

## **Mini Project Report on**

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# **STOCK PRICE VISUALIZATION AND FORECASTING**

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**Submitted in partial fulfillment of the requirement for the award of the degree of**

**BACHELOR OF TECHNOLOGY  
IN  
COMPUTER SCIENCE & ENGINEERING**

**Submitted by**

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**Professor**



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Dehradun, Uttarakhand  
January 2023**



## CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the project report entitled “**Stock Price Visualization and Forecasting**” in partial fulfillment of the requirements for the award of the Degree of Bachelor of Technology in Computer Science and Engineering of the Graphic Era (Deemed to be University), Dehradun shall be carried out by the under the mentorship of **Mrs. Meenakshi Maindola, professor**, Department of Computer Science and Engineering, Graphic Era (Deemed to be University), Dehradun.

SAMARTH AGARWAL

2017365

signature

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# Chapter 1

## Introduction

The following section includes a brief introduction about how stock market visualization and forecasting work with the problem statement.

### 1.1 Introduction

Financial markets are an example of a dynamic and composite system in which users are allowed to buy and sell currencies, stocks, equities, and derivatives over a virtual platform which in some cases are supported by brokers.

The rapid advancement in fields of artificial intelligence and machine learning techniques, availability of large-scale data, and increased computational capabilities have opened doors for developing sophisticated methods in predicting stock prices. Also, this easy access to investment opportunities has made the stock market more complex and volatile than ever before.

Stock prices are fluctuating and uncertain in nature, and there are many interconnected reasons behind such behavior. The possible cause could be the global economic data, changes in unemployment rate, monetary policies of influential nations, immigration policies, natural calamities, public health condition, government policies and many others. The primary goal for stakeholders in the stock market is to make higher profits and reduce the risk from the market evaluation. The major problem here is gathering multifaceted information, putting it together in a basket, and constructing a dependable model for prediction.

Stock price prediction is a complex and challenging task for companies, individuals, investors, and equity traders. Stock markets are noisy, non-parametric, non-linear, and deterministic chaotic systems. Which creates a challenge to predict the future price effectively and efficiently. Another important yet challenging task in stock price prediction is feature selection for which multiple approaches are available. Historically it is an observed trend that some researchers only rely on technical indicators whereas others use historical data.

The performance of the model will not be top notch if limited features are used on the other hand if multiple or all the features available in financial markets are included, the model would

be complex and difficult to interpret. In addition, model performance will be worse due to collinearity among various variables.

A proper model developed with an optimal set of attributes will be capable of predicting stock prices well and better predicting market situations.

Time series prediction is a widely used technique in many real-world applications such as weather forecasting and financial market predictions. It uses the continuous data in a specific time period to predict result in next time unit. The most common algorithm now days are based on Recurrent Neural networks.

A special type of RNN – Long short-term memory (LSTM) is used in this project along with various technical indicators like Moving average, convergence and divergence, daily closing volume are utilized for predicting stock price in this project.

## **1.2 Problem Statement**

The problem statement for motive of my research is to study various financial technical indicators and time series algorithm LSTM (Long-Short Term Memory) for predicting stock price based on historical data and develop an Machine learning model which is capable of taking a stock symbol of any company listed in SNP 500 and NSE stock exchanges and predicting the value of stock accurately and effectively and develop an interactive streamlit dashboard for the same.

## **Chapter 2**

### **Literature Survey**

Research in finance has studied how stock markets are affected by multi-source and heterogenous data in some manner. Multi-source heterogenous data means that data of stock market includes data from various sources such as stock market, foreign exchange markets, trading volumes, stock news and announcement, social media, and other unstructured data.

In particular, the efficient market hypothesis believes that information from various sources in the stock market will have impact on stock market, while behavioral finance believes that financial markets are influenced, explained and predicted based on individual behaviors of traders and motivations that produce these behaviors. These studies point out the fact that the internal mechanism of stock market is complex.

Obtaining accurate stock price effectively helps in avoiding future risk for decision makers it strengthen the control of stock market and contribute to sustainable development of the economy. Price forecast means to use various scientific methods to predict development prospects of the stock market through the regularities of the development of stock market and its history and status, depending upon a large amount of stock market information.

For decades, researchers have explored, studied and presented various forecasting methods. Reading about these methods and relevant research has certain positive significance for further research.

