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STOCK PRICE PREDICTION USING DEEP LEARENING

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ABSTRACT

Stock market investment which is one of the most complex and difficult and risky business to do. Stock market is very uncertain because the prices of stocks keep fluctuating every time. This paper is based on the demand for stock market price prediction and the problems it faces now a days. We compared and analyzed various types of neural network prediction methods and finally selected LSTM (long short-term memory) neural network for predicting stock price. Historical information is very important to investors for making investment decisions. Past studies have used opening price and closing price as key new predicators of financial markets, but extreme maxima and minima may provide additional information about future price behavior. Its main principle is to discover the role of time series through analyzing the historical information of the stock market, and to deeply explore its internal rules through the selective memory advanced deep learning function of LSTM neural network model, so as to achieve the prediction of stock price trend.

KEYWORDS: Stock Price, LSTM, Deep Learning

1. Introduction

Stock price prediction is very important for business environment. People can make profit or lose of their income from a stock market job. It is very complex and very risk to invest money in stock market. To avoid this we have designed a system, to design a stock price prediction, It must be able to predict the approximate stock market prices. This system should be able to reduce the confusion for stock investors and give approx stock prices based on previous years stock prices. This should help us in so many ways like, to save the damage causes by investing on less value companies and it is one of the alternative to know the value of the company in the market instead of spending money for consultancies. Especially it is more helpful for the new investors. In the past decades, there is an increasing interest in predicting markets among economists, policymakers, academics and market makers. The objective of this work is to study the supervised learning algorithms to predict the stock price and improve efficiency in prediction.

2. Existing System for Stock prediction

As many customers have invested their time and effort in world trade for getting it closer and more reliable to the people for carrying out the resources and make their lifestyle more deliberate than the previous. In the past few years various strategies and the plans had been derived and deployed ever since it's continuation and the topic is still a point of research where people are coming up with ideas to solve.

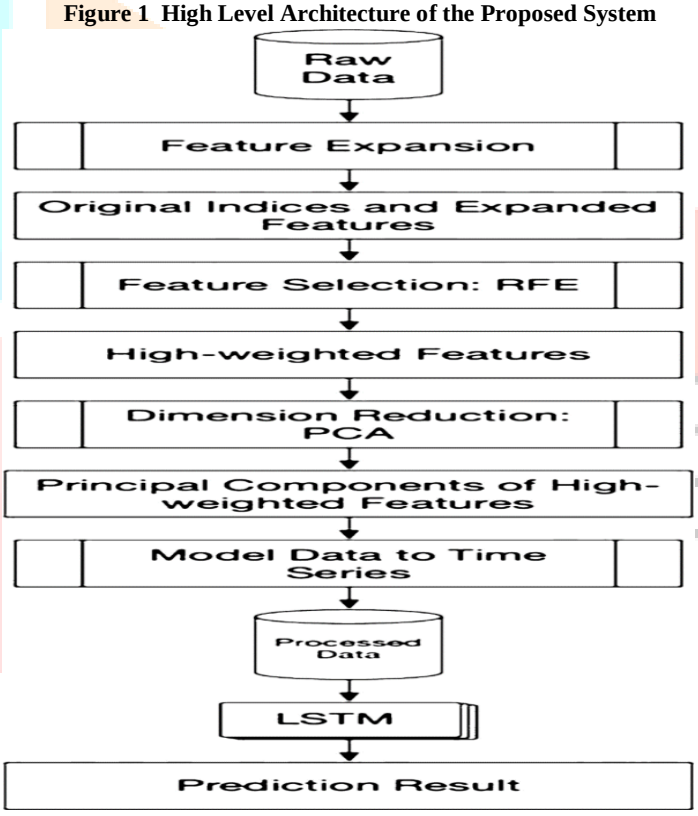
All the learning system from the past is limited and simple where learning of the simple algorithm for a computational mean is not enough that can even be done by human brain itself. The existing models can't cope up with the vulnerabilities and remove the rarest information that they cannot process causing it a major data loss which creates a problem in forecasting.

