IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 9, Issue 5, May 2020

Stock Market Analysis and Prediction

Mudit Sharma[1], Rahul Das[2], Bhwesh Gaur[3], Priyanka Dodeja[4], Ankit Bansal[5]

B.E. Final Year Student, Computer Science and Engineering, Government Engineering College, Bilaspur, India[1-5]

Abstract: Stock market, a notorious very dynamic place where every unprecedented event makes profit and losses in huge scale. This very project aims to predict the ups and downs in market with intraday or holding shares, providing user with insights as per the last 10 years of data visualized and analyzed for a company. We have used very famous Monte-Carlo method to fit the random nature of market into our simulations which mimics the market randomness for best fit result i.e. closing price prediction of company's stock in a market day. The visualizations of data are done using python libraries which produces heat maps, bar graphs, continuous graphs for last 10 years of data and helps in proper study of market behavior for particular day under study.

Keywords: Closing Price, Intraday, Market Prediction, Monte-Carlo, Stock Analysis, Stock loss, Share Market, Stock Prediction, Stock Profit.

I. INTRODUCTION

Market forces are what results in the stock prices change when the demand for buying the stock is high, then by default supplying it makes the prices higher. Equally, if the supply of the stock is higher than the demand, the prices are likely to fall, the daily price change will be the change of the security from the initial exchange day's close to the present day's end. The daily return of the stock depends on the company's earnings and the profitability from producing, selling of goods, services delivery income, and the history in the market pertaining to chart patterns and behavioral factors of traders and investors. The inevitability of the stock market from the research is that stocks are volatile, and they can vary in price tremendously. Following are the modules which are executed simultaneously for prediction:

A. Analysis of Past 10 years of Stock prices:
- Importing the required libraries (seaborn, pandas, datareader)
- Fetching data using yahoo finance API.
- Visualization using graphs and heat maps
- Moving average details analysis
- Daily returns on basis of closing value till date.
- Using Join plot, we visualize the daily returns (regression, scatter, hexagonal)
- Correlation between performance intended investment shares.

B. Quantile Method Risk Analysis:
- Value predication for risk amount of total investment.

C. Monte-Carlo Simulation:
- Zeroes formation to stimulate shock and drift in values.
- Expected profit or loses are simulated for stock prices under study, by graph of Monte-Carlo.
- 99% of values predicted will lie under will always be true, while 1% of chances remain non quantitative on sentimental grounds of market.

II. LITERATURE REVIEW

When investing, there is too much risk in going for the only particular stock, according to some financial experts. Returns are not guaranteed in making money at a specific point in time; neither is their assurance that the company will pay the dividends or rather if it will stay in business. Stock prices change often, so if the investment is not for a long time, then the chances of losing more money are high. Hence investing in a stock is risky. Modern portfolio theory emphasizes on making the most of the returns with no more risk. Diversification is encouraged since one can demand stocks that have a low correlation to each other to balance between when one stock goes down, others are up.
To analyse the stock market predictions, one cannot consider stock volatility daily, to know the price change, the return of stocks, and the correlation between the different stocks also, the monthly, quarterly and yearly records are reviewed. Standard deviation is one of the measures used to determine the stock volatility on how widely the prices have varied

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 9, Issue 5, May 2020

from its past average price with more changes in results, which leads to higher historical volatility. Beta measures the stock performance by comparing it to the overall stock market. A beta of 1.0 indicates that a stock has not been constant but rather going up and down in the stock market, and a beta of less than 0.0 indicates that the stock is moving opposite to the index. The timeframe for the data used reflects the last ten (10) years, and the company name is TESLA. On Monte Carlo, a variable that is called "stdev" is created which is assigned the standard deviation of the log returns. In these cases, Brownian motion will be used and comprising the totality of the drift and variance adjusted by "E" raised to the power of "R".

Once the coding has been done, the daily returns will be calculated as all the infrastructure will be in place. To predict future stock prices using Monte Carlo, the following should be considered: having the possible input, which is the previous average price records, and in our case is the average of TESLA in the past ten years, then generate random values from the probability distribution. Analyse the generated values then draw a conclusion from the values by attempting the model of the behaviour of the stock. Future predictions are gained by running numerous simulations and creating random price curves. Research shows that stock market prices follow a random walk hence the conclusion that using random values from the previous records work very effectively.

III. ARCHITECTURE AND WORKING

Data Analysis: After the necessary imports are completed, plotting closing values of intended stocks give following graph (Fig. 1), this gives a fair idea about the closing price we expect on a range of past few months. Giving us the probability of profit or loss as per the intended stock price.

