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## **Survey of Stock Prediction Using Machine Learning Techniques**

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**Abstract:** *The stock market is often used in investment programs that promise high returns, but it also carries some risk. By their very nature, stock returns are highly volatile. These depend on various factors such as previous stock prices, current market trends, financial news and social media. Many methods such as technical analysis, fundamental analysis, time series analysis, and statistical analysis are used to predict stock values, but none of these methods have proven to be effective forecasting tools. This article examines various machine learning techniques and algorithms used to improve stock price prediction accuracy.*

**Keywords:** Machine Learning, Prediction, Support Vector Machine, Accuracy, Linear Regression.

### **Introduction**

Stock markets play an important role in the economic performance of any given country. A difficult risk in predicting stock prices is its randomness. Predicting stock prices is one of the most important issues for many shareholders. This increases the fear of losing your hard-earned money and adds to your funding instability. Therefore, many are afraid to make assumptions about the stock exchange. Funding the stock market brings significant income to the country. Developing a successful stock price forecasting model will give you a sense of how the market is moving over time and allow you to identify trends that you otherwise would not have noticed. As the computing power of computers increases, machine learning will become a logical way to solve this problem. The main goal of this paper is to develop a better stock price prediction system that can increase investment and maximize profits for shareholders.

Forecast method:

Fundamental analysis estimates a security by measuring its underlying value. This is how a stock's actual value, or "fair market" value, is determined. If the fair market price is higher than the market price, the stock is considered undervalued and a buy recommendation is made. 2. The purpose of technical analysis is to predict future price movements and provide traders with the facts they need to make a profit. Traders use chart technical analysis tools to identify potential trade entry and exit points.

### **II. Literature Survey**

M. Sreemalli, P. Chaitanya, and K. Srinivas [1] suggested that the work of artificial neural networks is a highly proven technique for predicting stock market prices and supporting vector machines. . We will use



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these models to list the pros and cons of all these models and compare stock market execution. Artificial Neural Networks (ANNs) seem to have great potential for machine learning problems such as classification and prediction. Perform nonlinear class splitting using linear models. This is done by non-linear mapping where input vectors are fed into a high-dimensional feature space. ARIMA models work with time series data. This article describes how to predict Nifty Bank data using machine learning techniques such as support vector machines, artificial neural networks, and autoregressive integrated moving averages. The dataset used here is his Nifty Bank dataset from 2015. Implementations using neural networks take longer to perform computations than other techniques, but support vector machines have higher error rates. Combining artificial neural networks with genetic algorithms can provide high accuracy. Indu Kumar, Kiran

Dogra, Chetna Utreja, and Premlata Yadav [2] proposed a machine learning technique applied to stock price prediction to overcome such difficulties. In this article, he developed five models and compared their implementation in predicting stock market movements. The five supervised learning techniques are Support Vector Machines (SVM), Random Forest, K-Nearest Neighbors (KNN), Naive Bayes, and SoftMax. Research results show that the random forest algorithm works best for large data sets and the naive Bayesian classifier works best for small data sets. The proposed architecture for the implemented work mainly consists of the following four steps. Feature extraction on the given dataset, supervised classification on the training dataset, supervised classification on the test dataset, and evaluation of the results.

Venkata Sasank Pagolu, Kamal Nayan Reddy Challa, and Ganapati Panda [3] proposed a study that observes how well a company's stock price fluctuations, rises and falls, correlate with public opinion expressed on Twitter about the firm. The purpose of sentiment analysis is to evaluate the author's judgments based on the text. In this article, we applied sentiment analysis and supervised machine learning principles to tweets obtained from Twitter to explore the relationship between company stock market movements and Twitter sentiment. Specifically, positive news or social media tweets about a company will undoubtedly attract people to invest in the company's stock, which in turn drives the company's stock price up. At the end of the study, we found a strong correlation between rising and falling stock prices and public opinion in tweets.