The existing system in stock price predictions are biased because it consider a source point for data source or data set. Before the prediction of the data set a simple data retrieval should be generated and tested on the training data set which are more flexible and versatile in nature. Loss of sights is a major problem in the existing system as the stock varies each days and the loss margin can be higher with respect to time.

3. Proposed Model for Stock prediction

Deep learning not only saves time and resources but also outperforms people in terms of performance. it will always prefer to use a trained computer algorithm since it will advise you based only on facts, numbers, and data and will not factor in emotions or prejudice. Very good predictions can be made with basic and technical analysis together. A good forecasting system will help investors make investments more accurate and more profitable by providing supporting information such as future stock price guidance. The following figure demonstrates the high level architecture of proposed system.

Figure 1 High Level Architecture of the Proposed System



We have covered most of the basic and essential requirements for dealing with problems related to time series forecasting. The most significant topic covered was Long Short-Term Memory (LSTM). LSTM will be utilized for our proposed system the stock price prediction and through the literature review, it can be identified that there is a lot of experiments were done on the combination of multiple deep learning methods. The hybrid networks are showing promising signs for future research.

After a lot of study we have decided to develop our system by using LSTM(Long Short- Term Memory) model to predict the trend of stock price. In this paper, we present a theoretical and experimental framework to apply the proposed model to predict the stock market price.

In the proposed model we have used 4 parts which are Input layer, Attention Layer, Hidden Layer, Output Layer. The training of the model is solved by using Gradient descent Algorithm and you can see the frame work in the below Figure 2.

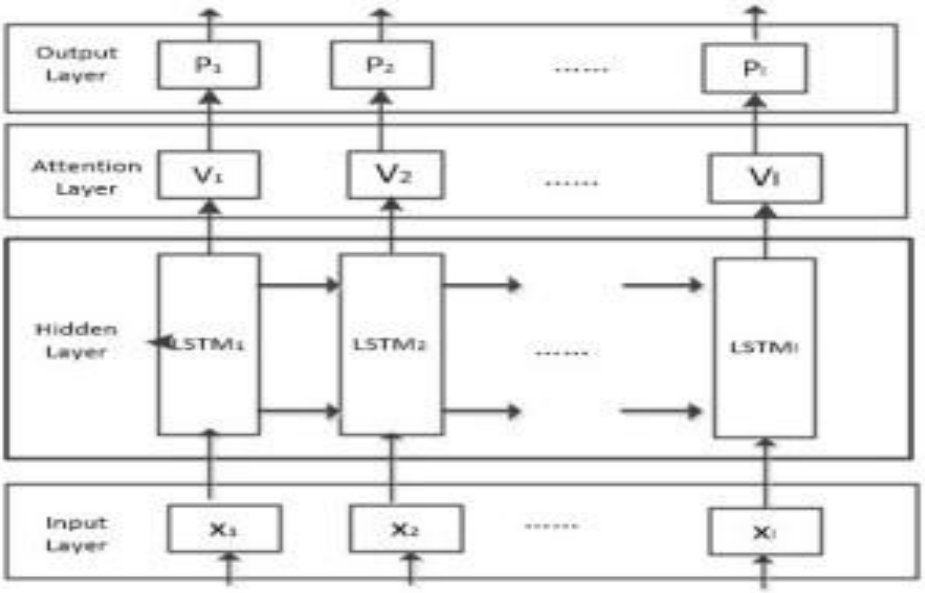


Figure 2 Different Layers of Proposed Framework

3.1 Input Layer:

The input layer takes the date, closing price, opening price, maximum price and minimum price in to the account of the stock in time series. It then divides the data into training and test data of ratio 7:3 and then converts each component of the taken data into the interval of [0,1] .

3.2 Hidden Layer:

The hidden layer is formed by LSTM unit. The hidden layer is effected by the data taken as the input by the input layer of the current moment and the previous moment.