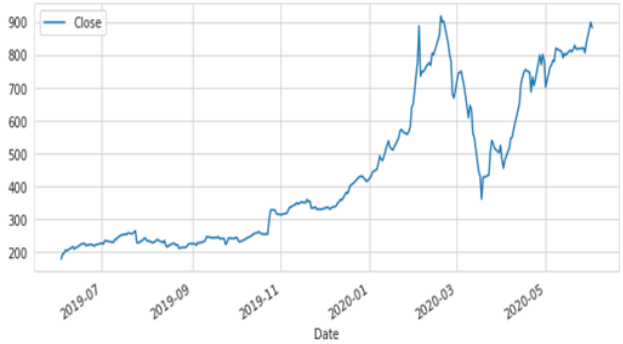

Fig. 1 Closing Price Graph (TSLA)

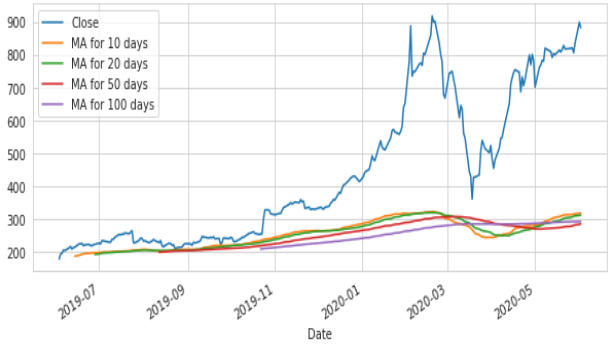

Fig. 2 Moving Average & Closing value

Moving Average: After locking the choices to inspect, we find the rolling mean and moving average over the closing values with 10, 20, 50 & 100 days of market performance for locked choices, this gives us the closest simulation path over the past trends, general trend shows 100 days moving average most of the time closely follows the closing price curve. (Fig. 2)

Return Analysis (Daily basis):

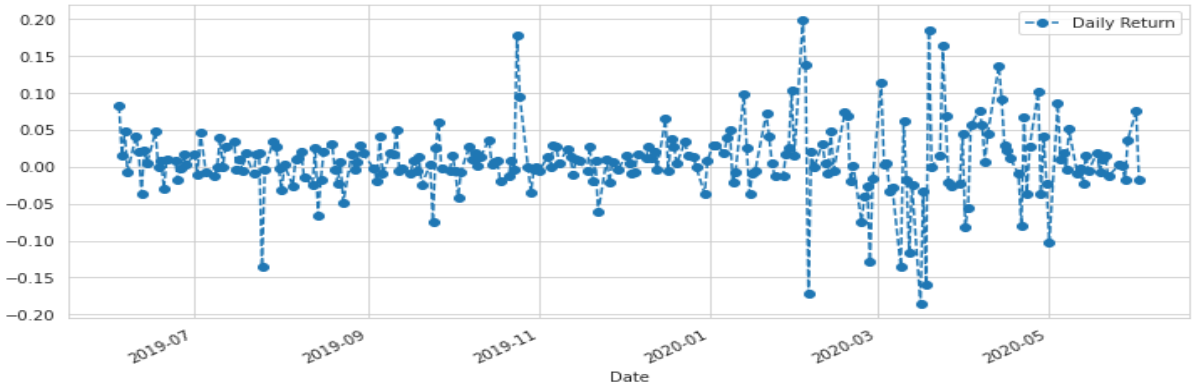

Fig. 3 Fluctuations in Closing Value

The fluctuations in closing values, if violent then it's a high-risk stock option to invest in, but if other way round means a relatively safer option. (Fig 3) Next we select the portfolio options and correlate them with Pearson Correlation Coefficient, this tells us about the relative performance of two or more stock options, as market is always up in some

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 9, Issue 5, May 2020

domains and down in some, for efficient risk management its necessary to invest in highly correlated positive trend showing options and sell the negative coefficient loss making options to lower the losses incurred, We start plotting by correlation plot of two options in portfolio and then with all the options in portfolio then study the correlation, if found to be scattered then the options are highly non-correlated and a perfect straight line shows very high correlation. (Fig 4 & Fig 5)

