

PREDICTING STOCK MARKET PRICE USING DEEP LEARNING

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Abstract: The stock exchange refers to public business sectors that exist for the purpose of giving, purchasing, and selling stocks that trade over-the-counter or on a stock exchange. The financial market is where financial backers can transfer responsibility for investible resources. Stocks, also known as values, address partial proprietorship in an organization. A well-functioning financial exchange is considered essential to monetary events because it allows businesses to quickly access funds from the general public. As a result, a significant amount of money, whether in the form of liquid cash or a digital fund, is invested in various firm stock to increase earnings for various investors and shareholders. Stock price prediction is a difficult task that is simulated using machine learning to anticipate stock returns. The Long-Short-Term Memory (LSTM) Recurrent Neural Network, one of the most prominent deep learning models for stock market prediction, will be discussed in this paper.

Keywords: Long Short term Memory(LSTM), Time series model, Deep learning, Recurrent Neural Network.

1. INTRODUCTION

The Stock exchanging addresses a technique to exploit the stock value vacillations of freely supported organizations to create a gain. In particular, with many stuck at home during the COVID-19 pandemic, it has turned into an advantageous type of venture for some with the chance of immense returns, clear in the half expansion in value choice exchanging this year

alone. It is consequently no question that many are continually tracking down ways of acquiring an edge and expect market patterns. However, it stays a potentially turbulent undertaking, because of the immense intricacy of data and abrupt changes which stay hard to anticipate. Thusly, I needed to comprehend whether how precisely would a prepared model be able to give us exact value forecasts, and what might be the most ideal way to foresee an ascent/drop before it works out. Anticipating stock costs is a dubious errand which is demonstrated utilizing AI to foresee the profit from stocks. As financial institutions begin to embrace

artificial intelligence, machine learning is increasingly utilized to help make trading decisions. Although there is an abundance of stock data for machine learning models to train on, a high noise to signal ratio and the multitude of factors that affect stock prices are among the several reasons that predicting the market difficult. One method for predicting stock prices is using a long short-term memory neural network (LSTM) for times series forecasting.

There are a ton of techniques and devices utilized with the end goal of financial exchange forecast. The financial exchange is viewed as exceptionally unique and complex in nature. An exact forecast of future costs might prompt a better return of benefit for financial backers through corporate securities. Throughout the long term, different AI strategies have been utilized in securities exchange forecast, however with the expanded measure of information and assumption for more precise expectation, the profound learning models are being utilized these days which enjoy demonstrated their upper hand over conventional AI techniques concerning exactness and speed of expectation. In this project, there is a detailed explanation on the profound ‘Long-Short-Term Memory (LSTM)’ Recurrent Neural Network, among the famous learning models, utilized in financial exchange expectation. In this project, we will get the verifiable information of stock consequently utilizing python libraries and fit the LSTM model on this information to foresee the future costs of the stock.

2. METHODOLOGY

- Determine the input and output attributes for the project's work.
- Collection of the required data.
- Exploring the data and analysis.
- Preprocessing the data for further use.
- Splitting the data into training data that is usually 70%.
- Splitting the data into testing data that is usually 30%.
- Training the chosen model.
- Testing the model.
- Deploying the model for use.
- The data set will be used to implement the method or framework.
- Data analysis is carried out depending on the implementation findings.
- A provided data set will be collected, and data preparation will be performed.
- A Recurrent Neural Network(LSTM) is used in this project for given model.
- Different modules are used such as matplotlib, pandas, keras, sklearn, and numpy.

3. IMPLEMENTATION

The LSTMs is a part of recurrent neural algorithms which have high chance of getting better predictions and choosing the right output, it always varies with other algorithms but whereas this algorithm is best suitable for continuous data and big change in data. This is used for higher computational level as it

involves various mathematical equations which take a lot of time to process but if there is a chance in increasing the different hidden and neural layers then it can show a range of better optimal results and a good chance at predicting the output correctly. LSTM is a very modified version of the Recurrent Neural Network which has an extra feature or method called backpropagation. LSTM has many layers inside it, these are called hidden layers. LSTM networks are a type of RNN that uses special units in addition to standard units. Similarly, RNNs are networks with loops in them, which allow them to use past information before arriving at a final output.

The following three components, or gates, form a memory block.

1. Forget gate: This is a very important gate in every memory cell because it has the capability of classifying the information which is useful and which is not useful. So, whenever it encounters a certain information, it decides whether this information is useful or not. If the information is useful then it stores this information as past data, and if the information is not useful then it immediately discards this information and totally forgets this information from the memory cell.

2. Input gate : This input gate carries out the information from one gate to another gate. This gate takes a whole lot of information which may contain important and non-significant data. This gate cannot verify or have the capability of knowing which data is useful and which is not. So, it takes a huge load of input from different sources which have contained duplicate,

missing and error values. Some information which is sent to another is also saved in their hidden state to use it for predicting the future data.

