

APPLE Stock Price Prediction

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BACHELOR OF TECHNOLOGY

in

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CERTIFICATE

This is to certify that project entitled “**APPLE Stock Price Prediction**” is the bonafied work carried out by **Ganesh, Shiva Teja, Jayavardhan reddy** as a Course Project for the partial fulfillment to award the degree **BACHELOR OF TECHNOLOGY** in **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING** during the academic year 2022-2023 under our guidance and Supervision.

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ABSTRACT

Stock market prediction is the act of trying to determine the future value of a company stock or other financial instrument traded on an exchange.

The successful prediction of a stock's future price could yield significant profit. Stock Market prediction refers to the process of understanding various aspects of the stock market that can influence the price of a stock and based on these potential factors building a model to predict the price of the stock.

The Stock-Forecasting software predicts stock prices, generates trading "Buy-Hold-Sell" signals, computes the most profitable company to invest in and analyzes the accuracy of predictions. Today, we have a number of indicators to help predict market trends. However, we have to look no further than a high-powered computer to find the most accurate indicators for the stock market. The stock market is an open system, and it can be viewed as a complex network.

The network is made up of the relationships between the stocks, companies, investors and trade volumes. By using a data-mining algorithm like the support vector machine, you can apply a mathematical formula to extract the relationships among these variables. The stock market is now beyond human prediction.

The technical and fundamental or the time series analysis is used by the most of the stockbrokers while making the stock predictions. The programming language is used to predict the stock market using machine learning is Python. In this paper we propose a Machine Learning (ML) approach that will be trained from the available stocks data and gain intelligence and then uses the acquired knowledge for an accurate prediction. The paper focuses on the use of Linear Regression, Moving Average, K-Nearest Neighbours, Auto ARIMA, Prophet, and LSTM based Machine learning techniques to predict stock values. Factors considered are open, close, low, high and volume. The models are evaluated using standard strategic indicators: RMSE and MAPE. The low values of these two indicators show that the models are efficient in predicting stock closing price.

Table of Contents

Chapter No.	Title	Page No.
1.	Introduction	
	1.1. Overview	1
	1.2. Problem Statement	2
	1.3. Existing system	3
	1.4. Proposed system	3
	1.5. Objectives	3
	1.6. Architecture	3
2.	Literature survey	
	2.1.1. Document the survey done by you	4
3.	Data pre-processing	
	1.1. Dataset description	5
	1.2. Data cleaning	7
	1.3. Data augmentation	7
	1.4. Data Visualization	7
4.	Methodology	
	1.1. Procedure to solve the given problem	8
	1.2. Model architecture	8
	1.3. Software description	9
5.	Results and discussion	9
6.	Conclusion and future scope	10
7.	References	11

CHAPTER 1

INTRODUCTION

1.1 OVERVIEW:

Prediction and analysis of the stock market are some of the most complicated tasks to do. There are several reasons for this, such as the market volatility and so many other dependent and independent factors for deciding the value of a particular stock in the market. These factors make it very difficult for any stock market analyst to predict the rise and fall with high accuracy degrees.

Stock Market prediction refers to understanding various aspects of the stock market that can influence the price of a stock and, based on these potential factors, build a model to predict the stock's price. This can help individuals and institutions speculate on the stock price trend and help them decide whether to buy or short the stock price to maximize their profit.

However, with the advent of Machine Learning and its robust algorithms, the latest market analysis and Stock Market Prediction developments have started incorporating such techniques in understanding the stock market data.

In short, Machine Learning Algorithms are being used widely by many organisations in analysing and predicting stock values. This article shall go through a simple Implementation of analysing and predicting a Popular Worldwide Online Retail Store's stock values using several Machine Learning Algorithms in Python.

- Stock market prediction is the act of trying to determine the future value of a company stock or other financial instrument traded on an exchange.
- The successful prediction of a stock's future price could yield significant profit.
- Stock Market prediction refers to the process of understanding various aspects of the stock market that can influence the price of a stock and based on these potential factors building a model to predict the price of the stock.
- The Stock-Forecasting software predicts stock prices, generates trading "Buy-Hold-Sell" signals, computes the most profitable company to invest in and analyzes the accuracy of predictions.

1.2 PROBLEM STATEMENT:

With an understanding of what stock and the stock market is, let's understand why people fascinate by a Machine Learning model that can predict the stock price.

A Machine Learning model predicts the value of an observation based on several inputs that are predictors. The stock market is working similarly, i.e., based on several inputs, the stock price fluctuates.

We'll dive into the implementation part of this article soon, but first it's important to establish what we're aiming to solve. Broadly, stock market analysis is divided into two parts – Fundamental Analysis and Technical Analysis.

