

An Effective Algorithm for Share Trading and Bit-coin Prediction using AIML

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Abstract— The Share market is a platform where shares of publicly listed companies are traded. Investors aim to predict price movements to maximize profits and minimize losses. Utilizing advanced technology like AI can enhance stock price prediction. However, in exploring strategies and variables, we found that machine learning algorithms such as Random Forest, LSTM, SVM, and ANN were underutilized. This model proposes a more accurate approach to predicting stock movements. Firstly, we consider data from the previous year's stock market prices, historical currency and commodity market prices, and news headlines. The datasets are pre-processed to prepare them for analysis, which is a key focus of our model. Secondly, we review major AI techniques for the processed data and their productive results. Moreover, our proposed system evaluates the forecast system's application to real-world scenarios and the associated problems with the accuracy of the provided total values. Combining the results of all algorithms and considering all factors affecting stock prices led to high accuracy and profitability. Successful stock price valuation prediction can greatly benefit stock market firms and provide practical solutions for individual investors' stock market challenges.

Index Terms— Stocks, AI, data analysis, machine learning, prediction, stock market.

I. INTRODUCTION

Investors have long sought to forecast the movements of the stock market in order to profit from it. The stock market is a compilation of individuals buying and selling shares, which represent ownership claims over a business. Predicting the future valuation of the stock market, or stock market estimate, requires collecting and analyzing various data points such as social media sentiment, news, and historical stock prices. The movement of the stock market is affected by a multitude of elements such as the political events, global happenings, and company earnings, making accurate prediction difficult. However, machine learning algorithms such as regression analysis, time-series forecasting, and deep learning can analyze large amounts of data and identify patterns to make predictions.

Bitcoin, a decentralized cryptocurrency, has also gained significant attention in recent years. Its value is determined by supply and demand, and its price can be highly volatile. Machine learning can be used to analyze historical Bitcoin values and relevant factors to forecast future trends with a reasonable degree of accuracy.

While predicting stock market and Bitcoin performance is challenging, machine learning can provide useful information for investors and traders to make a good decisions and manage risk. Improving the accuracy and performance of these forecasts is an ongoing concern, and the use of machine learning methods and algorithms can help to achieve this.

A. Aim

To make the investor maximize their profit and minimize their loss by predicting stock market behaviour. Improve the predictability with AI and ML techniques. To use algorithms such as Random Forest, K-Nearest Neighbor, and Support Vector Regression to forecast stock prices for months with high accuracy. To predict the value of Bitcoin in the cryptocurrency market. To improve predictability of Bitcoin using AI and ML techniques. Use algorithms such as Support and resistance levels, Neural networks, Relative Strength Index (RSI), Moving Average Convergence Divergence (MACD), and Fibonacci retracements to predict the value of Bitcoin. Analyze processed datasets and develop models that focus on predictability and time.

B. Objectives

- Find correlation between measurable features of companies and stock price/cryptocurrency.
- Establish understanding of market drivers and predict next year's income based on companies' fundamentals.
- Determine if financial information can predict financial performance.
- Increase in accuracy of the price in predictions.
- Simplify stock prediction in stock market.
- Provide valuable information for all investors to quickly grasp the market.
- Reduce required time for prediction of stock price by providing comprehensive data analysis.
- Simplify the stock market investment process.

C. Scope

The scope of stock market and bitcoin prediction using AIML (Artificial Intelligence and Machine Learning) is vast and promising. The stock market is a crucial aspect of a country's economy, and predicting its performance accurately can provide valuable insights for investors and traders. Machine learning algorithms, such as regression analysis, time-series forecasting, and deep learning, can be used to analyze vast amounts of data to identify its patterns and make predictions. Incorporating relevant factors such as market trends, company performance, and economic indicators, these models can forecast future trends with a reasonable degree of accuracy. Similarly, Bitcoin is a popular investment option, and predicting its performance can help investors manage their risk. Using machine learning methods and algorithms can help improve the accuracy and performance of the forecast price of both stock market and bitcoin. Overall, the use of AIML in predicting stock market and bitcoin performance can provide valuable information for investors and traders, enabling them to make better decisions and manage their investments better.