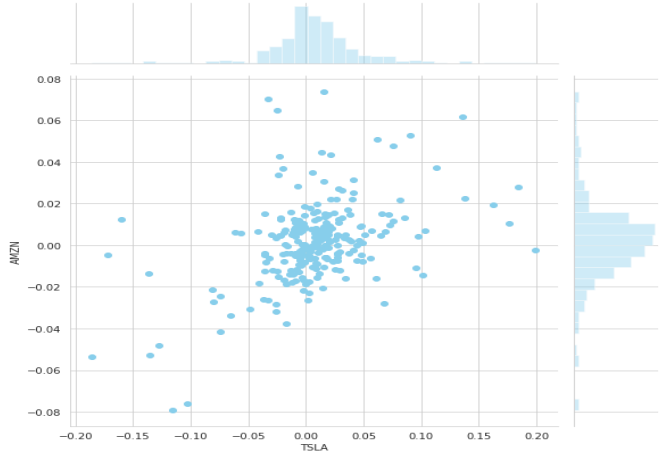

Fig. 4 Loosely correlated

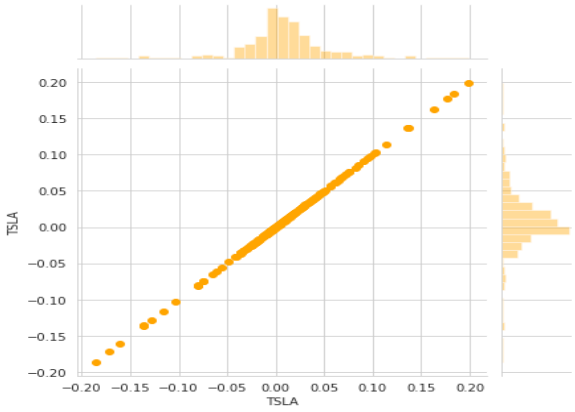

Fig. 5 Strongly Correlated

Following the above steps again we plot correlation between all the portfolio options and finally the heat map which states the correlation numerically, where closer to value 1 shows high correlation farther from same shows low correlation. (Fig 6 and Fig 7)

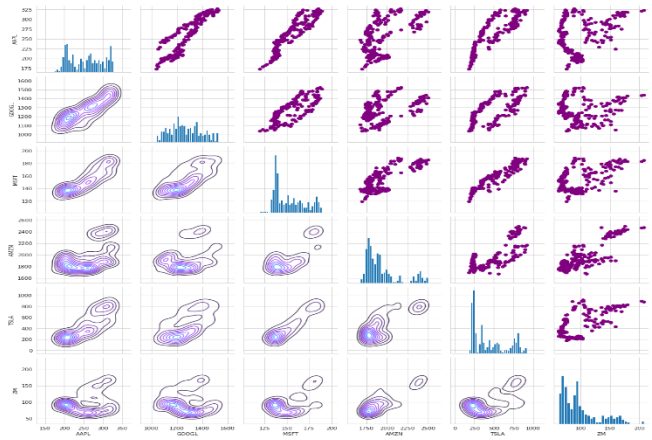

FIG. 6 CORRELATION BETWEEN PORTFOLIO STOCKS

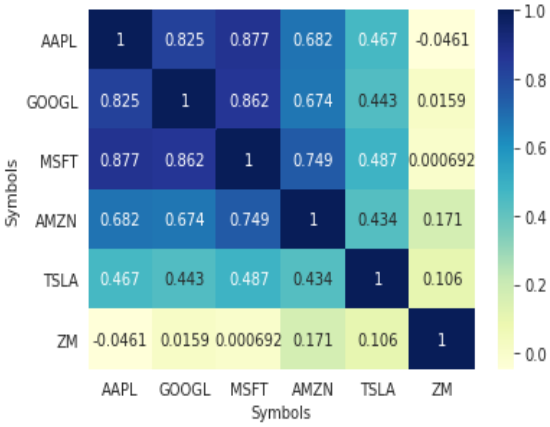

FIG. 7 HEAT MAP OF CORRELATION

Quantile Risk Analysis: We use this method specially to get equal contribution in term of probability of risk as all stocks are vulnerable to market shocks and drifts. Specific type of empirical is used as per the nature of stocks and in case of generalized approach 0.5 empirical type of quantile is employed, this method clearly predicts the worst-case scenario, i.e. maximum loss that can happen to an investment in a particular day.
If the quantile returns a value of "-0.016354" this means with 95 % of confidence your maximum losses will not go above 16% of your total investment, note that this value is dependent on performance of stock in market, strong holding stock options incur lower loss values.

Monte-Carlo Simulation: This uses Brownian Motion (Geometric) and gives us the value from the top of hill till the depth of ground value of a stock in a single day stock pricing by making random simulations of varied conditions may happen in market by its own versatility. Mathematically we employ following equation for condition simulations, giving graph with the intended aim of predicting the vales and safeguarding the risk intensive investment.