- Fundamental Analysis involves analyzing the company's future profitability on the basis of its current business environment and financial performance.
 - Technical Analysis, on the other hand, includes reading the charts and using statistical figures to identify the trends in the stock market.
1. To determine the future value of a company stock or other financial instrument traded on an exchange.
 2. In the current emerging competitive market, predicting the stock returns as well as the company's financial status in advance will provide more benefits for the investors in order to invest confidently.
 3. Forecasting and predicting the trends of market.
 4. To help the investors to understand when and what stocks can be purchased for the growth of their investment.

1.3 PROPOSED SYSTEM:

Stock is unpredictable and liberal in nature. The follow of the same is impressive and reluctant in nature. Finding the predictability and getting the nearest is the best hit goal for the same. The exact and accurate estimation of the same is never-less possible. There are various constraints that in-fluctuate the pricing and the rate of stock. Those constraints had to be taken in consideration before jumping to the conclusion and report derivation.

The predicted closing price for each day will be the average of a set of previously observed values. Instead of using the simple average, we will be using the moving average technique which uses the latest set of values for each prediction. In other words, for each subsequent step, the predicted values are taken into consideration while removing the oldest observed value from the set.

1.4 OBJECTIVES:

The objective of this project is to discover the pattern to decrease the machine failure. This project will enable us to formulate machine learning problems corresponding to these specific machines.

It helps us optimize the machine learning models and report on expected accuracy by applying few methodologies such as linear regression and logistic regression.

1.5 ARCHITECTURE:

The architecture of this machine learning model is “SUPERVISED LEARNING” and the process involved is data acquisition, data processing, data modelling and execution (parameter tuning and making predictions). The supervised can be further broadened into regression analysis based on output criteria.

CHAPTER 2

LITERATURE SURVEY

In the finance world stock trading is one of the most important activities. Stock market prediction is an act of trying to determine the future value of a stock other financial instrument traded on a financial exchange. This paper explains the prediction of a stock using Machine Learning. The technical and fundamental or the time series analysis is used by the most of the stockbrokers while making the stock predictions. The programming language is used to predict the stock market using machine learning is Python.

In this paper we propose a Machine Learning (ML) approach that will be trained from the available stocks data and gain intelligence and then uses the acquired knowledge for an accurate prediction. In this context this study uses a machine learning technique called Support Vector Machine (SVM) to predict stock prices for the large and small capitalizations and in the three different markets, employing prices with both daily and up-to-the-minute frequencies.

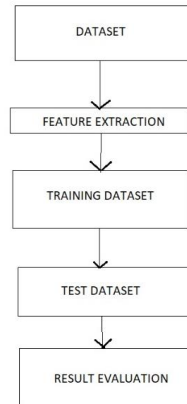
In this work, we propose an automated trading system that integrates mathematical functions, machine learning, and other external factors such as news' sentiments for the purpose of achieving better stock prediction accuracy and issuing profitable trades. Particularly, we aim to determine the price or the trend of a certain stock for the coming end-of-day considering the first several trading hours of the day.

To achieve this goal, we trained traditional machine learning algorithms and created/trained multiple deep learning models taking into consideration the importance of the relevant news. Various experiments were conducted, the highest accuracy (82.91%) of which was achieved using SVM for Apple Inc. (AAPL) stock.

CHAPTER 3

DATA PRE-PROCESSING

1.1 FLOW CHART:



This analysis uses different types of machine learning models.

It predicts from the given data.

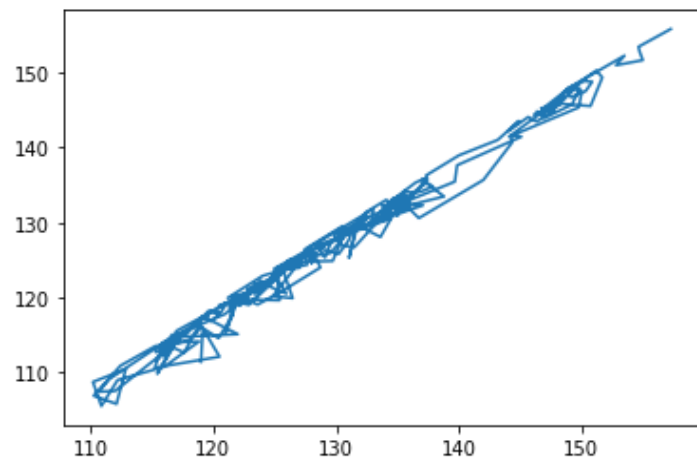
1.2 DATA SET DESCRPTION:

For this project, we have obtained my dataset from Kaggle. This dataset contains 2519 rows of data and 5 columns(features)that we could focus onto build our prediction model i.e., we use 7 attributes to predict the stock.