The first development in field of quantitative analysis is credited to two British statisticians Box and Jenkins, they developed Auto Regressive Moving Average (ARIMA) model utilizing only historic data of price and volume. ARIMA was only capable of handling stationary time series by default. Therefore, it was essential to convert nonstationary time series to stationary time series before implementation . Otherwise, performance will be abysmal. ARIMA also assumes that data has a linear relationship, which vividly raises questions about robustness of classical time series.

Multiple papers and research work are available for predicting stock prices based on ARIMA in combination with various machine learning algorithms. Some of them were considered for this project, however their accuracy and efficiency are extremely low.

Other research work includes development of Recurrent Neural Networks (RNN) to deal with various problems and intrinsic structure of stock price dataset. RNN comes out to be more suitable for sequential data modelling and time series applications such as stock market prediction, language translation, auto complete in messages/emails, and signal processing.

During the training process of RNN, the cost or error is calculated between predicted and actual values. The error is minimized by repeatedly updating network parameters (weights, biases) until the lowest possible value is attained. However problem related to vanishing gradient are persistent with RNN architechure.

LSTM a typical recurrent neural network is designed to overcome vanishing gradient problem. Memorizing information for a longer period of time is the default behaviour of LSTM. This technique of LSTM is used in the scope of this project.

## Chapter 3

### Methodology

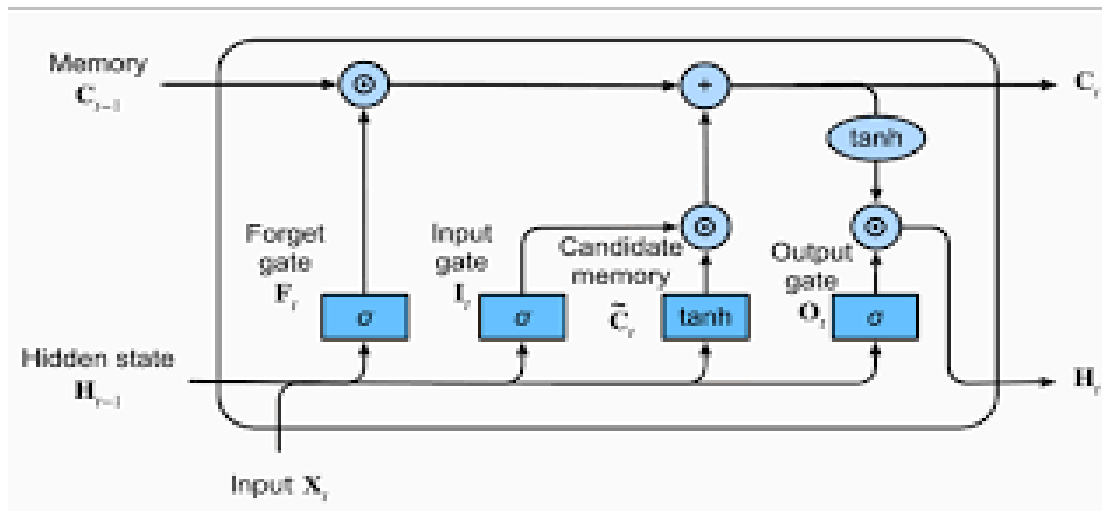
#### 3.1 LSTM MODEL

A special type of RNN, which is capable of learning long-term dependence, is called Long-Short Term Memory (LSTM). LSTM enables RNN to remember long-term input parameters. Contains information in memory, like computer memory. It can read, write, and delete information in its memory. This memory can be classified as a closed cell, with a closed description, the cell decides to store or delete information. In LSTM, there exists three gates: input, forget and exit gate. These gates determine whether new input (input gate) should be allowed, data deleted because it is not important (forget gate), or allow it to affect output at current timeline (output gate)

**1. Forget gate:** The forget gateway works to determine when certain parts of the cell will be inserted with information that is more recent. It subtracts almost 1 in parts of the cell state to be kept, and zero in values to be ignored.

