Stock Price prediction with LSTM Based Deep Learning Techniques

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Abstract - Stock price estimates are a complex task that requires a strong algorithm to calculate long-term prices. Stock prices are naturally related; hence it will be difficult to predict the cost. A proposed algorithm that uses market data to predict the share price using machine learning strategies such as a repetitive neural network called Long Short Term Memory, in which process weights are adjusted for each data point using a stochastic gradient. This program will provide better results compared to currently available pricing estimates algorithms. The network is trained and tested with a variety of input data to attract graphical results.

Keywords — Credit Card, Fraud, Autoencoder, Deep Learning.

I. INTRODUCTION

Researchers in recent years have been using extensive neural networks extensively in the use of retrieval, classification and prediction. Deep neural networks have been developing very well due to data availability and the rate at which numerical calculations are obtained [1]. Sequence of data points taken from areas divided equally by time in serial sequence is known as time series data. One of the most comprehensive learning apps includes time series predictions, which predict future price values. Predictions can be categorized primarily as short-term (predictions of seconds, minutes, and days) and long-term (predictions for more than a year or more).

This paper deals with one of the time series estimates related to a financial sector called Stock Price Prediction. In this Timeline the variable is the stock price. Economic benefits can be easily realized by predicting the development of financial instruments such as stocks. The behavior of the stock is very flexible and confusing in nature. The constant fluctuations in stock make it difficult to predict its future movements. The stock market needs prior knowledge in order for an investment decision to be made wisely. Strategies involved in the analysis of time series of financial and stocks data have gained value due to their nature of helping to maximize profits while maintaining low risk potential.

Recent advances in series time analysis include the integration of deep neural networks [2, 3] such as CNN, RNN, LSTM networks. The Ensemble of deep neural networks is also used for cell prediction problem [4] but incorporates the training of each specialist separately and obtains results using measurement methods. Instead of training different neural networks separately, one can combine layers of different models into a single deep neural network. In this paper, the proposed approach is based on combining different strategic layers into a single deep neural network while using a small number of training features.

Researchers in the field of financial season analysis using NN models have used different input variables to predict stock returns. In some functions, one-time series data is used as input [5], [6]. Some activities focus on the inclusion of amazing market information and macroe conomic diversity. In [12], a combination of financial time analysis and NLP has been compiled. In [9] and [7], deep learning structures have been used for modeling the multivariate financial timeline series. In [11], an NN model that uses flexible technical analysis variables was used to predict Shanghai stock market. The task compared the performance of two learning algorithms with two methods of weight gain. The sh6wn results are that the efficiency of back-to-back expansion can be increased by combining gradient readings with repeated line-weight weights.

In 1996, [11] used back distribution and RNN models to predict the stock index of five different stock markets. In [10], the use of time delays, neural network models of the daily presentation process are presented in the daily stock dictionary. In [8], the use of machine learning algorithms such as PSO and LS-SVM used for S&P 500 stock market forecast. Implementation of genetic function and neural network models was introduced internally. The work

included the use of a genetic algorithm and an artificial network of predictable neural networks. In this workload the NN is derived from the genetic algorithm. However, the prediction accuracy of this model was low. The use of a predictive wavelet wave is introduced internally. The employee used a wavelet wave to describe short-term characteristics in stock trends. With the introduction of LSTM, time-based data analysis works well. These types of networks have the ability to capture past data. They are used in the stock price forecast by [8], [7].

II. RELATED WORK

During the course of the literature study, the details of the stock market forecast systems currently in use are taken into account.

Twenty years ago it was decided that stock exchanges had become an important field of research. In many cases scientists had tried to create a direct link between macroeconomic data information beyond that, stocks return, so to speak, with the disclosure of offline slides in the financial exchange record, an astonishing step for scientists to look forward to the steady expectation of stock returns. Despite the fact that, after much of the writing has emerged from the unparalleled display of stock measurements, most of them have demanded that the non-linear model be shown before the measurement. in any case, finding the explanation that financial exchanges are back is noisy, uncertain, confusing and not line in nature. There are various functions used to predict parameters. Mainly including, binary limit, line limit, hyperbolic sigmoid, and brown.

Stock Market Forens Investigation Using Machine Learning Methods has been mentioned. The stock forecast has become a sharp point of interest. Special testing is one of them, however it does not reliably provide certain results, so it is important to develop accurate gauge techniques continuously. All processes recorded under regression have their own specific conditions and constraints due to their various combinations. The way in which straight backslide models work consistently using at least one square method, however it can be incorporated into different practices, for example by reducing the “inconsistency of equality” to another level, or by minimizing the disabled variation of square backward function. Also, a small square method can be used to fit non-linear models.