3.3 Attention Layer:

The attention layer calculates the weights of the input data, the can learn or train by selecting the input data which is taken as input weights. Model that return the highest weights are closer to achieving the target value than those that return low weights.

3.4 Output Layer:

The model is trained and then used to predict the market trend over a N+1 day period after the stock time series data is input, i.e stock data is input over N days. For example, To predict the closing price of the sixth trading day, a trained model uses the five trading days of previous trading.

4. Prerequisites for System Implementation

Python is high-level, object oriented and general-purpose programming language. Python language mainly emphasizes on code readability with the use of its significant features. It is one of the most accessible programming languages available because it has simplified syntax that gives more emphasis on natural language. So for implementing our model we make use of python languages which has the needed features and the availability of libraries for predicting stock price effectively by implementing the LSTM model in deep learning. Here we predicted the price of Google stock market which will change dynamically.

4.1 Features of Python Language

i. Python is easy to code.
ii. Python supports GUI.
iii. Python is a high-level language.
iv. Python is highly portable

4.2 Libraries

Various sophisticated libraries are available in Python for stock price prediction which is reusable. In general libraries are core collection of modules in Python and they do not pertain to any specific context like the C or C++ languages. The following are the various modules used for price prediction in the given scenario and perform various activities to implement the proposed system.

4.2.1 Pandas

Pandas is a Python library. It is used to analyze data. It used for working with data sets. It has functions for analyzing, cleaning, exploring and manipulating data.

4.2.2 Matplotlib

It is a collection of functions that make matplotlib work like MATLAB. Each pyplot function makes some change to a figure: e.g., creates a figure, creates a plotting area in a figure, plots some lines in a plotting area, decorates the plot with labels, etc.

4.2.3 Seaborn

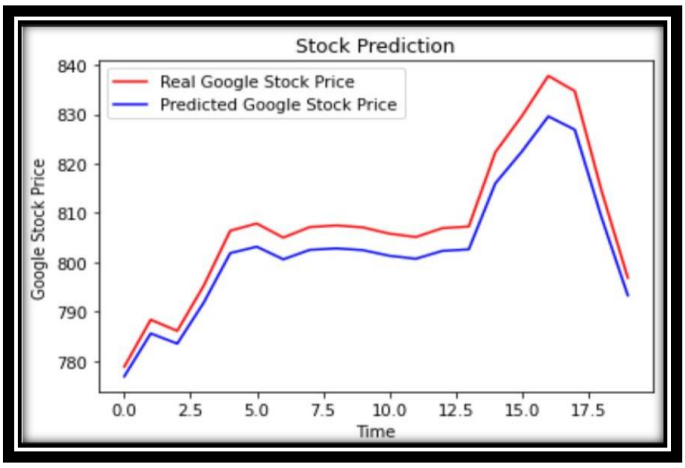
Seaborn is a library that uses Matplotlib underneath to plot graphs. It will be used to visualize random distributions. Seaborn is an amazing visualization library for statistical graphics plotting in Python.

4.2.4 Numpy

A library for the Python programming language, adding support for large, multi- dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate with.

5. Experimental Results

For analysing results we have taken Google as sample industry for pridicting it's stock price.The following figure shows both plotting and visualizing the predicted Google stock price and Real Google stock price. If you observe there is minute difference between Real Google Stock price and Predicted Google Stock Price in Figure 3b. From the analysis of various research papers we can confirm that if the difference is small then we can identify that our proposed system gives effective
results.



