

Stock Price Prediction Using Machine Learning

By

Aditya Bhatt
2016582

Guided by

Mr. Kireet Joshi

Mini Project Report

July 2022



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Date : July 2022

Aditya Bhatt
2016582

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ABSTRACT

Researchers have been studying different methods to effectively predict the stock market price. Useful prediction systems allow traders to get better insights about data such as: future trends. Also, investors have a major benefit since the analysis give future conditions of the market. One such method is to use machine learning algorithms for forecasting. This project's objective is to improve the quality of output of stock market predicted by using stock value. A number of researchers have come up with various ways to solve this problem, mainly there are traditional methods so far, such as artificial neural network is a way to get hidden patterns and classify the data which is used in predicting stock market. This project proposes a trivial method for predicting stock market prices. It does not fit the data to a specific model; rather we are identifying the latent dynamics existing in the data using machine learning architectures. In this work we use Machine learning architectures Long Short-Term Memory (LSTM) for the price forecasting of finance.yahoo listed companies and differentiating their performance. On a long term basis, sling window approach has been applied and the performance was assessed by using root mean square error.

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I owe my gratitude to my classmates who helped in understanding different machine learning techniques. Without their support, a significant portion of project work was not possible in constrained time. I must also appreciate my family and friends for helping me survive all the stress throughout the year. To my parents, for supporting me both on and off the water.

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Introduction:

Due to the high profit of the stock market, it is one of the most popular investments. People investigated for methods and tools that would increase their gains while minimizing the risk, as the level of trading and investing grew. Two stock exchanges namely- the National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE), which are the most of the trading in Indian Stock Market takes place. Sensex and Nifty are the two prominent Indian Market Indexes. Since the prices in the stock market are dynamic, the stock market prediction is complicated.

From gradually the very past years some forecasting models are developed for this kind of purpose and they had been applied to money market prediction. Generally, this classification is done by: 1. Time series analysis 2. Fundamental analysis 3. Technical analysis

The definition of forecasting can be like this the valuation of some upcoming result or results by analysing the past data. It extends different areas like industry and business, economics and finance, environmental science.

Fundamental Analysts are concerned with the business that reasons the stock itself. They assess a company's historical performance as well as the reliability of its accounts. Different performance shares are created that aid the fundamental forecaster with calculating the validity of a stock, such as the P/E ratio. Warren Buffett is probably the foremost renowned of all Fundamental Analysts.

Applications:

- Business
- Companies
- Insurance Company
- Government Agency
- This application is useful for stock investors, sellers, buyers, brokers.

Motivation:

The future price of a stock is the main motivation behind the stock price prediction. In various cases like business and industry, environmental science, finance and economics motivation can be useful. The future value of the company's stock can be determining.

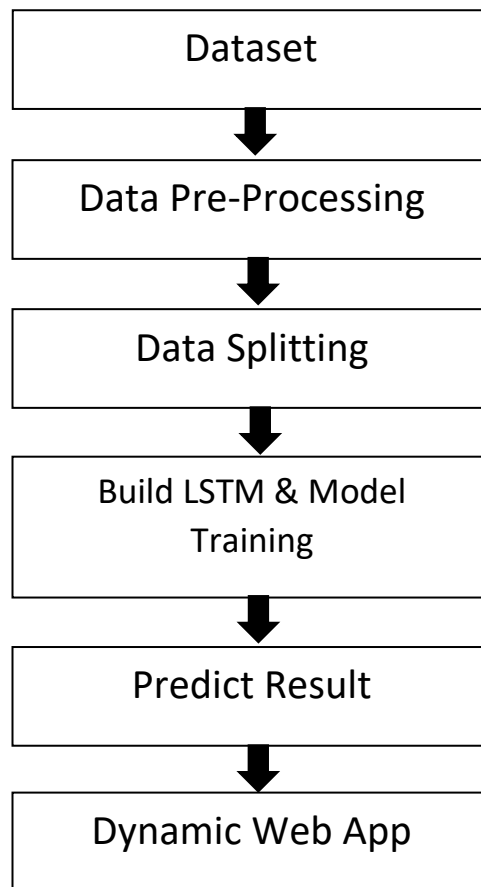
Overview:

Stock Price Prediction by Machine Learning present to estimate the stock future value and machine learning technique like LSTM (Long Short Term Memory) for existing work. This machine-learning algorithm is to perform the best predicting result of the stock future price. LSTM is capable to catching the modifications in the behaviour of the stock price for the indicated period in this proposed system.