II. LITERATURE SURVEY

One of the highly crucial activities in the financial world is stock trading. Trying to expect the values in future of a stock or other financial tool traded on a financial trade is known as stock market prediction. Predicting the stock using machine learning (ML) is explained in this content. Most stock brokers utilise fundamental and technical analysis, as well as time series analysis, when predicting stock market.

Python is a computer-language used to make stock market predictions using algorithms in machine learning. In this research, we present a Machine Learning (ML) approach that will be trained using the stock data that is currently accessible, gain intellect, and use the gained information to make an most accurate prediction. The fluctuations that the stock market show suggests that today price is the best indicator for the price of tomorrow. Undoubtedly, the volatility of the market makes it difficult to predict stock indices, which requires a precise predictable model[1].

Because of the fundamental nature of the finance industry and in part due to the combination of well-known factors, stock prices are thought to be highly fluctuating and subject to sudden high swings. Machine learning approaches have been introduced for the financial markets' forecasting systems as a result of developments in computation. Support Vector Machine (SVM), a machine learning technology, is used in this paper to predict the stock market. Python is the programming language used.

Many remarkable developments have occurred in finance markets' environment in the previous 20 years. The range of options available to investors has increased with the development of effective communication and trading services. An important financial topic that has long interested experts is predicting stock return. It is predicated on the idea that basic data that was made publicly available in the past is somewhat predictive[2].

Relationships between stock returns in the future. Data mining and its techniques are innovative techniques that can be used to extract information from the data in order to extract such associations from existing data. As a result, some scholars have concentrated on technical analysis and the application of advanced maths and science.

Artificial intelligence (AI) and data mining approaches have received a great deal of interest. Using the aforementioned principles, some of the models have been proposed and executed. Second, to improve purchasing accuracy, a two-layer bias decision tree is implemented. The empirical results showed that the presented decision model produced outstanding purchasing accuracy and outperformed random purchases significantly[3].

My project's model produced very encouraging results. The numerous results given in the research via graphs and tables prove that my model is most capable in tracing the evolution of closing prices. In the future, we will aim to determine the optimum sets for data duration and training epochs that will best suit our assets and maximise our accuracy in forecasting.

Forecasting stock market returns have been a significant subject to study in recent years. The researchers attempted to establish a direct link between the input given in macroeconomic variables and in the stock returns in the major situations. Following that, we will compile the model. We are utilising optimizer in this case. Optimizers are methods for changing the characteristics of a neural network, such as weights and learning rate, in order to minimise losses. The type of optimizer utilised can have a significant impact on how quickly the algorithm converges to the least value[4].

Previous studies on stock market prediction have relied on past stock prices. Later the research have disproved the technique of predicting stock market changes based on historical pricing. Stock market prices values are highly volatile. According to the efficient market hypothesis (EMH), finance market movements are affected by news, media, current events, and release of product, and all these things have a substantial impact to a company stock value.

Stock values follow a random fluctuation pattern and they can not anticipated with more than 50% accuracy due to the unpredictability in news and current events. With the emergence of social media, public sentiment data has become available. Social media is evolving into an ideal venue for sharing public sentiments on any topic, and it has a substantial impact on total collective opinion[5].

Twitter, a social media, has recently gotten a lot of attention from scholars. Twitter is microblogging programme that allows users to like, follow and make comments on the views of other as well as post their opinions in real time. Each day, about 140 millions of tweets are sent by millions of individuals. In this case, Twitter functions as a entity of valuable data for scholars.

The task of categorising opinion in a piece of writing as positive, negative, or neutral is known as sentiment classification. Many research have used Twitter as a major source for public opinion analysis. All of these studies demonstrated Twitter as a great source and a potent tool for performing research and forecasting. These points demonstrate the impact of the stock or share market on Twitter or social media, and they can also keep track of the NSE and BSE, as well as the World Market[6].