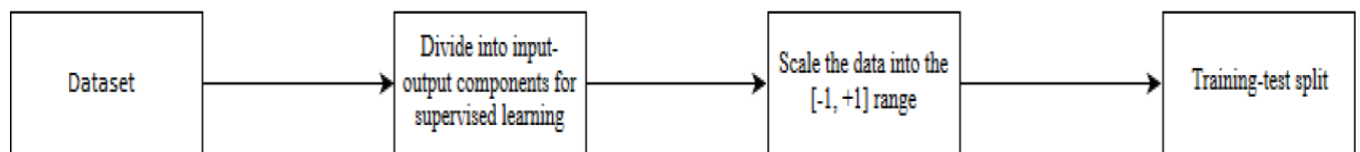
**2. Input gate :** Based on the input (e.g., previous output  $o(t-1)$ , input  $x(t)$ , and the previous state of cell  $c(t-1)$ ), this network category reads the conditions under which any information should be stored (or updated) in the state cell.

**3. Output gate:** Depending on the input mode and the cell, this component determines which information is forwarded in the next location in the network.

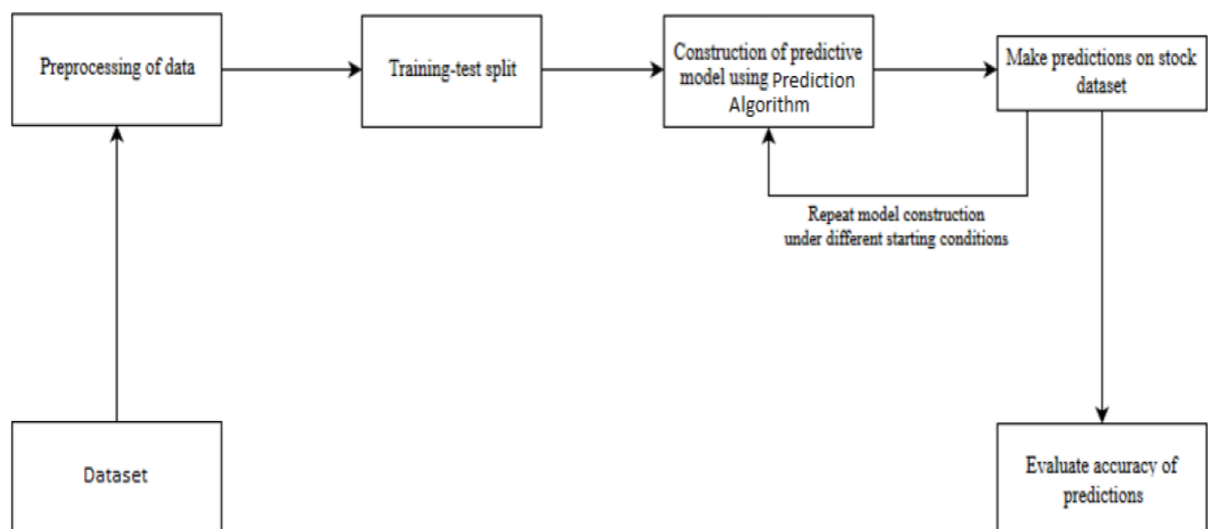


## 3.2 SYSTEM ARCHITECTURE

### 1) Pre-Processing the data



### 2) Overall architecture





## Chapter 4

### Result and Discussion

The actual price and closing price of TESLA is shown below, the model was trained in bulk sizes of 512 and 50 epochs and forecast were made remarkably similar to actual stock price.

## Stock Trend Prediction

Enter the start Date:

2010/05/17

Enter the End Date:

2023/01/04

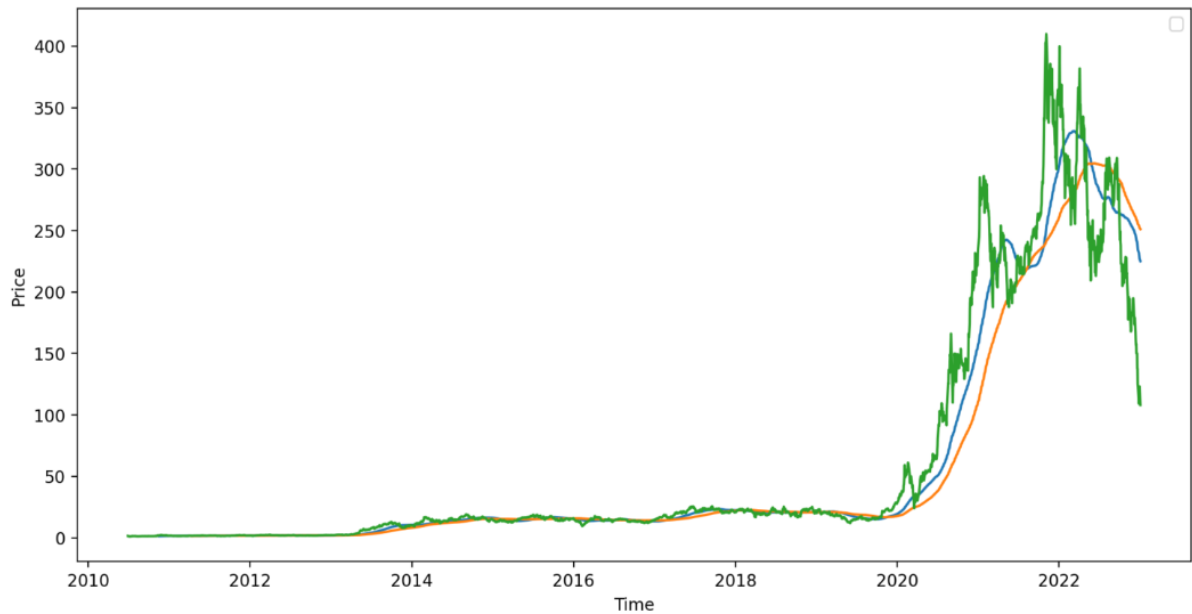
Enter the Stock Ticker

TSLA

## Data From 2010 - 2023

	Open	High	Low	Close	Adj Close	Volume
count	3,151.0000	3,151.0000	3,151.0000	3,151.0000	3,151.0000	3,151.0000
mean	58.8795	60.1953	57.4180	58.8231	58.8231	93,639,883.6242
std	95.6493	97.8446	93.1643	95.5153	95.5153	81,721,950.1485
min	1.0760	1.1087	0.9987	1.0533	1.0533	1,777,500.0000
25%	8.9797	9.1337	8.7680	8.9633	8.9633	42,351,150.0000
50%	16.2387	16.4953	15.9480	16.2327	16.2327	76,005,000.0000
75%	24.6443	25.1033	24.1673	24.5520	24.5520	117,384,000.0000
max	411.4700	414.4967	405.6667	409.9700	409.9700	914,082,000.0000

## Closing Price vs Time chart with 100MA & 200MA



## Predictions VS Original



The actual price and closing price of TESLA is shown below, the model was trained in bulk sizes of 512 and 50 epochs and forecast were made remarkably similar to actual stock price.

# Stock Trend Prediction

Enter the start Date:

2010/05/17

Enter the End Date:

2023/01/04

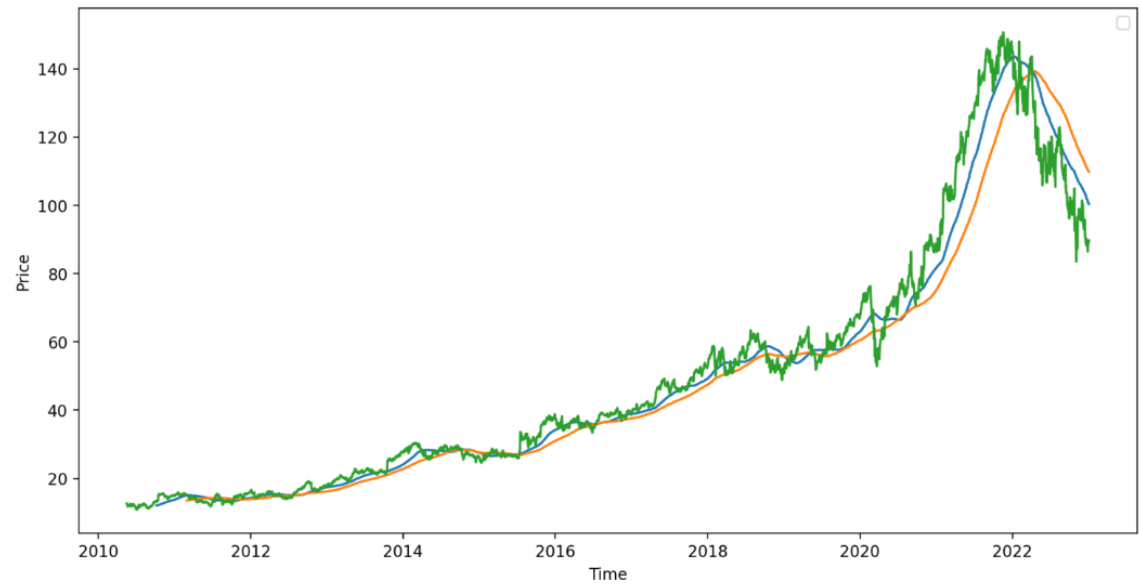
Enter the Stock Ticker

GOOG

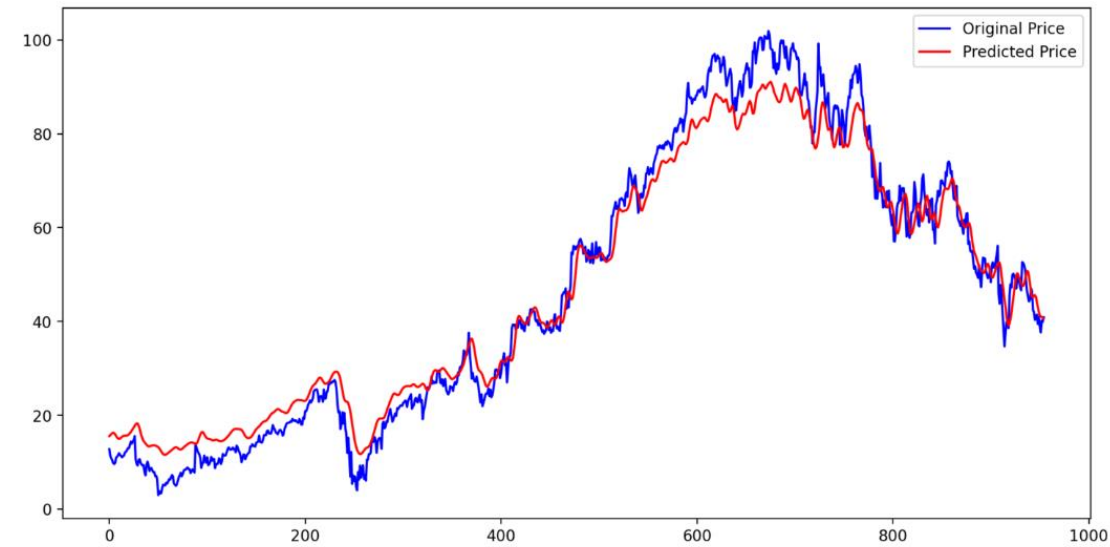
## Data From 2010 - 2023

	Open	High	Low	Close	Adj Close	Volume
count	3,181.0000	3,181.0000	3,181.0000	3,181.0000	3,181.0000	3,181.0000
mean	50.0100	50.5154	49.5121	50.0206	50.0206	55,198,641.3681
std	36.1860	36.6049	35.7797	36.1887	36.1887	47,721,328.7673
min	10.9168	11.0157	10.8003	10.8610	10.8610	158,434.0000
25%	21.8880	22.0349	21.7684	21.9074	21.9074	25,858,801.0000
50%	38.5035	38.7270	38.2690	38.4770	38.4770	36,488,000.0000
75%	62.1505	62.7380	61.7305	62.2745	62.2745	74,233,205.0000
max	151.8635	152.1000	149.8875	150.7090	150.7090	595,214,680.0000

# Closing Price vs Time chart with 100MA & 200MA



# Predictions VS Original



## Chapter 5

### Conclusion and Future Work

Stock investing has attracted the interest of many investors around the world Over the years. However, making a decision regarding the future prospects of a stock is a difficult task as many factors are involved. even the slightest improvement in performance of prediction of stock value can be enormous. A good forecasting system can help investors in making their investments more accurate and more profitable by providing supporting information such as future stock price guidance. In addition to historical prices as parameters, other related information could affect prices such as politics, economic growth, financial matters and the atmosphere on social media about the particular company. Numerous studies have proven that emotional analysis has a significant impact on future prices. Therefore, the combination of technical and basic analysis can produce exceptionally good predictions.

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