Propose a machine learning-based normalization for stock price prediction. The dataset utilized for analysis was selected from Yahoo Finance. It consists of approximately 9 lakh records of the required Stock price and other relevant data. The data reflected the stock price at some time intervals for every day of the year. It contains various data like date, symbol, open price, close price, low price, high price and volume. Here, the data for any company can be considered. All the data was available in a file of CSV format which was first read and transformed into a data frame using the Pandas library in Python. The normalization of the data was performed through the sklearn library in Python and the data were divided into training and testing sets. The testing data set was kept as 30% of the available dataset.

This project focuses on (LSTM) Long Short Term Memory architecture. LSTM architecture is able to identify the changes in trends which show evident from the result. LSTM is identified as the best model for the proposed methodology. This shows that the proposed system is capable of identifying some interrelation within the data. In the stock market, there may not always follow the same cycle or may not always be in a regular pattern for the changes that are occurred. The period of the existence will differ and the existence of the trend is based on the companies and the sectors. For investors, this type of analysis of trends and cycles will obtain more profit. We must use networks like LSTM as they rely on the current information to analyse various information

Proposed Work / Tools and Methodology:

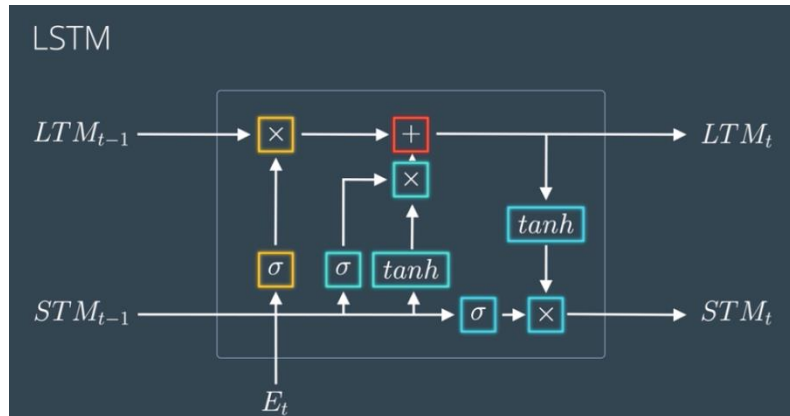


The system presented here composes of six modules:-

1. Input as Dataset (pandas, numpy)
2. Pre processing (scikit learn)
3. Data splitting
4. Build & Model train LSTM (tensorflow)
5. Output as Predicted Result (matplotlib for visualization)
6. Web app deployment for better data visualization and dynamicity (streamlit)

Attribute such as: price of open, high, low, close, adjusted close price taken from huge dataset are fed as input to the models for training to pre-process the data techniques like normalization & one hot encoding in applied on dataset. After this data is divided in two sets namely training & testing which are ratio of 80:20 respectively. Then, this set are used to train a model using 3 different approaches: LSTM, CNN and Hybrid approach of LSTM+CNNS. Finally, all these modules are evaluated using Root mean square error.

Working of LSTM model:



Long Short Term Memory is a kind of recurrent neural network. In RNN output from the last step is fed as input within the present step. It tackled the matter of long-term dependencies of RNN within which the RNN will not predict the word hold on within the long term memory however can offer additional accurate forecasts from the recent info. Because the gap length will increases RNN does not offer an economical performance. LSTM will by default retain the knowledge for a long period of time. It is used for processing, predicting and classifying on the basis of time-series data.