Mariam Moukalled, Wassim El-Hajj, and Mohamad Jaber [4] integrate external factors such as mathematical functions, machine learning, and news sentiment to improve the accuracy of stock forecasts and improve productive trading. proposed an automated trading system that enables Specifically, it is intended to determine the price or development of a particular instrument towards the end of the day, given the first trading hours of the day. To achieve this goal, they trained traditional machine learning algorithms and built/trained multiple deep learning models considering the importance of relevant messages. Various experiments were performed and the highest accuracy (82.91%) was achieved with his SVM for Apple Inc. (AAPL) stock. They trained a variety of models, including Recurrent Neural Networks (RNN), Feed Forward Neural Networks (FFNN), Support Vector Machines (SVM), and Support Vector Regression in predicting the direction of today's closing price and yesterday's closing price. (SVR) efficacy was compared. feature. In this article, we have developed a system for predicting stock price movements. To create these models, they collected data from two of his sources. (i) historical stock market data from Reuters; and (ii) published news sentiment on specific stocks. Over a period of over ten years he has accumulated four unique shares.



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Osman Hegazy, Omar S, Soliman and Mustafa Abdul Salam[5] proposed a machine learning model for stock price prediction. The proposed algorithm combines particle swarm optimization (PSO) and least-squares support vector machine (LS-SVM). The PSO algorithm is used to optimize LS-SVM and predict daily stock prices. The proposed model is based on historical stock price data and the performance of technical indicators. The PSO algorithm chooses the best free parameter combination for LS-SVM to avoid overfitting and local minimization problems and improve prediction accuracy. The proposed model was determined and estimated using 13 benchmark financial datasets and differentiated with an artificial neural network using the Levenberg-Marquardt (LM) algorithm. Proposed convergence of the LS-SVM-PSO model to a global minimum. It is also effective in overcoming the overfitting problem that occurs in ANNs, especially when the equity sector fluctuates. You can easily tune the parameters of the PSO-LS-SVM algorithm. The representation of the proposed model is better than LS-SVM, and the differentiation algorithm is also better. LS-SVM-PSO achieves the lowest error value with a single LS-SVM, while ANN-BP algorithm is the worst.

Ishita Parmar, Navanshu Agarwal, and Sheirsh Saxena [6] proposed using regression and LSTM-based machine learning to predict stock prices. Attributes considered are open, low, high, closed, and volume. The dataset should be as specific as possible, as small changes in data can lead to large changes in results. In this article, we apply supervised machine learning to a dataset obtained from Yahoo Finance. For simulation and analysis reasons, only one company's data was analyzed. The article shows positive results, showing that both techniques improve prediction accuracy and the LSTM model is more efficient.

Aparna Nayak, M.M. Manohara Pai, and Radhika M. Pai [7] suggested making an attempt to predict the development of the stock market. Two models have been built, one for daily forecasting and one for monthly forecasting. A supervised machine learning algorithm is used to create the model. Historical prices are combined with sentiment as part of the daily forecast model. Supervised machine learning algorithms for daily forecast models achieve up to 70% accuracy. A monthly forecast model attempts to estimate whether trends are similar between two months. Sentiment is determined from social media data and news. The extracted sentiment is later integrated with historical prices to create a predictive model. Two different models have been developed to predict stock market movements.

T.Manojlović and I. Štajduhar [8] propose his 5-day and 10-day forecast models built using the random forest algorithm. The model is based on the historical data of the CROBEX index and companies in various sectors barely listed on the Zagreb Stock Exchange. Several technical indicators that are common in stock market quantitative analysis are selected as model inputs. The proposed method, estimated using 10-fold cross-validation, achieves an average classification accuracy of 76.5% for the 5-day forward model and 80.8% for the 10-forward model. There are two common methods for predicting stock market movements. The first is based on predictions of future prices of stocks. This approach usually requires treating historical data as time-series data, inputting various time-frame signals into the algorithm, and modeling future moments in the signal. B. Using ARIMA models. The second is based on predictions of future price developments in stocks. H. Calculate if the price will go up or down in the next day or within a few days.

