



IJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 Issue: VII Month of publication: July 2021

DOI: <https://doi.org/10.22214/ijraset.2021.37169>

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Future Trend Prediction in Share Market with Machine Learning

Prof. Kanchan Mahajan¹, Nikeeta Ingale², Komal Sahani³, Karishma Kothawade⁴, Chetana Mahajan⁵

Department of Computer Engineering Sandip Institute of Technology and Research Centre, Nashik, India

Abstract: In Stock Market Prediction, the point is to estimate the future worth of the monetary loads of an organization. The new pattern in securities exchange forecast advances is the utilization of AI which makes expectations dependent on the upsides of current financial exchange lists via preparing on their past qualities. AI itself utilizes various models to make expectation simpler and credible. The thought centers on the utilization of dissimilar Machine learning algorithms to anticipate stock qualities. Variables considered are open, close, low, high and volume. The principal thing we have considered is the dataset of the securities exchange costs from earlier year. The dataset was pre-handled and adjusted for genuine examination. What's more, the proposed thought inspects the utilization of the forecast framework in verifiable settings and issues related with the accuracy of the general qualities given. The thought additionally portrays AI model to foresee the life span of the stock in a serious market. The effective forecast of the stock will be an extraordinary resource for the securities exchange establishments and will give genuine answers for the issues that stock financial backers face.

Keywords: Machine Learning, LSTM Model, Data Pre-processing, Data Mining, Dataset, Stock, Stock Market.

I. INTRODUCTION

Basically stock market is a collection of stock of various clients and Suppliers. A stock (also known as shares more commonly) in general represents ownership claims on business by a particular individual or a group of people. The attempt to determine the future range of the stock market is known as a stock market prediction. 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 change the stock's value and performance. Fundamental Analysis, Machine Learning, Technical Analysis, Market Mimicry, and Time series aspect structuring are some of the different methods and ways of implementing the prediction system. The prediction has moved up into the technological arena by the development in digital era. The most prominent and advising technique involves the use of Artificial Neural Networks, Recurrent Neural Networks that is basically the application of machine learning. Machine learning requires artificial intelligence which permits the system to learn and improve from past experiences without being programmed constantly. Algorithms like Backward Propagation which is commonly known as Back propagation errors is one of the traditional methods of prediction in ML. Lately, a lot of researchers are using more of ensemble learning techniques. It would use low price and time lags to predict future highs while another network would use lagged highs to predict future highs. These predictions were used to create stock prices. Stock market price prediction for short time windows appears to be a random process. The fluctuations in stock price 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 refrains people from investing in stocks. Thus, there is a need to correctly predict the stock market which can be used in a real-life scenario. The traditional method of prediction is used in previous model, like multivariate analysis with a prediction time series model. Machine learning and artificial intelligence techniques are used to predict the prices of the stock in an increasing trend. More and more researchers invest their time every day in coming up with ways to arrive at techniques that can further improve the accuracy of the stock prediction model. Due to the very large number of options available, there can be a number of ways on how to predict the price of the stock, but all methods don't work the same way. The output varies for each technique even if the same data set is being applied. 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. The methods used for predicting the stock market include LSTM (Long Short-Term Memory) along with technical analysis, machine learning modeling and predicting the variable stock market. The datasets of the stock prediction model include details such as the closing price, opening price, the data and various other variables that are required to predict the object variable that is the price on a given day.

II. LITERATURE SURVEY

A. Survey of Stock Market Prediction Using Machine Learning Technique

In the present time the stock market prediction has become a major issue. One of the methods adapted is technical analysis, but such methods does not always produce correct results. So, it is very important to develop methods for more accurate and close predictions. Generally, investments are made using predictions that are obtained from the stock price after considering all the factors that might modify it. The technique that was employed in this case was a regression. Since financial stock marks generate vast amounts of data at any given time, a great volume of data needs to undergo analysis before a prediction is made. Each of the techniques listed under regression has its own advantages and limitations over its other counterparts. One of the remarkable skills that introduced was linear regression. The way linear regression models work is that they are often fitted using the least squares approach, but alternatively they can also be fitted in other ways, such as by decreasing the "lack of fit" in some other norm, or by reduce a handicapped version of the least square's loss function. Conversely, the least square approach can be used to fit nonlinear models.

B. Survey of Stock Market Prediction Using SVM

The modern studies provide a logical proof that most of the predicting regression models are inefficient out of sample predictability test. The reason for the unwanted result was due to parameter instability and model uncertainty. The studies also included the traditional tactics that promises to solve this problem. SVM also known as Support Vector Machine provide with the kernel, decision function, and sparsity of the solution. It is used to learn polynomial radial basis function and the multi-layer perception classifier. It is a training algorithm for classification and regression, which works on a larger dataset. There are many methods/techniques in the market but SVM provides greater efficiency and accuracy. The strong interrelation between the stock prices and the market index are indicated by the correlation analysis between SVM and Stock Market.

C. Stock Market Prediction Using Historical Data

The process of stock market prediction is filled with uncertainty and can be influenced by multiple factors. Therefore, business and finance plays an important part of the Stock market. The technical and fundamental analysis is done by sentimental analysis process. Social media has a high impact due to its increased utilization, and it can be helpful in predicting the trend of the stock market. By applying machine learning algorithms on historical data of stock prices the technical analysis can be done. The method usually involves gathering various social media data, news to extract sentiments expressed by individuals. Other data like previous year stock prices are also considered. The relationship between various data points is considered, and a prediction is made on these data points. The model was capable to make predictions about future stock values.

