STOCK PRICE PREDICTION USING ML TECHNIQUES

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Abstract - *Stock Price Prediction is a business venture in the financial area. It is a dynamic and complex process. For predicting future pricing, machine learning algorithms have lately become popular. A traditional approach of predicting stock values is using historical data. Among investors, stock market forecasting is in high demand. So, we're working on a technology that will improve the accuracy of future stock prices. LMS (Least mean square) error Algorithm and LSTM (Long short term memory) Algorithm are the predictions approaches used to estimate stock price. The LMS algorithm is a series of adaptive filters that identify the filter coefficients by minimizing the least mean square of the error signal. The LSTM algorithm is a type of artificial recurrent neural network architecture (RNN) also suitable for classifying, processing, and predicting based on time series data.*

Key Words: **Stock price prediction, LMS (Least mean square) algorithm, LSTM Algorithm, RNN(Recurrent neural network) architecture, Data Cleaning, Feature Extraction.**

1.INTRODUCTION

Correct stock predictions can result in significant profits for both the seller and the broker. Obtaining an exact value is difficult since it is directly dependent on external factors such as the economic, social, psychological, and political areas, all of which have a substantial impact. Researchers from several domains, including business and computer science, are studying stock price prediction. In the research field, estimating stock prices is both fascinating and challenging. If investors do not have enough information and knowledge, their investment can suffer a much loss.

Stock price predictions are employed using a variety of methods. The RNN model is employed when the model needs to handle time-series data or natural language. Among the RNN architecture, LSTM is one of the most successful algorithm. It is more efficient in dealing with long input sequences than other recurrent neural networks. Thus, with the help of the LSTM network, a very high level of accuracy may be attained in forecasting future trends and stock price forecasts. The LMS filter is a type of adaptive filter used for linear problem-solving. We'll use LMS to show how linear algorithms are employed to anticipate stock market movements with great accuracy. We collect historical data of the Tata company and predict the company's future price.

2. RELATED WORKS

[1]   This paper used machine learning to implement a model. They used Bloomberg's data set. A feature selection technique   was used to implement all of the data sets. The data set was narrowed down to 10 samples based on the most essential characteristics. Accuracy and hit ratio were measured during the training session. The results are compared to actual judgments based on technical indications. They used two algorithms to produce a visual for a foreign exchange stock market: the GASVM method, which has a profit ROR of 55 percent, and the PCASVM algorithm, which has a profit ROR of 68 percent.

[2] The purpose of this paper is to anticipate the market performance of the Karachi Stock Exchange (KSE) using various machine learning techniques. This study discusses several machine learning approaches, algorithms, and attribute combinations, including single layer perceptron (SLP), multi-layer perceptron (MLP), radial basis function (RBF), and support vector machine. They used market history, news, general public sentiment, commodity price, interest rate, and foreign currency to develop this model. The KSE 100 dataset was used to test these methods. The most basic structure is the SLP model. SLP is made up of two layers: input and output, and it is trained on the same dataset, yielding 83 percent accurate results. The MLP algorithm was applied to the dataset first for training and then for testing, and the model correctly predicted the outcomes in 77% of the test set and 67% of the training set. When indicating in the test set and 61 percent of the training set, the RBF algorithm produced 63 percent results. When the dataset was run through the SVM algorithm, the closest result was obtained.

[3] This paper is discusses about various techniques related to the prediction of the stock market. Predicting stock market values in the future is a difficult endeavour. Stock prices fluctuate on a daily basis. This article explains how to apply all deleted criteria that are a huge problem at any moment in order to anticipate future stock prices with more accuracy. This paper employs a variety of machine learning techniques, including Artificial Neural Networks, Neuro-Fuzzy Systems, Time Series Linear Models (TSLM), and Recurrent Neural Networks (RNN). Fundamental analysis and technical analysis are two of the most commonly employed methodologies. The fundamental analysis entails determining the exact product value, obtaining reliable and accurate company financial reporting information, and

conducting technical analysis to extract rules from data that investors can use to make future decisions based on these terms. The stock closing price is the ANN model's specification, and it has a higher performance than regression and a smaller prediction error. The hidden Markov model is utilized for optimization, and the ARIMA model is resilient and efficient, with open, high, close, and moving average prices as parameters. The Time series linear model incorporates the actual data, as well as the characteristics of the data and the number of months utilized, into the ideal linear model. The RNN model comprises past time points in the input layer, as well as input, hidden, and output layers. The stock market forecasting system aims to improve accuracy, and these techniques are used to assess the stock market's performance and trends.

[4] This paper employs two machine learning approaches to forecast the share price. One technique is based on LSTM, while the other is based on RNN. They examined aspects such as current market price, price earning ratio, and base value when developing this strategy. These approaches rely on past data to train the models. RNN employs the CNN sliding window approach, whereas LSTM employs linear and nonlinear models. Because this method uses 10% of the previous data to train a model, there is a possibility of scale-out values; therefore, to avoid this scaling out, they have introduced sliding window normalisation. The NSE dataset has been used to test these approaches. As a result, these two strategies are more effective than traditional ways. In comparison to LSTM-based algorithms, RNN methods provide better accuracy, according to this article. Because RNN uses the backpropagation method to avoid data overlapping, it has a higher accuracy than LSTM-based methods.

[5] This paper tells that Predicting the future value of a stock helps to gain profit. So we require precise sophisticated ways to forecast the stock price. Machine learning is a viable option for accurate stock market forecasting. They introduced two machine learning strategies in this paper: regression-based and LSTM-based machine learning methods. They used a few criteria to anticipate the stock market, including open, close, low, high, and volume. Data models will be trained using previous values in this method. The regression-based technique predicts continuous values using a linear function, but the LSTM-based method and the RNN-based method do not. Both methods produce effective results. These methods have been tested on a massive dataset of nearly 9lk records. This study suggests that these two approaches assist to attain high accuracy and reliability when compared to conventional methods, however the LSTM-based method is a better alternative for stock market prediction because to its accuracy.