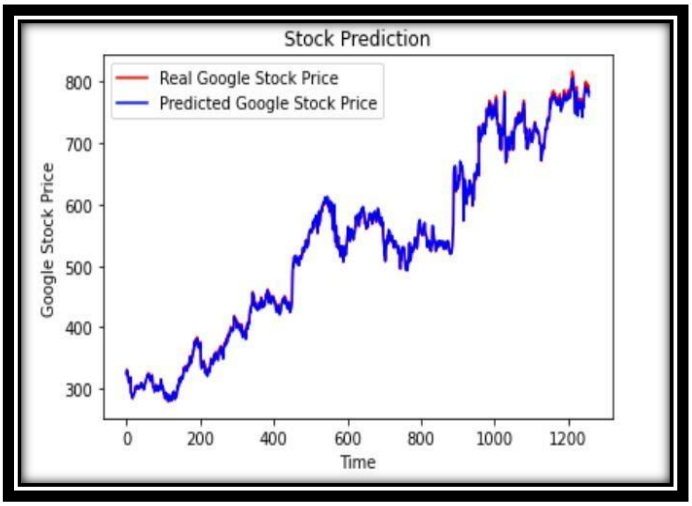


Figure 3 a)Plotting Google Stock Price (Real, prediction) **b) Visualizing Google Stock Price (real, prediction)**

6. CONCLUSION

Knowledge of stock movements by a fraction of a second can lead to high profits investors can make which makes stock market studies a major motivation for a researcher. The great advances and success of natural language process and sentiment analysis of online news based on machine learning and deep learning have gained huge popularity recently in the financial domain especially in market prediction models. Predicting the stock market was a time-consuming and laborious procedure a few years or even a decade ago. However, with the application of deep learning (also other machine learning methods) for stock market forecasts, the procedure has become much simpler. In this paper we have used LSTM deep learning method for effective prediction of Stock price. In the future, the stock market prediction system can be further improved by utilizing a much bigger dataset than the one being utilized currently. This would help to increase the accuracy of our prediction models.Furthermore, other models of Machine Learning could also be studied to check for the accuracy rate resulted by them.

7. REFERENCES

[1] B. Wang, F. L. Zhang, "Comparison of artificial neural network and time series model for

[2] forecasting stock prices", Journal of Wuhan University of Technology (Information and Management Engineering), vol. 27, no. 6, pp. 69-73, 2005.

[3] J. Lin, Y. H. Guo, "Short term prediction of stock prices based on neural networks", Journal of Southwest Jiaotong University, vol. 33, no. 3, pp. 299-304, 1998.

[4] AdebiyiAyodele, K. Ayo Charles., O. Adebiyi Marion., and O. Otokiti Sunday, "Stock Price Prediction using Neural Network with Hybridized Market Indicators," Journal of Emerging Trends in Computing and Information Sciences, Vol3 No 1, Pp 1-9, 2012.

[5] T. AkinwaleAdio, O.T. Arogundade and F Adekoya Adebayo. "Translated Nigeria Stock Market Price Using Artificial Neural Network for Effective Prediction," Journal of Theoretical and Applied Information TechnologyVol1 No 1. Pp 36-43. 2009.

[6] N. C. Ashioba, E.O. Nwachukwu, and O. Owolobi. "Finding the Optimal Solution for a Transportation Problem Using Neural Network. Microwave," International Journal of Science and Technology, Vol. 3 No 1, Pp 36-40, 2012.

[7] J. H. Sun, "Long time series clustering method and its application in stock price", Diss. WuHan University, 2011.

[8] D. Christian, S. Cincotti, "Clustering of financial time series with application to index and enhanced index tracking portfolio", Physica A Statistical Mechanics & Its Applications, vol. 355, no. 1, pp. 145151, 2005.

[9] H. C. Yin, C. Y. Zhao, "Research on stock forecasting based on neural network", Natural Science Journal of Harbin Normal University, vol. 23, no. 3, pp. 47-49, 2007.

[10] F. Gianni, S. Surcis, "A cloud computing based real time financial system", ACM Symposium on Applied Computing ACM, pp. 12191220, 2009.

[11] Colah, Understanding LSTM Networks, 2015, [online] Available: http://colah.github.io/posts/2015-08-Understanding-LSTMs/.

[12] F. A. Gers, J. Schmidhuber, F. Cummins, "Learning to forget: continual prediction with LSTM", Neural Computation, vol. 2, no. 10, pp. 2451-71, 1999