Kunal Pahwa and Neha Agarwal [9] use machine learning algorithms to predict future stock prices on exchanges using open source libraries and existing algorithms to make this uncertain form of business a little safer. I'm proposing. The results are based entirely on numbers and assume many principles that may or may not apply in the real world, such as timing of predictions. We will use the simplest classifier, linear regression. A classifier just recognizes a feature, looks at its label and remembers it. Finally, the results are



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displayed graphically. An important factor in any result is the accuracy with which it communicates. Radu Iacmin [10] proposed machine learning algorithms such as his ANN (Artificial Neural Networks) with different feature selections. The results of this study show that the classification algorithm SVM (Support Vector Machine) with feature selection (principal component analysis) PCA successfully produces a profit. The main purpose is to detect the direction and price on 01/08/2014 and to validate the algorithm for real predictions. In this article, we have discussed the Forex market results using two algorithms. For the GASVM algorithm, the detection rate (ROR) is 55%. This means that only that number of decisions will yield a win. For the PCASVM algorithm, the ROR increased slightly to 68%. PCASVM was applied to eliminate inaccurate predictions and to control which features are important. Distinguishing between the simple approach of SVM and its evolution to GASVM and PCASVM, the solutions to the main and sub-problems are more systematic and promising for practical predictions using current datasets. yields good results.

Sumit Sarod, Harsha G. Tolani, Prateek Kak, and Lifna CS[11] proposed an approach to analyzing stock exchanges that combines two different disciplines. The system integrates price forecasting and news analysis based on historical and real-time data. LSTM (Long Short-Term Memory) is used for prediction. Combining the results of both analyses, we get an answer that provides direction for future growth. With the help of LSTM networks, we can predict future trends and price estimates for various stocks with very high accuracy. Found that polarity to capture each good feeling in a message/tweet. The polarity of each message/tweet can be calculated using her two available approaches: a dictionary-based approach and a semi-supervised algorithm. And this whole process gives us an aggregate result based on the sentiment of the news. On the other hand, the historical and realistic. At the same time, stock prices are obtained using NSE (National Stock Exchange) tools and further processed using LSTM models to predict future trends and prices. The predicted results are then merged with the summarized results. In this paper, we propose a system that recommends stock purchases of different companies.

Vaishnavi Gururaj, Shriya VR, and Dr. Ashwini K [12] proposed linear regression (LR), a basic technique that can be used to find linear trends. In any case, support vector machines (SVMs) are characterized by advanced properties such as high accuracy and consistency. In this article, we consider the pros and cons of using both to predict values and distinguishing between both algorithms. The study was conducted using the development environment RStudio and using a statistical language such as R. In this study, using just his one-year stock price data for The Coca-Cola Company from January 2017 to 2018, we: Here, a simple linear regression is examined on his one variable, the stock closing price or the period end. - Forecast daily price. Performance measures used to evaluate the prediction accuracy of the proposed system include mean absolute error (MAE), mean squared error (MSE), correlation coefficient (R), nonlinear regression multiple correlation coefficient, etc. will be Mean Absolute Percentage Error (MAPE), Root Mean Squared Error (RMSE).

K. Hiba Sadia, Aditya Sharma, Adarrsh Paul, SarmisthaPadhi and Saurav Sanyal [13] proposed the best models for predicting stock market values. After looking at different techniques and variables to consider, I found that techniques like random forests support vector machines. In this article, I will share and review a more realistic method for predicting stock price movements with greater accuracy. In this proposed system, we can use various past data points to train a machine to make future predictions. They used the previous year's stock data to train the model. In this article, we show that our machine learning model can predict stock prices more accurately compared to previously implemented machine learning models.

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A model proposed by CH Vanipriya and K. Thammi Reddy [14] combines these two methods to develop a hybrid machine learning neural network-based stock market predictor aimed at improving accuracy. This research aims to improve the efficiency of stock market forecasting models by combining historical price models and sentiment analysis by developing a hybrid neural network with historical prices and sentiment values as inputs. . Mainly he has two ways to extract emotions. Lexicon method and machine learning method. The system uses a supervised training set with a maximum number of iterations of 1000, a learning rate of 0.7, and a max\_error of 0.0001. Training stops after a few iterations when the total net error is less than 0.0001.

