

# Predicting Stock Market Trends Using Machine Learning

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**Abstract**— *The stock market is basically an aggregation of various buyers and sellers of stock. A stock (also known as shares more commonly) in general represents ownership claims on business by a particular individual or a group of people. 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. The prediction is expected to be robust, accurate and efficient. The system must work according to the real-life scenarios and should be well suited to real world settings. The system is also expected to take into account all the variables that might affect the stock's value and performance. 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 Monte cario 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.*

## I. INTRODUCTION

Basically, quantitative traders with a lot of money from stock markets buy stocks derivatives and equities at a cheap price and later on selling them at high price. The trend in a stock market prediction is not a new thing and yet this issue is kept being discussed by various organizations. There are two types to analyze stocks which investors perform before investing in a stock, first is the fundamental analysis, in this analysis investors look at the intrinsic value of stocks, and performance of the industry, economy, political climate etc. to decide that whether to invest or not. On the other hand, the technical analysis it is an evolution of stocks by the means of studying the statistics generated by market activity, such as past prices and volumes.

In the recent years, increasing prominence of machine learning in various industries had enlightened many traders to apply machine learning techniques to the field, and some of them have produced quite promising results.

Stock market price prediction for short time windows appears to be a random process. The stock price movement over a long period of time usually develops a linear curve. People tend to buy those stocks whose prices are expected to rise in the near future. The uncertainty in the stock market refrain people from investing in stocks. Thus, there is a need to accurately predict the stock market which can be used in a real-life scenario. The methods used to predict the stock market includes a time series forecasting along with technical analysis, machine learning modelling and predicting the variable stock market. The datasets of the stock market prediction model include details like the closing price, opening price, the data and various other variables that are needed to predict the object variable which is the price in a given day. The previous model used traditional methods of prediction like multivariate analysis with a prediction time series model. Stock market prediction outperforms when it is treated as a regression problem but performs well when treated as a classification. The aim is to design a model that gains from the market information utilizing machine learning strategies and gauge the future patterns in stock value development.

## II. LITERATURE REVIEW

### Survey of Stock Market Prediction Using Machine Learning Approach

Stock market is basically nonlinear in nature and the research on stock market is one of the most important issues in recent years. People invest in stock market based on some prediction. For predict, the stock market prices people search such methods and tools which will increase their profits, while minimize their risks. Prediction plays a very important role in stock market business which is very complicated and challenging process. Employing traditional methods like fundamental and technical analysis may not ensure the reliability of the prediction. To make predictions regression analysis is used mostly. In

this paper we survey of well-known efficient regression approach to predict the stock market price from stock market data based. In future the results of multiple regression approach could be improved using more number of variables.

### **Stock Market Prediction Using Machine Learning Techniques**

*Tapas Ranjan Baitharua, Subhendu Kumar Panib - 2016*

The main objective of this research is to predict the market performance of Karachi Stock Exchange (KSE) on day closing using different machine learning techniques. The prediction model uses different attributes as an input and predicts market as Positive & Negative. The attributes used in the model includes Oil rates, Gold & Silver rates, Interest rate, Foreign Exchange (FEX) rate, NEWS and social media feed. The old statistical techniques including Simple Moving Average (SMA) and Autoregressive Integrated Moving Average (ARIMA) are also used as input. The machine learning techniques including Single Layer Perceptron (SLP), Multi-Layer Perceptron (MLP), Radial Basis Function (RBF) and Support Vector Machine (SVM) are compared. All these attributes are studied separately also. The algorithm MLP performed best as compared to other techniques. The oil rate attribute was found to be most relevant to market performance. The results suggest that performance of KSE-100 index can be predicted with machine learning techniques.

### **Machine Learning Techniques And Use Of Event Information For Stock Market Prediction: A Survey And Evaluation**

*Paul D. Yoo, Maria H. Kim, Tony Jan*

This paper surveys machine learning techniques for stock market prediction. The prediction of stock markets is regarded as a challenging task of financial time series prediction. In this paper, we present recent developments in stock market prediction models, and discuss their advantages and disadvantages. In addition, we investigate various global events and their issues on predicting stock markets. From this survey, we found that incorporating event information with prediction model plays very important roles for more accurate prediction. Hence, an accurate event weighting method and a stable automated event extraction system are required to provide better performance in financial time series prediction.