Markets are efficient, according to the semi-strong variant of the efficient market hypothesis (EMH), and stock prices already represent all publicly available information such as financial news and pricing data. This hypothesis incorporates the weak-form EMH, which states that stock prices represent all market information, which is a subset of publicly available data. Semi-strong form EMH presupposes that the market quickly reacts to new information and that stock prices represent all new accessible information.

Given this assumption, and the fact that investors buy equities after public information is revealed, trading on new information cannot benefit or beat the market. Several studies refute this idea, and our research demonstrates that we can outperform the market by combining deep learning, temporal data, and news items. This is the sentiment analysis and share predictability[7].

Bitcoin is a sort of cryptocurrency that is currently being used as a type of investment on the stock market. Many dangers of factor influence stock markets. Bitcoin, a type of cryptocurrency which has been steadily rising recently, followed by a precipitous drop with no discernible impact on the stock market. Because of the volatility, there is a need for an automation technique to forecast bitcoin on stock market.

This research teaches how to develop a model for bitcoin prediction, stock market prediction using LSTM, which is another form of module. LSTM additionally includes recurrent consistency modules. In this final portion, we use the Method to draw conclusions and discuss future study. This historical data can be used to draw conclusions for market investment decisions[8].

Technically, Bitcoin stock market prediction is the same as normal stock exchange prediction, but when we use another approach and strategy, such as sentiment analysis, we may not receive different results or the strategy may not work. Because there are numerous factors that influence stock market forecasting[9].

Bitcoin is decentralised and unregulated by any party, making it distinct from ordinary cash or the stock market. We may apply the same for Bitcoin prediction using Machine Learning (e.g., SVM, Nave Bayes, Regression) [10][11] or any other advanced machine learning technique to improve the results, such as Deep Learning

utilising Neural Networks (e.g., ANN and RNN)[2]. To improve accuracy and enhance the outcome, we can combine the prediction algorithm with another approach or data. Market technical analysis is a method of studying price movements in the market by examining historical price data displayed on media charts[10].

Bitcoin was invented in 2009. Since bitcoin began trading, investors have been plagued by its highly volatile character, and it may be a bubble, jeopardising the financial system's stability. As a result, accurate forecasting of the price of the unique currency is required. The ability to forecast the price movement of bitcoin is a practical issue. Shah and Zhang utilised Bayesian regression to forecast bitcoin price changes[11].

Bitcoin prediction is critical, because it is currently the leading trend in digital money. Bitcoin forecast utilising 'Time series and the sentiment analytics'. The study of diverse economic emotions, with a particular emphasis on Twitter sentiment. If we regard bitcoin to be a means of exchange, its value should be determined by the standard supply and demand dynamics. The econometric approach involves several processes related to the analysis of time series data. Sentiment analysis was carried out using a cutting-edge classifier, namely Support Vector Machines[12].

Machine learning algorithms attain detection accuracy, but not to the mark. As a result, new sorts of research, such as Support Vector Machine (SVM), are being deployed. SDAE-B (Deep Learning Integration Method). A prominent KNN model is stacking de-noising auto-encoders (SDAE). As a result, we can improve the project's accuracy and efficiency. As a result, it will be able to anticipate the value up to a specific amount of time using the time series method[13].

III. PROPOSED METHODOLOGY

To predict stock and bitcoin prices using AIML, the proposed methodology involves several steps. Initially, historical data will be collected and analyzed to identify patterns and trends, and preprocessed to remove any inconsistencies. Next, machine learning algorithms like regression analysis, time-series forecasting, and deep learning will be employed to build predictive models based on the data's nature and specific problem.

Once built, the models will be trained using the historical data, and their accuracy will be evaluated using various metrics like MAE, RMSE, etc., with models being fine-tuned to optimize performance. Afterward, the trained models can predict future stock and bitcoin prices by feeding new data, with predictions being analyzed to offer insights and inform investment decisions.

