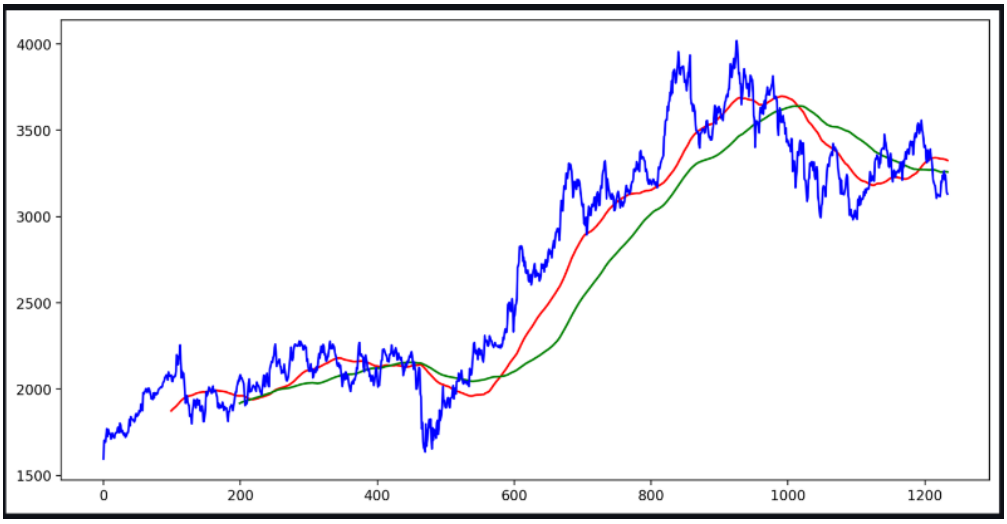

Fig 3 : 200MA data visualization

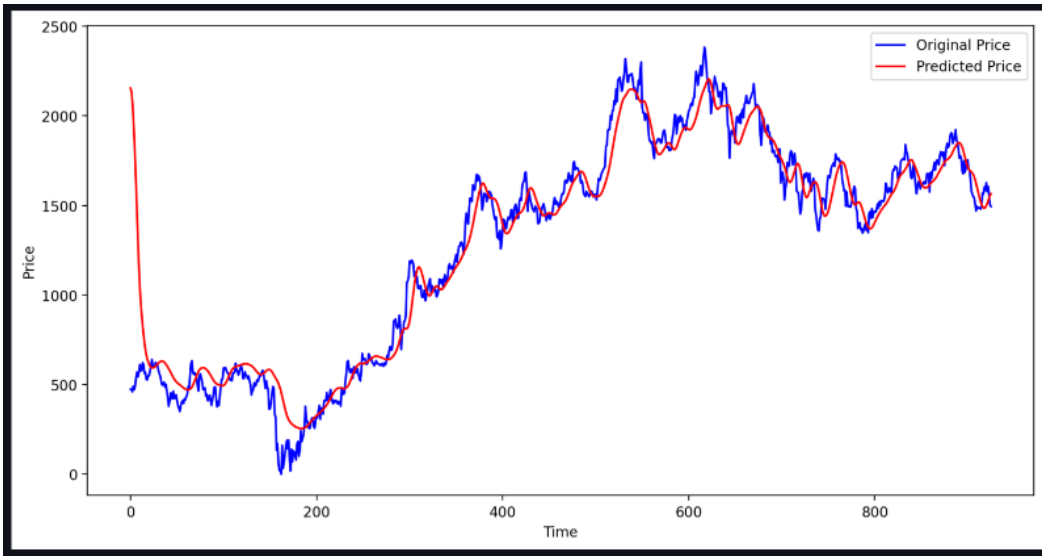

Fig 4 : Prediction vs Original

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V. CONCLUSION

In this project, the study of the share is conducted, and it may be conducted for a number of shares in the future. If the model trains a larger number of data sets utilising more powerful computers, more layers, and an LSTM module, the forecast might be more precise. we put into practise a system on TCS Company Stock Price. and put forth a model for stock prediction which incorporated the prediction value and stock close value.

In the future, we plan to add sentiment analysis from social media to better understand how the market feels about price changes for specific shares. We can do this by integrating Twitter and Facebook APIs into our programme because Facebook is a popular social network with a wealth of user-posted market trend data.

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