3. SYSTEM ARCHITECTURE

The below figure 1 shows the model of stock price prediction. The input is in the form of a raw dataset. The data

set is a collection of valuations of stock market information about some companies. The initial step is to convert raw data into processed data. Which is done by data cleaning since the raw data collected has multiple attributes, but only some of those attributes are needed for the prediction. Then, in feature extraction, the data set is divided into two subsets. Training Set and Test Set The training set is used to train a model, while the testing set is used to test the trained model. After preprocessing, we are going to analyse the data using LSTM and LMS algorithms. Next, we get the output in the form of a report and graph format.
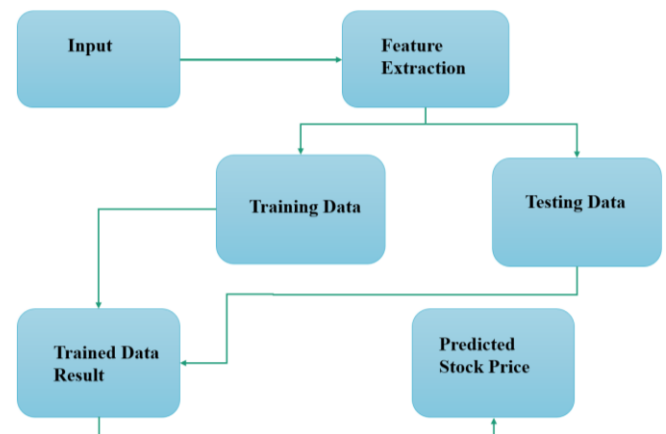

Fig -1: Block diagram of Stock Price Prediction

ALGORITHAM FOR LOGIC IMPLEMENTATION

Step 1: Start

Step 2: Inputting the raw data.

Step 3: Preprocessing the data using feature extraction data using data cleaning method.

Step 4: Splitting of data for training and testing.

Step 5: Analysing the data by using either

- LMS Algorithm

- LMS with LSTM Algorithm

- LSTM Algorithm

Step 6: Output in the form of graphs and reports.

Step 7: Predicted stock price.

Step 8: Stop

4. PROPOSED STOCK PRICE PREDICTION

Fig -2: Level-0 DFD

The above Figure 2 is the Data Flow Diagram Level-0, where the user selects a dataset from a certain company and the *pre-processing* will happen, which will convert the raw dataset into processed data, and the cleaning process happens here.
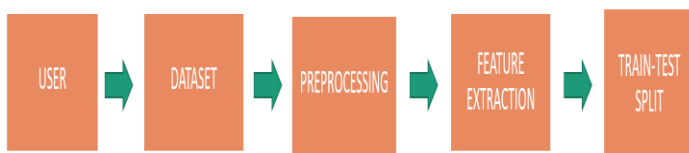

Fig -3: Level-1 DFD

The above figure 3 shows that, after the preprocessing, feature extraction takes place, which will be split into two sets: Training and Testing. The 80% is for training and it create the model. Testing will take 20% of the data and test the accuracy of the trained model.
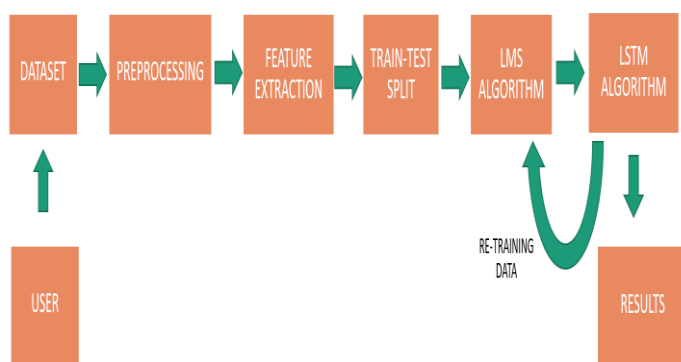

Fig -4: Level-1 DFD

The above Figure 4 is the Data Flow Diagram Level-2. After feature extraction, the model will be selected, and the accuracy will be predicted using the LSTM and LMS algorithms. Next, we get the output in the form of a report and a graph format.

5. CONCLUSIONS

Since the stock market is so unpredictable, investors must invest after evaluating affecting aspects such as public opinion, historical data, and news events. Many researchers have attempted to construct prediction models based on machine learning algorithms to forecast the precise value of stocks using various tools and approaches, but have yet to discover the best solution. Our method describes a few of the machine learning methodologies used by researchers to forecast stock market trends and prices using machine learning and artificial intelligence algorithms while taking into account the numerous features, traits, and aspects involved. The LSTM Algorithm and the LSM Algorithm are the two primary methodologies mentioned in this paper. Hybrid methods have also been used to construct prediction models for the same; these strategies combine two or more algorithms that are similar to one other, such as LSM and LSTM. It is possible to combine any of the methodologies to create a hybrid system model for stock market price prediction; however, the system must be built in such a way that accuracy and performance can be improved while computing complexity is reduced.

Each model has its own advantage and disadvantage over the others, based on their assessment factors and the datasets used for their study. Some models perform better when using historical data, while others perform better when using sentiment data. The fusion algorithms, according to the literature study, predicted results with more precision than any of the other models examined. They take into consideration the main characteristics of the many techniques that make them up, and as a result, they require less time to compute than other prediction models.

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