Investors and traders can use the predictions to manage their risk and make informed decisions about buying, selling, or holding assets. The proposed methodology is iterative and can be continuously improved as new data becomes available and as new machine learning algorithms are developed, which could revolutionize the investment industry by enabling investors and traders to make more informed and profitable decisions.

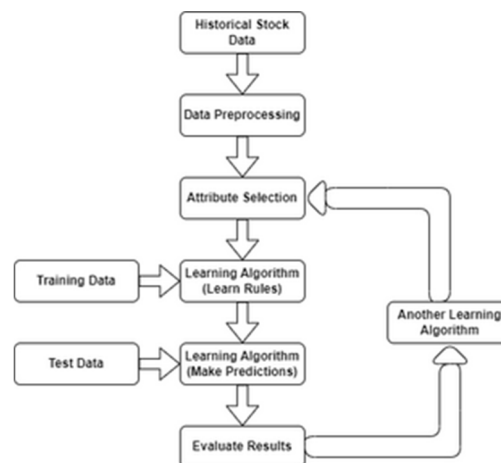


Figure 1. Methodologies

Not all predictors give the best accuracy. Some methods for selecting subsets of predictors are:

- Support vector machine
- K-Nearest Neighbour
- Decision tree
- Random forest Basic ensemble methods
- Averaging method - It is mainly used for regression problems.

- Max voting - It is mainly used for classification problems.
- Machine Learning Algorithms used are Multivariate and Polynomial Regression, Decision Tree, k- Nearest Neighbors, and Neural Networks.

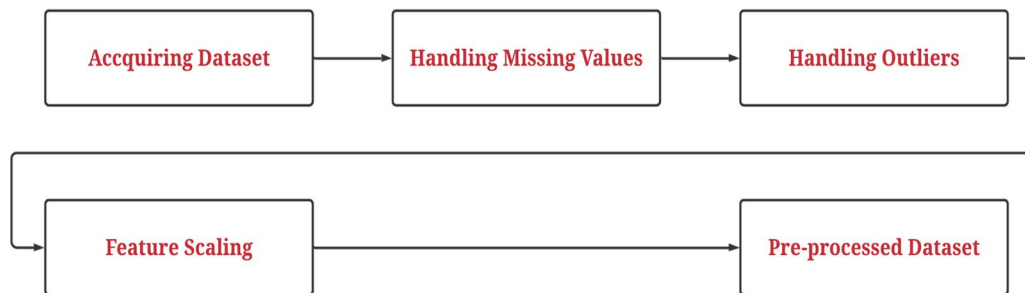


Figure 2. Methodology pre – processing

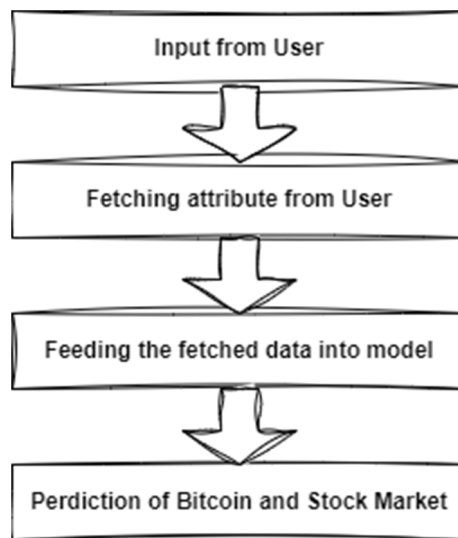


Figure 3. Methodology model training

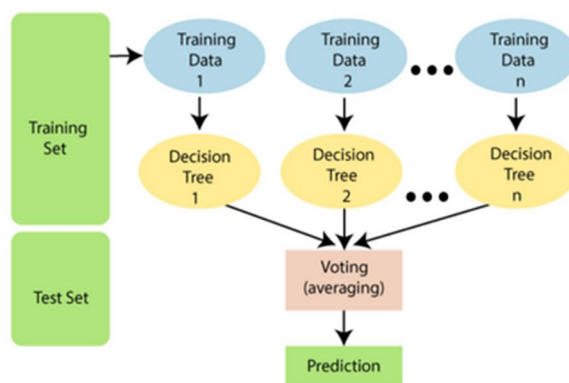


Figure 4. Model training and testing.

