

# Stock Price Predictor

CSE 523 Machine Learning - Group-8

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**Abstract** - Stock Market Prices are usually highly volatile, affected by multiple factors stemming from internal company matters/decisions or external market forces and overall investors' sentiments. With the introduction of technological breakthroughs such as global digitalization, stock market forecasting has entered a technologically enhanced era, reviving the traditional trading methodology. The application of advanced Machine Learning techniques has improved the prediction accuracy of stock prices. However, due to non-linear, irregular, and chaotic data, stock market analysis and prediction remain one of the most challenging research areas. This study describes the stock price prediction on the basis of machine learning algorithms. The data of the companies 'Vodafone-Idea Limited, 'Axis Bank' and 'Asian paints LTD' of the year 2015-2020 has been critically analyzed. Furthermore, the models were evaluated on the basis of RMSE values.

**Keywords** - Machine Learning, Linear Regression, Validation Set, Test Set, Moving Average, RMSE-Root mean square error, Stock Market prediction

## I. INTRODUCTION

Stock market prices are characterized as non-linear, dynamic, and irregular in nature. The prediction of stock prices is a challenging task as it does not depend on fixed variables. Multiple factors affect the ups-downs of stock prices such as risks, demand, and supply at a point of time, companies' earnings and profits, investor's sentiments, etc. [1] To maximize the profit and minimize the loss, Stock market Prediction examines previous data and estimates future data. In the financial sector, machine learning (ML) has been widely used to provide a new mechanism that can help investors to make better investments. Machine learning is commonly used in stock market prediction; while it does not provide an exact result, it can anticipate the value.[2] Till

Now, We focus on the two ways in this project: Moving Average and Linear Regression.

## II. Literature survey

The set of articles include studies that fundamentally focus on machine learning algorithms for stock market prediction. These machine learning techniques include linear regression, Auto-Regressive Integrated Moving average, Prophet, etc. Moreover, some statistical formulas for evaluating the models have also been studied. Enke and Thawornwong (2005) investigated the predictive relationships for a variety of financial and economic factors using a machine learning data retrieval technique. By analyzing the gained information from each model, only significant variables should be selected to keep in the forecasting models.

## III. Implementation

### A. Description of data:

The historical data of three companies- 'Vodafone-Idea Limited, 'Axis Bank' and 'Asian Paints', has been collected from the money control website.[3] The data set includes 5-year data from January 2015 to January 2020 of the above companies. This data is in tabular form and contains information regarding the variables such as High, Low, Open, Close, Adjacent close, and Volume. However, only the closing price of the stocks has been used for the prediction.

	DATA SET	TRAINING DATA SET	TEST DATASET
TIME INTERVAL	01/01/2015-01/01/2020	01/01/2015-01/01/2019	01/01/2019-01/01/2020

Table 1. Statistics of the dataset

### B. Implementing Linear Regression Model:

Linear Regression, one of the most simple approaches, can be used to predict any continuous variable, including stock price predictions. As the name implies, linear regression is a linear technique that identifies the linear combination of X factors that are used to predict the Y variable (closing price).

$$Y = \Theta_1 * x_1 + \Theta_2 * x_2 + \Theta_3 * x_3 + \dots + \Theta_n * x_n$$

Here, days of the week are taken as independent variables i.e.  $x_1, x_2, x_3, \dots, x_n$

### C. Implementing Moving Average Model:

Simple moving average model is a smoothing method based on the concept of averaging random fluctuations in the time series to identify the underlying direction in which the time series is changing. Here  $A_t$  is the observed value in period t and  $F_t$  is predicted for period t.

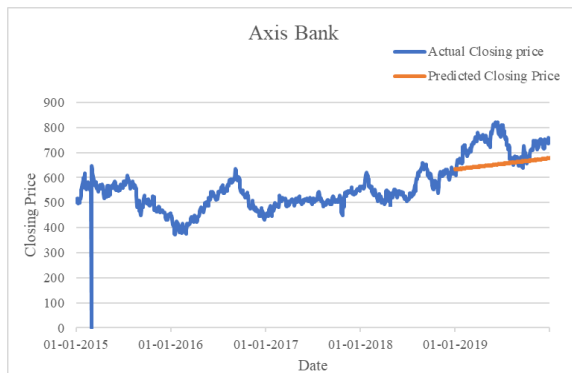
$$F_{t+1} = \frac{A_t + A_{t-1} + \dots + A_{t-k+1}}{k}$$

## IV. Results

### A. Linear Regression:

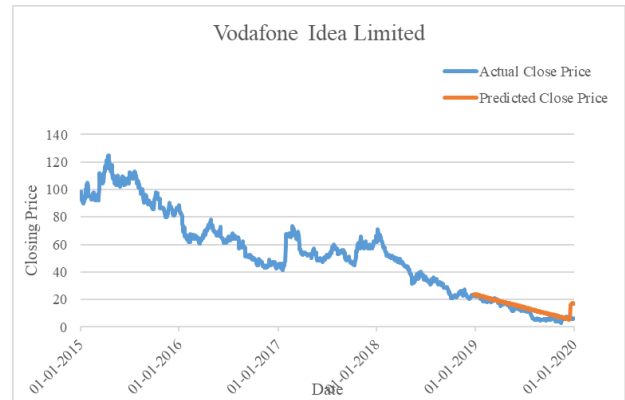
#### 1. Axis Bank:

RMSE Value-84.5568



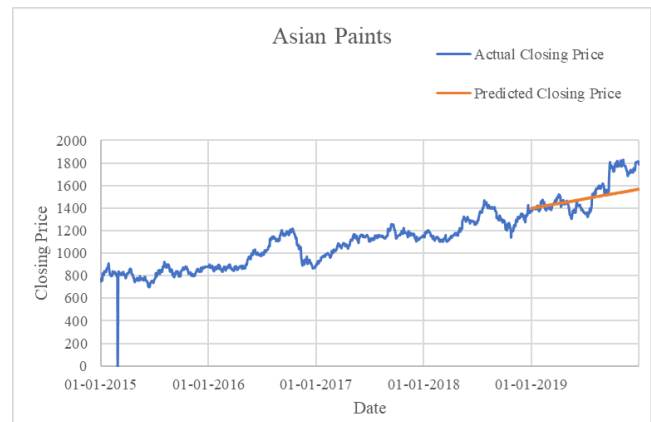
#### 2. Vodafone-Idea:

RMSE Value - 3.77067



#### 3. Asian Paints:

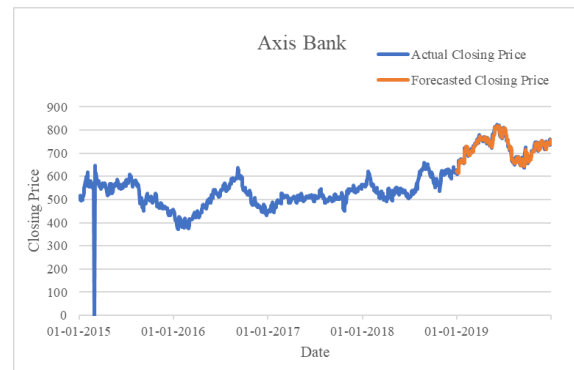
RMSE Value - 84.5568



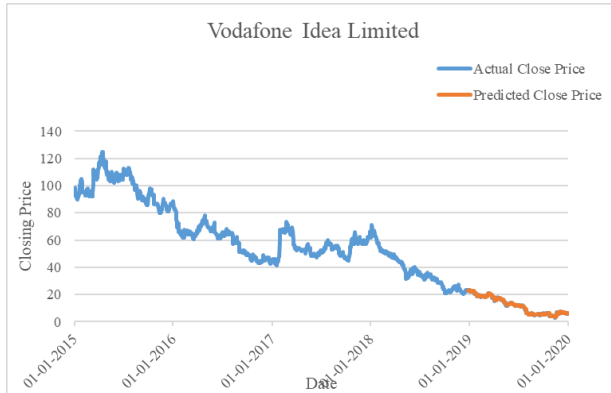
### B. Moving Average Models:

#### 1. Axis Bank:

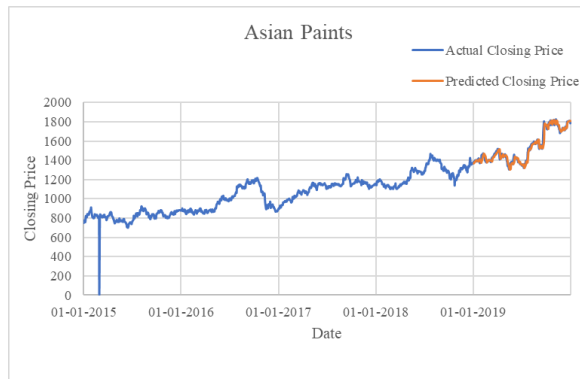
RMSE Value-13.25673



## 2. **Vodafone-Idea:** RMSE Value - 0.591515



## 3. **Asian Paints:** RMSE Value - 25.3334



## V. **CONCLUSION**

The RMSE value of Vodafone Idea company for Linear Regression Model is very less, and therefore this model seems to be good for the company. However, the closing price of Vodafone Idea Limited company is following a constant decreasing trend and does not have irregularity in it. Therefore, we have tried the Linear Regression model for the companies having high fluctuations and irregularity; Asian Paints and Axis Bank. However, we can not conclude the same as above in these companies. RMSE values of these companies are quite high which means the Linear Regression model has performed very poorly. This model overfits the date and month column. Rather than considering the previous values from the point of prediction, the model considered the value from the same date in the previous month or a year ago. Hence, the Linear Regression model is not a good model for our data set. Furthermore, we have tried another approach i.e. moving average. Moving average of period two is used further to predict the closing price. The RMSE values of Companies for moving average models are lower than linear regression models and therefore, we can say that our model is performing better. However, there is

still need to be accuracy in predicted prices and hence a better model is to be required for the same.

## VI. **REFERENCES**

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