### **A Machine Learning Model For Stock Market Prediction**

*Osman Hegazy, Omar S. Soliman and Mustafa Abdul Salam*

Stock market prediction is the act of trying to determine the future value of a company stock or other financial instrument traded on a financial exchange. The successful prediction of a stock's future price will maximize investor's gains. This paper proposes a machine learning model to predict stock market price. The proposed algorithm integrates Particle swarm optimization (PSO) and least square support vector machine (LS-SVM). The PSO algorithm is employed to optimize LS-SVM to predict the daily stock prices. Proposed model is based on the study of stocks historical data and technical indicators. PSO algorithm selects best free parameters combination for LS-SVM to avoid over-fitting and local minima problems and improve prediction accuracy. The proposed model was applied and evaluated using thirteen benchmark financials datasets and compared with artificial neural network with Levenberg-Marquardt (LM) algorithm. The obtained results showed that the proposed model has better prediction accuracy and the potential of PSO algorithm in optimizing LS-SVM.

### **Stock Market Prediction Using Machine Learning**

*V Kranthi Sai Reddy*

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.

### **Problem Statement**

- Employing traditional methods like technical and fundamental analysis may not ensure the reliability of the prediction.

- Although one can never be sure of the rise and fall of the Market, predicting it to a great extent is very much possible using the modern techniques of Machine Learning (ML), Data Mining.
- Existing paper survey various approaches including Support Vector Machine (SVM), Random Forests (RF) in stock Prediction and have a high possibility of advancement in the future

**Disadvantages**

- Feature Extraction is very complex
- Given Less Accuracy
- Performance level is very low

**III. PROPOSED WORK**

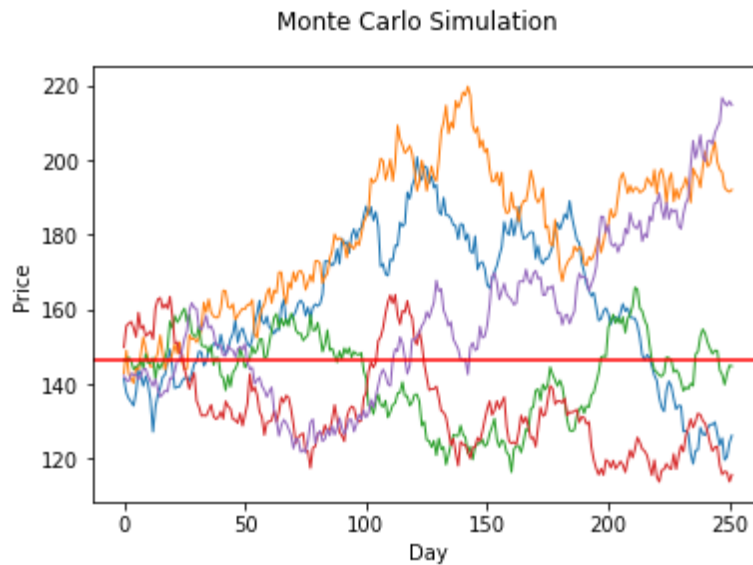
- We will develop a financial data predictor program in which there will be a dataset storing all historical stock prices and data will be treated as training sets for the program. The main purpose of the prediction is to reduce uncertainty associated to investment decision making.
- We propose a Machine 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.
- Our proposed system uses a BOOTSTRAP AND Monte cario methods 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.

**Advantages**

- High Performance and accuracy.
- Easily Extract the Features.
- High Level Prediction of Risk Analysis

**IV. IMPLEMENTATION**

0	1	2	3	4	5
0	141.280951	142.800718	146.438541	149.808738	142.140061
1	137.638922	148.912853	146.062301	155.476929	140.986500
2	136.062392	142.688561	147.085394	156.170871	140.694814
3	135.173333	141.370801	145.994278	156.622109	142.801831
4	134.114904	140.184093	143.888110	154.952246	142.368012
...	...	...	...	...	...
247	125.463686	196.615962	142.494383	115.746214	216.568912
248	119.617563	192.555893	139.782984	116.543737	215.265475
249	120.482257	191.767196	142.718962	116.290094	214.465282
250	124.255340	191.403152	144.905510	113.796409	215.651696
251	126.140778	191.971187	144.731523	115.646880	214.635932



## V. CONCLUSION AND FUTURE WORK

In the project, we proposed the use of the data collected from different global financial markets with machine learning algorithms in order to predict the stock index movements. Monte Carlo simulations are used to model the probability of different outcomes in a process that cannot easily be predicted due to the intervention of random variables. It is a technique used to understand the impact of risk and uncertainty in prediction and forecasting models. Various machine learning based models are proposed for predicting the daily trend of Market stocks. Numerical results suggest the high efficiency. The practical trading models built upon our well-trained predictor. The model generates higher profit compared to the selected benchmarks.

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