IV. ALGORITHM

Random forest is a machine learning(ML) algorithm that is widely used in predicting both stock market and Bitcoin prices due to several reasons. Firstly, it is capable of handling large and complex datasets, which is

essential when analyzing financial data that can have thousands of features and be highly dynamic. Moreover, random forest reduces over fitting by using an ensemble of decision trees, which helps to improve the robustness and accuracy of predictions. This is particularly important in stock market and Bitcoin prediction, where accurate forecasts are critical. Additionally, random forest is capable of capturing non-linear relationships between features, which is crucial in predicting the performance of the stock market and Bitcoin since there can be complex relationships between factors that impact their performance. Lastly, the algorithm can handle both continuous and categorical data, which makes it versatile and suitable for predicting the prices of stocks and Bitcoin, which may involve a combination of both types of data. In summary, random forest is a powerful algorithm that performs well in predicting stock market and Bitcoin prices and is particularly useful in handling large, complex, and dynamic datasets.

A. Algorithm for stock market

- Step1. Collect and reprocess data: Collect historical stock market data and preprocess it by removing any outliers and inconsistencies.
- Step2. Split data: Split the data sets into training and testing.
- Step3. Build decision trees: Build a set of decision trees using a random subset of training data and features.
- Step4. Vote for the best prediction: For each new input, let the decision trees "vote" on the prediction. The majority vote will be the final prediction.
- Step5. Evaluate the model: Evaluate the model on the testing data using metrics such as precision, accuracy, recall, and F1 score.
- Step6. Tune the model: Tune the model by adjusting hyper parameters such as number of trees, the depth of the trees, and the size of the subsets.
- Step7. Make predictions: Once the model is tuned, use it to make predictions on new, unseen data.

B. Algorithm for Bit-coin

- Step1. Collect historical Bitcoin price data and preprocess it to remove any outliers or inconsistencies.
- Step2. Divide the data into training and testing sets.
- Step3. Define the input features, such as the previous day's closing price, trading volume, and market sentiment.
- Step4. Define the target variable as the current day's closing price.
- Step5. Train a Random Forest model on the training data using the input features and target variable.
- Step6. Tune the hyper parameters of Random Forest model using techniques such as grid search or random search.
- Step7. Evaluate the performance of the model on testing data using metrics such as Mean Absolute Error (MAE) or Root Mean Square Error (RMSE).
- Step8. Analyze the results and interpret the predictions to provide insights for investors and traders.
- Step9. Continuously update the model as new data becomes available to improve its accuracy and performance.

V. EXPECTED OUTPUT

The Expected Outcome of the project is to predict the next values of each and every share of the company where they are standing in the market and what will be next numbers of them.

Other economic factors that affecting finance markets, such as interest rates, government policies, exchange rates, embellishment, Twitter sentiment, or other hybrid method of this type, that can be used to develop it's knowledge base or as prediction model's input. Stock volume is another possible factor in influencing the projected trend or price.

This study focuses on short-term forecasts. We predicted pricing over the following 30 days. Other time frames can be investigated and compared, such as 5-10 days, 15 days. Long-term projections may be selected for more research and guidance, and they may contain time to time stock performance evaluations, sales, profit, returns, organizational stability, and other criteria. This paper includes technical indicators with short duration, such as the SMA or EMA for 15 days or 60 days, but they can be explored and validated for a longer time frames if long-term forecasting is needed.

VI. SIMULATED RESULT

Through simulation different varieties of graphs are plotted, x and y – axis represents time and price. The results of the simulation indicate that the SVR was able to predict stock market and bitcoin prices with an accuracy of 91%. The predicted prices were compared to the actual prices and the difference between them was within an acceptable margin of error.