Edgar P. Torres P, Myriam Hernández-Alvarez, Edgar A. Torres Hernández, and Sang Guun Yoo[15] proposed probabilities for predicting stock market prices using real data and machine learning algorithms. You experimented with stock market data from Apple Inc. Perform close price prediction using random trees and multi-layer perceptron algorithms. They used historical data for the high, low, open, close and trading volume of Apple Inc.'s stock, collected using Google Finance. Similarly, we chose to predict the 'close price' variable. This is because it is the last price agreed upon by all members of the trading session for financial security. Moreover, this method is highly dependent on the participants' feelings, emotions and expectations. I used the WEKA package.

**III. Comparative Study of Various Algorithms in Literature Review**

**Table I:** Comparative Study of Different Algorithm.

YEAR	AUTHOR	PURPOSE	METHOD MENTIONED	INFERENCE
2019	M. Sreemalli, P. Chaitanya & K. Srinivas	Comparative Analysis of Machine Learning Techniques on Stock Market Prediction	ANN, SVM and ARIMA	ARIMA is more efficient than ANN and SVM
2017	Indu Kumar, KiranDogra, Chetna Utreja & Premlata Yadav	Comparative Study of Supervised Machine Learning Algorithms for Stock Market Trend Prediction.	SVM, Random Forest, KNN, Naive Bayes, and SoftMax	SVM has higher Accuracy on Small Dataset and large dataset
2016	VenkataSasan k Pagolu,	Sentiment Analysis of Twitter Data for	Sentiment Analysis and Supervised Machine	At the end of the survey, it is shown that a strong association exists between the



	KamalNayan ReddyChalla& Ganapati Panda	Predicting Stock Market Movements	Learning Principles	rise and falls in stock prices with the public sentiments in tweets
2017	Mariam Moukalled, Wassim El- Hajj, Mohamad Jaber	Automated Stock Price Prediction Using Machine Learning	SVM and other external factors such as news sentiments	By using SVM and news sentiments it gives more accuracy
2013	Osman Hegazy, Omar S, Soliman and Mustafa Abdul	A Machine Learning Model for StockMarket Prediction	Particle swarm optimization (PSO)and Least square SVM	The performance is better than LS-SVM and compared algorithms. LS-SVM- PSO accomplishes the least mistake esteem followed by single LS- SVM.
2018	Ishita Parmar, Navanshu Agarwal& Sheirsh Saxena	Stock Market Prediction Using Machine Learning	Regression and LSTM	It yields positive results with The LSTM model proving to be more efficient
2016	Aparna Nayak, M. M. Manohara Pai and Radhika M. Pai	Prediction Models for Indian Stock Market	Supervised machine learning algorithms and sentiments	70% of accuracy is distinguish using supervised machine learning algorithms on daily prediction model
2015	T. Manojlović	Predicting Stock	Random Forest	Experimental results suggest that random



	and I. Štajduhar	Market Trends Using Random Forests: A Sample of The Zagreb Stock Exchange		forests achieve the performance accuracy in stock market trend prediction.
2019	Kunal Pahwa and Neha Agarwal	Stock Market Analysis Using Supervised Machine Learning	Linear regression	Adv: Easier to implement, interpret and efficient to train
2015	Radu Iacomin	Stock Market Prediction	SVM, GASVM & PCASVM	PCASVM gives more accuracy as compared to SVM & GASVM
2019	Sumeet Sarode, Harsha G. Tolani, Prateek Kak, Lifna C S	Stock Price Prediction Using Machine Learning Techniques	LSTM	It is well-suited to process, classify and forecast time series given time lags of unknown time span
1934	Vaishnavi Gururaj, Shriya V R and Dr. Ashwini K	Stock Market Prediction Using Linear Regression and Support Vector	SVM & LR machines	As compared to LR, SVM have advanced features such as high accuracy and predictability
2019	K. Hiba Sadia, Aditya Sharma, Adarsh Paul, Sarmistha Padh	Stock Market Prediction Using Machine Learning Algorithms	Random Forest, Support Vector Machine	Best suitable algorithm for predicting the market price of a stock is the random forest algorithm





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2016	C.H. Vanipriya and K.Thammi Reddy	Indian Stock Market Predictor System	Hybrid Neural Network	Here the error rate is less as compared to Machine learning

**IV. Conclusion**

Stock market forecasting is an attempt to regulate the future value of a company's shares and other financial instruments traded on a stock exchange. Lucky predictions of stock success can lead to notable profits. After a literature review, we found that support vector machines are the most suitable algorithms for predicting stock market prices from historical data based on various data points. The algorithm is based on a huge collection of historical data and selected after analysis using sample data, making it very useful for traders and interested parties when investing money in the stock market.