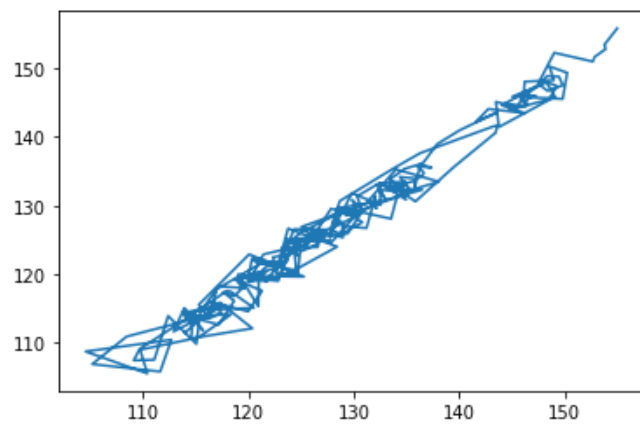
DATA SET:

	A	B	C	D	E	F	G
1	Date	Open	High	Low	Close	Adj Close	Volume
2	9/8/2020	113.95	118.99	112.68	112.82	111.4744	2.31E+08
3	9/9/2020	117.26	119.14	115.26	117.32	115.9207	1.77E+08
4	9/10/2020	120.36	120.5	112.5	113.49	112.1364	1.82E+08
5	9/11/2020	114.57	115.23	110	112	110.6641	1.81E+08
6	9/14/2020	114.72	115.93	112.8	115.36	113.984	1.4E+08
7	9/15/2020	118.33	118.83	113.61	115.54	114.1619	1.85E+08
8	9/16/2020	115.23	116	112.04	112.13	110.7926	1.55E+08
9	9/17/2020	109.72	112.2	108.71	110.34	109.0239	1.78E+08
10	9/18/2020	110.4	110.88	106.09	106.84	105.5657	2.87E+08
11	9/21/2020	104.54	110.19	103.1	110.08	108.767	1.96E+08
12	9/22/2020	112.68	112.86	109.16	111.81	110.4764	1.83E+08
13	9/23/2020	111.62	112.11	106.77	107.12	105.8423	1.51E+08
14	9/24/2020	105.17	110.25	105	108.22	106.9292	1.68E+08
15	9/25/2020	108.43	112.44	107.67	112.28	110.9408	1.5E+08
16	9/28/2020	115.01	115.32	112.78	114.96	113.5888	1.38E+08
17	9/29/2020	114.55	115.31	113.57	114.09	112.7292	99382200
18	9/30/2020	113.79	117.26	113.62	115.81	114.4287	1.43E+08
19	10/1/2020	117.64	117.72	115.83	116.79	115.397	1.16E+08
20	10/2/2020	112.89	115.37	112.22	113.02	111.672	1.45E+08

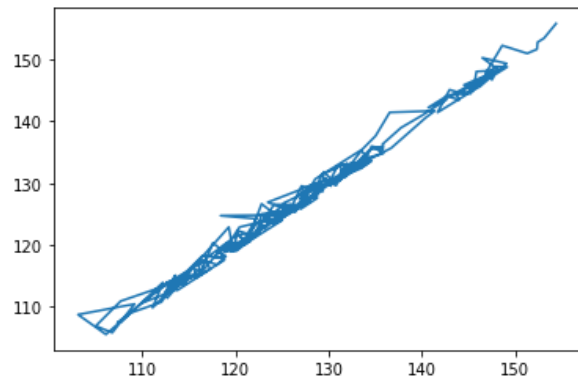
GRAPHS



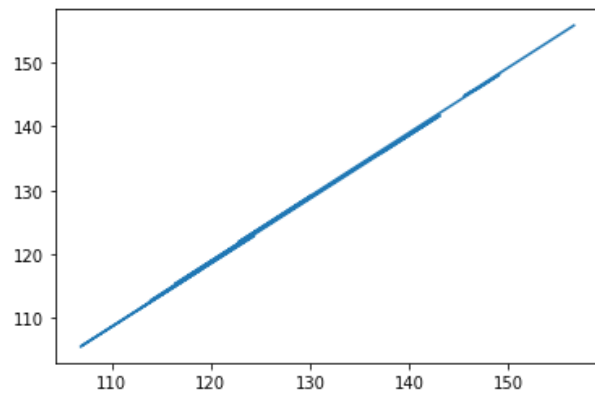
X=High ,Y =Adj close



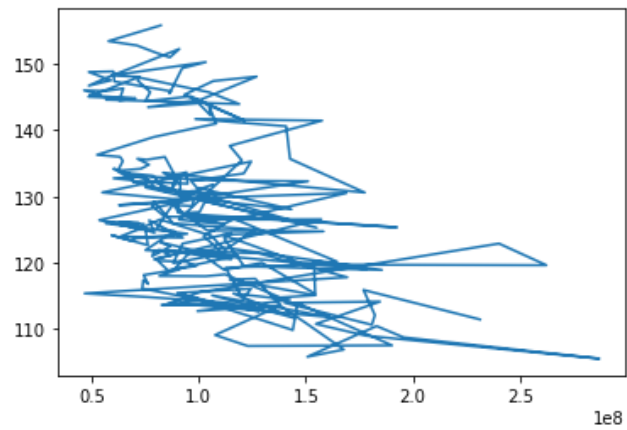
X=Open ,Y =Adj close



X=Low ,Y =Adj close



X=Close ,Y =Adj close



X=Volume ,Y =Adj close

DATA CLEANING

DATA PREPROCESSING:

Data preprocessing is required tasks for cleaning the data and making it suitable for a machine learning model which also increases the accuracy and efficiency of a machine model. In this particular section we re-label & convert some categorial features into numeric values. This is crucial for training machine learning models since machine learning models accepts the numeric values. We have a total of 2519 rows and 5 columns(attributes) in the dataset .

Enough methods are performed on the data evaluate the data a set and gather knowledge about the data. Let's perform some Machine Learning model and Experimentation to create a model that helps us to achieve our goal we state in the problem definition.

METHODOLOGY:

This section talks about the algorithms used for the project. We are used algorithm logistic regression and lasso.

LINEAR REGRESSION:

- ✓ One of the most straightforward techniques, Linear Regression, can be used to predict any continuous values, including the predictions of the stock price.
- ✓ Linear Regression, as the name suggests, is a linear technique, i.e., it finds the linear combination of the X variables that are used to predict the Y variable (the stock price in this case).
- ✓ The major advantage of this method is that it is high in interpretability as the user can know which factor influences the price of stock more and by how much.
- ✓ The disadvantage includes that it is highly limited in its scope. Many predictors cannot be used, which is required to solve the stock price prediction problem.

Machine Learning-based packages such as sci-kit learn to allow the user to use Linear Regression in a Machine Learning framework. Some libraries in R also allow the same, but

the disadvantage persists.

LINEAR REGRSSION CODE:

```
y = data['Adj Close']
x=data['Close']
n = len(data)
yp=[]
def mse(b0,b1):
    for i in range (0,n):
        y_bar =(b1*x[i])+b0
        dif =(y[i]-y_bar)**2
        yp.append(dif)
    ypp=np.array(yp)
    MSE = np.mean(ypp)
    print("The Mean Square Error for b0=",b0,"b1=", b1,"is: ",MSE)
for i in range(0,100):
    mse(i,i+1)
```

RIDGE REGRESSION CODE:

```
from sklearn.linear_model import Ridge
Ridge_reg=linear_model.Ridge(alpha=50,max_iter=100,tol=0.1)
Ridge_reg.fit(x_train,y_train)
trainr_prediction=Ridge_reg.predict(x_train)
error_scorer=metrics.r2_score(y_train,trainr_prediction)
print(error_scorer)
ff=Ridge_reg.score(x_train,y_train)

ll=Ridge_reg.score(x_test,y_test)
```

LASSO REGRESSION CODE:

```
from sklearn import linear_model
lasso_reg=linear_model.Lasso(alpha=50,max_iter=100,tol=0.1)
lasso_reg.fit(x_train,y_train)

j=lasso_reg.score(x_test,y_test)
trainl_prediction=lasso_reg.predict(x_train)
error2_score=metrics.r2_score(y_train,trainl_prediction)
print(error2_score)

jj=lasso_reg.score(x_train,y_train)
```

MEAN SQUIRE ERROR CODE:

```
y = data['Adj Close']
x=data['Close']
n = len(data)
yp=[]
def mse(b0,b1):
    for i in range (0,n):
        y_bar =(b1*x[i])+b0
        dif =(y[i]-y_bar)**2
        yp.append(dif)
    ypp=np.array(yp)
    MSE = np.mean(ypp)
    print("The Mean Square Error for b0=",b0,"b1=", b1,"is: ",MSE)
for i in range(0,100):
    mse(i,i+1)
```

1.3 Software description:

REQUIREMENTS(S/W&H/W)

HARDWARE REQUIREMENT:

System	: Intel core i3,i5,i7 and 2ghz minimum
RAM	: 4gb or above
Hard disk	: 10GB OR above
Input	: keyboard and mouse
Output	: monitor or pc

SOFTWARE REQUIREMENTS:

OS	: windows 8 or higher version
Platform	: jupyter notebook,google colab
Program language	: python

CONCLUSION:

Stock Market are the best alternative for business to grow and it's a side way income for the individuals who are ready to invest and earn from the same. The term stock had been in picture ever since and it's growing in bulk every day. There are thousands of investors investing on the same and making the fortune out of it. The project can be further continued to gain the effectiveness of the prediction with addition implementations of the content that can involve real time scenario and the way of executing and processing the real time scenario.

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3. www.kaggle.com