The impact of financial measurement and technical analysis on stock price forecasting using random forests, the use of AI and man-made awareness frameworks to predict stock costs is a growing example. A growing number of professionals are spending their time every day thinking of ways to deal with strategies that can further improve the accuracy of the stock model. As a result of the galactic number of available options, there may be several approaches to strategies capable of estimating stock costs, however not all strategies work in a comparable way. The crop changes each method of educational or comparative file accuracy like the Gaussian kernel SVM. In comparison, the authors use five standard algorithms and change the depth learning parameters five times, such as performance and the subtraction parameter [9].

It is also mentioned in [1] that the stock price Multi-Source Predicting Multidisciplinary readings to see without a doubt the defense trade is a difficult task, however the web becomes a useful gadget to make this task less difficult, because the course of data processing , it is not so difficult to establish associations between different variables and, in particular, the case of entertainment How budget trading information is predictable enough is to use other alternatives from certain official data and the use of various strategies, such as using an emotional analyzer, to promote positive relationships.

III. LONG SHORT – TERM MEMORY (LSTM) NEURAL NETWORK

LSTM has a cell shape that contains additional memory, which is used to store relevant prediction information. Some information is in stock, a modified building structure, known as a gate. There are steps to do such work. In the first steps forget the department deciding whether to discard any available information or not. After that, layer the tanh and install the door to decide which new information should be stored. To save new information, add and delete information according to the previous gateway. In the last step, the activation function is applied to the output data [2].

LSTM type RNN. In LSTM architecture, hidden layers will be replaced by the LSTM cell. The LSTM cell contains a variety of gates, you can control the input stream. The LSTM cell contains the input gate, the cell state, the forget gate and the output gate. Includes blockade of sigmoid layers, tanh layers, and point duplication operator.

- Input gate: Input gate consists of the input data.
- Cell State: The Entire Network runs through the cell's state, and it allows you to add or delete information, Gate.
- Forget gate layer: It is used to determine the part of the information is allowed.
- Output gate: It consists of the output generated by the LSTM.
- Sigmoid layer generates numbers between zero and one.
- tanh Layer generates a new vector, which will be added to the state.