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 9, Issue 5, May 2020

$$\varpi d / d = \phi \varpi t + \Im \Omega \sqrt{\varpi t}$$

Where,

ϖd = difference in price of stock

ϕ = return(expected)

d = Stock cost

ϖt = time interval of investment

$\Im$ = Standard deviation

Ω =Random value (to stimulate randomness)

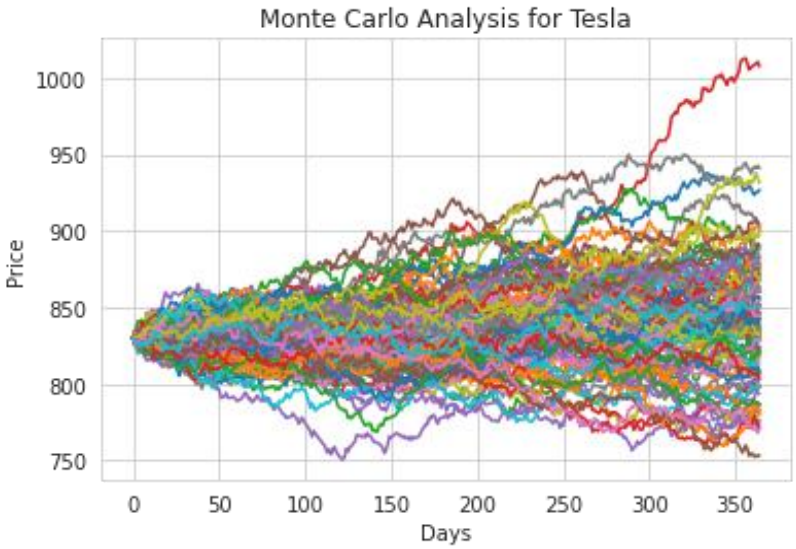

Fig. 8 Example of Monte-Carlo Simulation on Tesla Stock Prices

IV. CONCLUSION

The whole Analysis and perdition using python and previous data along with machine learning models deployed on them has produced amazing and effective results in one of the most hard to simulate place, the prolonged used of this system has enabled many great aspects of share market environment like effective loss and profit making stock option predictions ultimately meeting the needs of investment personnel, still this model does not comply with the very uneven and non-quantitative segments that control the stock pricings and hence the whole market like sentiments of people. Truth be told the simulations of sentiments are far beyond the reach now, otherwise we have made a efficient and valued model capable of reducing the overall uncertainty in the target arena.

ACKNOWLEDGMENT

A great masterpiece is inspiration gained from many. This project has given us a chance to challenge the difficult and push to our limits giving greater understanding to our field of study. Most important is the guidance from our mentor **Professor Alka Pandey** (Assistant Professor, Department of Computer Science &Engineering). The smooth functioning and every resource at our disposal is the blessings from our Head of Department **Professor Sourabh Yadav** (Department of Computer Science & Engineering). Our Head of Institute **Dr. B S Chawla Sir** (Principal, Government Engineering College, Bilaspur) has provided us the much-needed motivation for this research to be fruitful and effective.

REFERENCES

[1]. M. M. Rodrigues Junior and V. E. Wilhelm, Measurement of Power Indexes in Weighted Voting games by Monte-Carlo Simulation IEEE LATIN AMERICA TRANSACTIONS, VOL. 14, NO. 3, MARCH 2016
[2]. Nele Vandaele,Michèle Vanmaele, Explicit portfolio for unit-linked life insurance contracts with surrender option, Journal of Computational and Applied Mathematics 233 (2009) 16–26
[3]. Deid, Guppy Multiple Moving Average (GMMA),
[4]. Jiyan Yang, Market Segmentation & Information Asymmetry in Chinese Stock Markets: A VAR Analysis, The Financial Review, 13 Oct 2003.

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 9, Issue 5, May 2020

BIOGRAPHIES

Mr. Mudit Sharma perusing Bachelor of Engineering with major in Computer Science and Engineering from Government Engineering College Bilaspur (C.G) Affiliated to Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G) in 2020. Proficient Python developer.

Mr. Rahul Das perusing Bachelor of Engineering with major in Computer Science and Engineering from Government Engineering College Bilaspur (C.G) Affiliated to Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G) in 2020.Proficient C++ and Java developer.

Mr. Bhwesh Gaur perusing Bachelor of Engineering with major in Computer Science and Engineering from Government Engineering College Bilaspur (C.G) Affiliated to Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G) in 2020. Proficient Python developer

Ms. Priyanka Dodeja perusing Bachelor of Engineering with major in Computer Science and Engineering from Government Engineering College Bilaspur (C.G) Affiliated to Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G) in 2020. Proficient Python developer

Mr. Ankit Bansal perusing Bachelor of Engineering with major in Computer Science and Engineering from Government Engineering College Bilaspur (C.G) Affiliated to Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G) in 2020. Proficient React developer