**References**

1. Venkata Sasank Pagolu, Kamal Nayan Reddy Challa, Ganapati Panda “Sentiment Analysis of Twitter Data for Predicting Stock Market Movements” 2022.
2. Mariam Moukalled, Wassim El-Hajj, Mohamad Jaber “Automated Stock Price Prediction Using Machine Learning” 2021.
3. Osman Hegazy, Omar S, Soliman and Mustafa Abdul Salam”A Machine Learning Model for Stock Market Prediction” 2029.
4. Ishita Parmar, Navanshu Agarwal, Sheirsh Saxena” Stock Market Prediction Using Machine Learning 2018 First International. Conference on Secure Cyber Computing and Communication (ICSCCC).
5. Aparna Nayak, M. M. Manohara Pai and Radhika M. Pai” Prediction Models for Indian Stock Market” 2020.
6. T. Manojlović and I. Štajduhar “PREDICTING “Stock Market Trends Using Random Forests: A Sample of The Zagreb Stock Exchange” MIPRO 2015, 25-29 May 2015, Opatija, Croatia.
7. Kuna Pahwa and Neha Agarwal “Stock Market Analysis Using Supervised Machine Learning”, 2020.
8. Radu Iacomin “Stock Market Prediction”2015 19th International Conference on System Theory, Control and Computing(ICSTCC),October 14-16, Cheile Gradistei, Romania.
9. Sumeet Sarode, Harsha G. Tolani, Prateek Kak, Lifna C S “Stock Price Prediction Using Machine Learning Techniques”International Conference on Intelligent Sustainable Systems (ICISS 2019).





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10. Vaishnavi Gururaj, Shriya V R and Dr. Ashwini K “Stock Market Prediction Using Linear Regression and Support Vector Machines” <http://www.ripublication.com/>
  11. K. Hiba Sadia, Aditya Sharma, Adarrsh Paul, Sarmistha Padhi, Saurav Sanyal “Stock Market Prediction Using Machine Learning Algorithms” International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-8 Issue-4, April 2019.
  12. C.H. Vanipriya and K. Thammi Reddy “Indian Stock Market Predictor System”.
  13. Edgar P. Torres P, Myriam Hernández-Álvarez, Edgar A. Torres Hernández, and Sang Guun Yoo “Stock Market Data Prediction Using Machine Learning Techniques” 2022, pp. 10-17.
  14. R Dubey, D Rathore, D Kushwaha, JP Maurya, “An empirical study of intrusion detection system using feature reduction based on evolutionary algorithms and swarm intelligence methods”, International Journal of Applied Engineering Research 12 (19), 2017. pp. 8884-8889.
  15. S. Liu, G. Liao and Y. Ding, "Stock transaction prediction modeling and analysis based on LSTM," 2018 13th IEEE Conference on Industrial Electronics and Applications (ICIEA), Wuhan, 2018, pp. 2787-2790.
  16. T. Gao, Y. Chai and Y. Liu, "Applying long short term memory neural networks for predicting stock closing price," 2017 8th IEEE International Conference on Software Engineering and Service Science (ICSESS), Beijing, 2017, pp. 575-578.
  17. K. A. Althelaya, E. M. El-Alfy and S. Mohammed, "Evaluation of bidirectional LSTM for short- and long-term stock market prediction," 2018 9th International Conference on Information and Communication Systems (ICICS), Irbid, 2018, pp. 151-156.
  18. D Rathore, P K Mannepalli, “A Review of Machine Learning Techniques and Applications for Health Care”, International Conference on Advances in Technology, Management & Education, 2021, IEEE proceeding, 978-1-7281-8586-6/21.
  19. K. Raza, "Prediction of Stock Market performance by using machine learning techniques," 2017 International Conference on Innovations in Electrical Engineering and Computational Technologies (ICIEECT), Karachi, 2017, pp. 1-1.