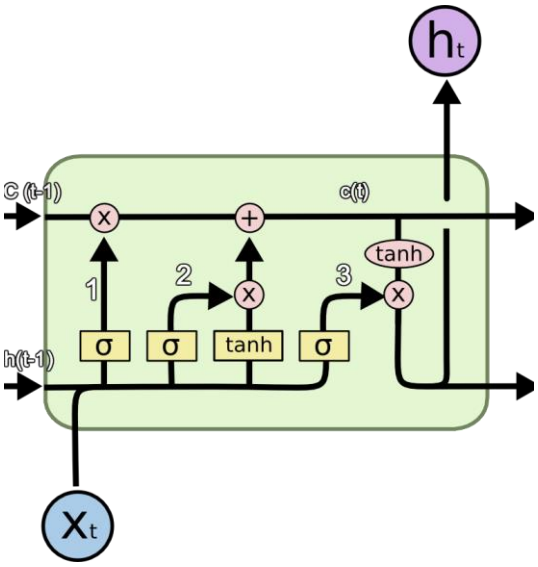

Fig 1: LSTM Architecture

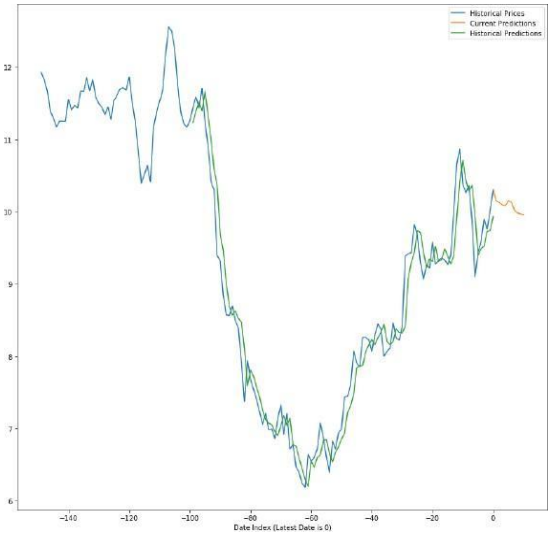

Fig.2 : Accurcy of The Prediction Stock

IV. RESULTS

The experiment was done for three different deep learning models. The maximum value of error percentage obtained for each model. From the table it is clear that LSTM is giving more accurate results than the other two models. This is due to the reason that LSTM does not depend on any previous information for prediction. It uses only the current window for prediction. This enables the model to understand the dynamical changes and patterns occurring in the current window. However in the case of RNN and LSTM, it uses information from previous lags to predict the future instances. Since stock market is a highly dynamical system, the patterns and dynamics existing with in the system will not always be the same. This cause learning problems to LSTM and RNN architecture and hence the models fails to capture the dynamical changes accurately.

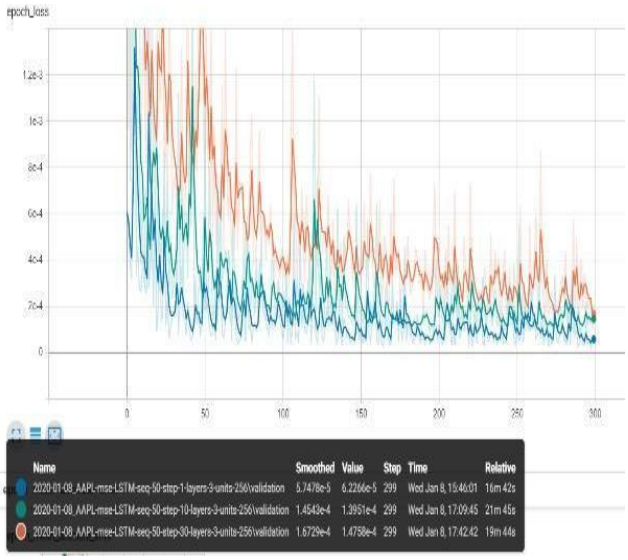

Fig3: Predicted Data Graph

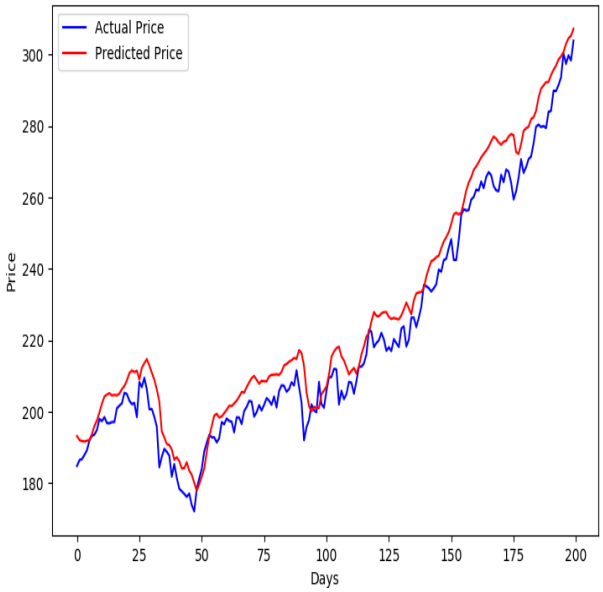

Fig 4: Final Output Of the Tanning Data

V. CONCLUSIONS

The study of the share is carried out in this paper and it can be carried out for several shares in the future. Prediction could be more reliable if the model trains a greater number of data sets using higher computing capacities, an increased number of layers, and LSTM modules. In future enhancement the inclusion of sentiment analysis from social media to understand what the market thinks about the price variation for a particular share and it can be implement this by adding twitter and Facebook API to our program as Facebook is a leading social media which has lots of market trend information posted by users. In this paper, we have presented several approaches to prediction of stock index values its movement patterns on a weekly forecast horizon using eight machine learning, and four LSTM-based deep learning regression models. we constructed, optimized, and then tested the predictive models. Data pre-processing and data wrangling operations were carried on the raw data, and a set of derived variables are created for building the models. Among all the machine learning and deep learning-based regression models, the performances of the LSTM based deep learning regression models were found to be far too superior to that of the machine-learning-based predictive models. The study has conclusively proved our conjecture that deep learning-based models have much higher capability in extracting and learning the features of a time series data than their corresponding machine learning counterparts. It also reveals the fact that multivariate analysis is not a good idea in LSTM-based regression, as univariate models are more accurate and faster in their execution.

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