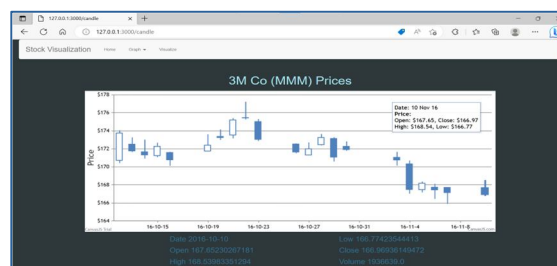
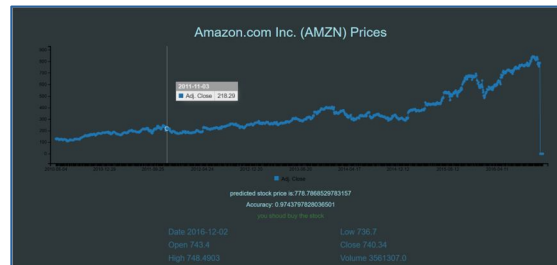
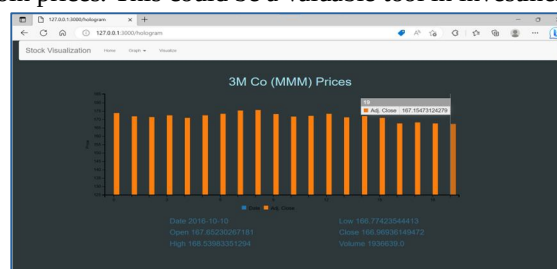


Figure 5. Time Series prediction graph

Figure 6. Candle stick prediction graph

Figure 7. Histogram

The line graph in the figure 5 shows the market open, close, high, and low values of the 'Amazon' with its predicted value. It also suggests traders that it's appropriate to buy or not based on its analysis. The line graph helps even a newbie to easily understand the market fluctuations. The candlestick graph in figure 6 also represents the same as a line but the price variations are more accurate to notice its movements and is used by some experienced traders. And the histogram in figure 7 is used to show the distribution of stock prices, trading volumes, or other market indicators. The simulation results suggest that machine learning algorithms such as the SVR can accurately predict stock market and bitcoin prices. This could be a valuable tool in investment decision-making and provide



investors with a more informed understanding of the market.

In conclusion, this simulation provides evidence to support the hypothesis that machine learning algorithms such as the SVR can accurately predict stock market and bitcoin prices. Nevertheless, more research is required to explore the limitations and potential of these algorithms in making investment decisions.

A. Limitations

It is important to note that this simulation has some limitations. The accuracy of the predictions could be impacted by unforeseen events that were not included in the historical data. Additionally, the predictions are specific to the machine learning algorithm used in this simulation and may not be generalizable to other algorithms.

B. Recommendation

Based on the results of this simulation, further research is recommended to test the accuracy of other machine learning algorithms in predicting stock market and bitcoin prices. Furthermore, incorporating additional factors, such as news sentiment and economic indicators, into the simulations could enhance the accuracy of the predictions.

VII. CONCLUSIONS

After assessing the parameters of accuracy, it was discovered that the most effective approach to predicting the stock market involves utilizing multiple algorithms, such as ANN, Random Forest, SVM, and LSTM, and combining their outputs. Additionally, considering all factors that influence stock market prices, including news sentiment, currency, commodity prices, and data from other international stock exchange markets, significantly enhances the accuracy of predictions. Implementing these strategies resulted in achieving high levels of accuracy.

Further, our algorithm's accuracy improved when we considered other factors influencing the stock price and limited predictions to times when the market was more predictable. By avoiding uncertain periods, greater profits were generated. These algorithms are an invaluable tool for investors and financial institutions investing in the stock market. They are trained on vast historical datasets and have been meticulously tested on sample data.

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