Structure of LSTM:

- LSTM has a chain organization that contains four neural networks and different memory blocks called cells.
- LSTM has a new structure called a memory cell. The memory cell makes the decisions about what information to store, and when to allow reading, writing and forgetting.
- A memory cell contains three main gates:
 - Input gate- a new value flows into the memory cell.
 - Forget gate- a value remains in the memory cell.
 - Output gate- value in the memory cell is used to compute the output

Applications of LSTM includes:

- Language Modelling
- Machine Translation
- Image Captioning
- Handwriting generation
- Question Answering Chatbot

Results and Conclusions:

Stock Price Predictor

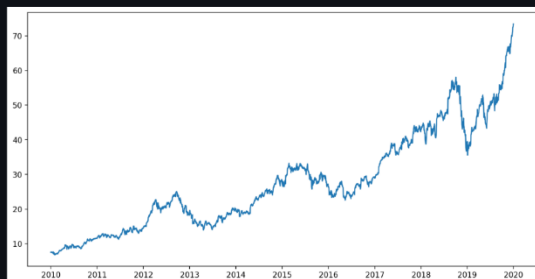
Enter Stock Ticker

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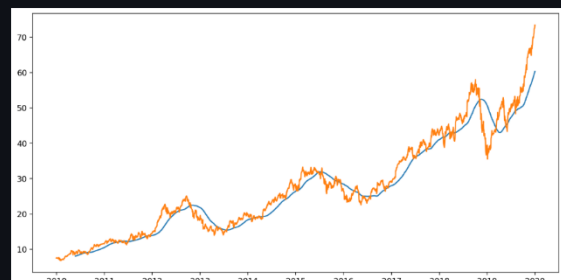
Data from 2010 to 2019

	High	Low	Open	Close	Volume	Adj Close
count	2,517.0000	2,517.0000	2,517.0000	2,517.0000	2,517.0000	2,517.0000
mean	27.8166	27.3221	27.5719	27.5784	299,614,107.4295	25.5568
std	14.1477	13.9232	14.0252	14.0461	235,235,550.4745	14.1571
min	7.0000	6.7946	6.8704	6.8589	45,448,000.0000	5.8645
25%	16.3439	16.0439	16.2350	16.1775	124,760,400.0000	14.0288
50%	25.0550	24.5925	24.7700	24.8600	222,031,600.0000	22.6389
75%	37.9575	37.2900	37.5675	37.6375	406,722,400.0000	35.8035
max	73.4925	72.3800	72.7800	73.4125	1,880,998,000.0000	72.1399

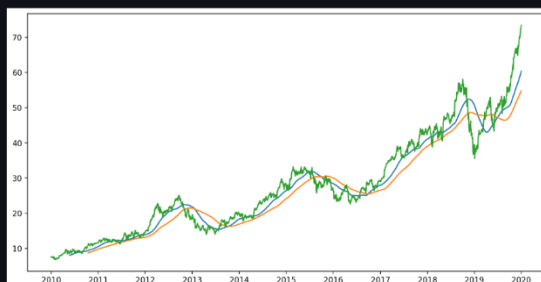
Closing Price vs Time



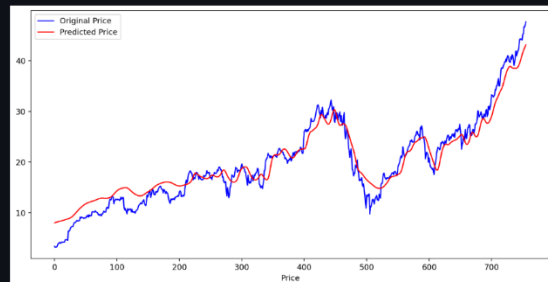
Closing Price vs Time with 100 days moving avg



Closing Price vs Time with 100 and 200 days MA



Predictions vs Original



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