3. Output gate: This output gate is used for carrying out the function and giving the final result to our query and predicting the output for it from the forget gate. This output gate is the final way of getting our answer when it undergoes different transitions to bring the back-past saved data to predict our future-based value. The final hidden state is transferred from input to our processing output. In this way, different gates work in a memory cell of LSTM. LSTM networks are a type of RNN that uses special units in addition to standard units. LSTM units include a 'memory cell' that can maintain information in memory for long periods of time. This memory cell lets them learn longer-term dependencies

Sample training Set

Date	High	Low	Open	Close	Volume	Adj Close
2020-04-15	434.980011	412.250000	413.000000	426.750000	13561200.0	426.750000
2020-04-16	449.519989	431.609985	437.000000	439.170013	16128700.0	439.170013
2020-04-17	432.000000	414.700012	431.000000	422.959991	12616300.0	422.959991
2020-04-20	444.489990	430.559998	435.170013	437.489990	12655800.0	437.489990
2020-04-21	447.000000	425.600006	444.769989	433.829987	23177600.0	433.829987
2020-04-22	433.000000	413.000000	429.730011	421.420013	21123800.0	421.420013
2020-04-23	438.410004	419.260010	419.260010	426.700012	13952300.0	426.700012
2020-04-24	427.170013	415.880005	425.000000	424.989990	8670400.0	424.989990
2020-04-27	429.000000	420.839996	425.000000	421.380005	6270200.0	421.380005
2020-04-28	421.000000	403.459991	419.989990	406.059998	4973624.0	406.059998

Fig 3.1 Training Dataset

Final predicted stock market price

```
In [17]: y_pred = model.predict(X_test) #predicting the new values

In [15]: predicted_price = sc.inverse_transform(y_pred) #inversing the scaling transformation for plotting
print(predicted_price)

[[1013.6919 ]
 [1015.0071 ]
 [1019.322 ]
 [1026.0223 ]
 [1032.2224 ]
 [1036.0822 ]
 [1030.0818 ]
 [1024.6888 ]
 [1019.4895 ]
 [1016.84753]
 [1013.6379 ]
 [1009.1765 ]
 [1004.9264 ]
 [1000.9353 ]
 [999.3086 ]
 [1000.2938 ]
 [1006.17004]
 [1016.54706]
```

Fig 3.2 Output for predicting stock market price

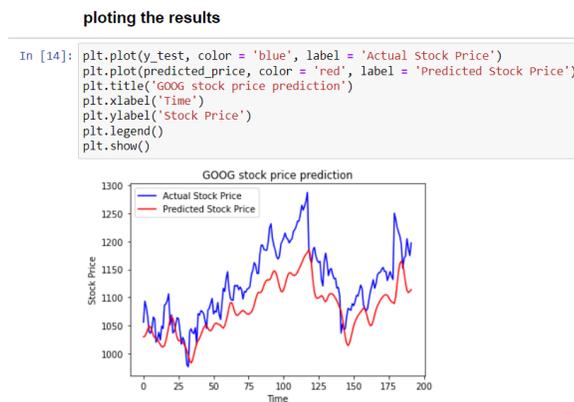


Fig 3.3 Visualizing predicted stock market price vs Actual stock market price

4.CONCLUSION

Financial exchange trading is becoming more widespread fast, allowing experts to devise new techniques for the anticipation using novel approaches. The determining strategy, on the other hand, not only benefits analysts, but also financial backers and anyone in charge of the securities exchange. An it is expected to hypothesis model with great precision to aid in the forecasting of stock lists. In this work, we used one of the most precise estimating technologies, the Long

Short-Term Memory unit, to assist financial backers, examiners, or anybody interested in investing in the securities exchange by providing them with accurate information on the securities exchange's future situation. When compared to the ARIMA calculation (Auto Regressive Integrated Moving Normal), it is demonstrated that the ARIMA computation uses past data and does not zero in on the occasional part. As a result, precision suffers. The LSTM method produces more exact results than the ARIMA method. The upcoming upgrade will include a comparison of LSTM precision to other forecast calculations. LSTM is more precise comparing to the different forecasting methods.

5. FUTURE SCOPE

In today's world there is a lot of emerging technologies like bitcoin and other virtual currencies and using block chain has changed today's financial situation. so to adapt to these, there is a lot need of machine learning and deep learning algorithms to control and furtherly to make our life easier and simpler. In this given project to adapt to new predicting stock market price we have used deep learning algorithm and able to predict with higher rate of accuracy and solve the given rate of problem very smoothly. If the model is trained with using higher rate of data, then possibly it can be introduced in to the industries and can be cope with other new technologies.

6. REFERENCE

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