III. METHODOLOGY

LSTMs are very powerful in sequence prediction problems because they can store the past data or information. This plays a vital role in our case because for predicting the future value of stock it is necessary to consider the previous values. In order to add new information, it transforms the existing information completely by applying a function. Because of this, the entire information is modified, on the whole, i. e. there is no consideration for 'important' information and 'not so important' information. LSTMs have the accord of being able to learn the context needed to make predictions in time series forecasting problems, rather than having this context assigned and fixed.

The dataset being utilized for analysis was fetched from Yahoo Finance. The dataset consisted of approximately 7000 records of the required stock prices and other relevant values. The data consisted of various branches namely date, symbol, open, close, low, high and volume.

In order to simulate and analyze, the data for only one company was considered. The data was available in a file of csv format which was first read and transformed into a data-frame using the Pandas library in Python.

The sklearn library in Python was used to perform the normalization of data and the data was divided into training, testing and cross validation sets where the sets were kept as 80%, 10%, 10% or 60%, 20%, 20% of the available dataset respectively. However, machine learning has many such models but this paper concentrate on one of the most important amongst them and made the predictions.

A. Long Short Term Memory (LSTM) Network Based Model

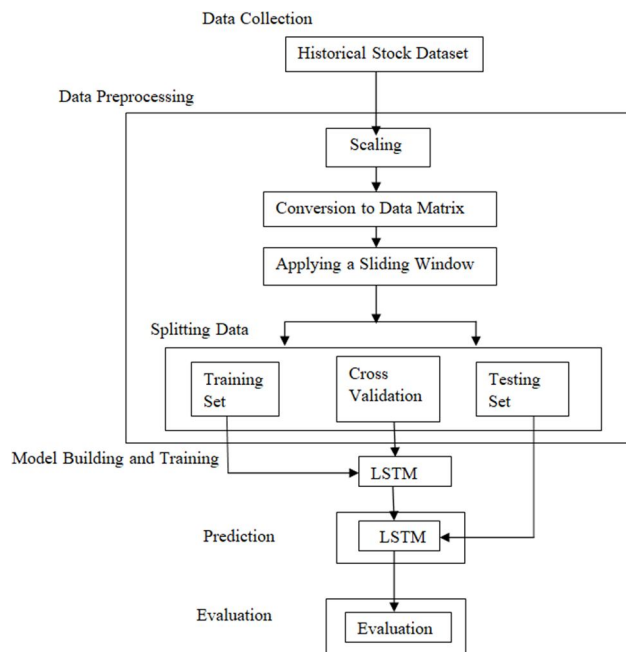


Figure-1: Flowchart of the Proposed System

In the proposed system, the dataset is collected. The data collected is the live data but as it is integrated into the system it becomes a historical data. Then the data preprocessing technique is performed which will transform the source data into an understandable format. The data preprocessing in the proposed system includes feature scaling, conversion to data matrix and applying sliding window. In scaling, independent variables or features of data are normalized in the range. Then, the dataset is sent to conversion to data matrix. In conversion to data matrix, the system will scan the dataset to check whether it contains information/data or not by processing it into a matrix. The dataset is further passed to applying a sliding window. In this step the dependent and independent variables/attributes are identified. Now once the data preprocessing is done, dataset is further divided into training, testing and cross validation sets where the sets are kept as 80%, 10%, 10% or 60%, 20%, 20% of the available dataset respectively. These datasets are then loaded to the prediction model where predictions are made using LSTM (Long Short Term Memory) algorithm. Evaluating these predictions, the user is recommended in which share he/she should invest or purchase.

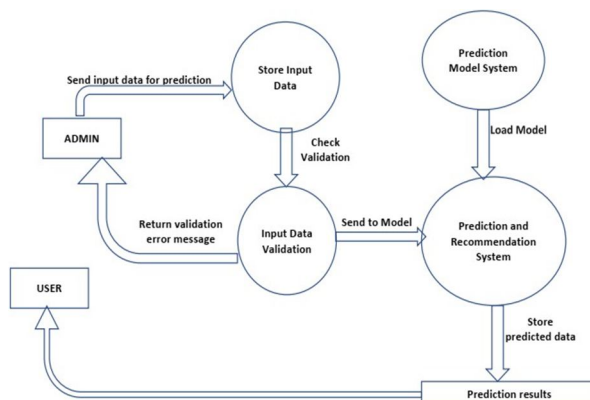


Figure-2: Architecture Diagram

In this paper, a sequential model has been made where the admin sends the input data for prediction and stores the data. The data is then validated, and if there is any error message then the message is returned to the admin and if the data is valid then it is sent to the prediction and recommendation system model. The prediction model system then loads data to the prediction and recommendation model. Using LSTM algorithm, the data is predicted. This stored predicted data is displayed to the user in the form of result.

IV. EXPERIMENTAL SETTINGS

For the purpose to cross validate our system, we have taken 10 stocks randomly from Yahoo Finance. We have considered the closing price of the stocks as a parameter for comparing and predicting the future worth of the stocks. So we took the values of 10 stocks on May 25th, 2021 and integrated in our system, then after 15 days i.e. on June 9th, 2021 we noted the closing price of the same stocks. The observations has been put down into the following table:

Stocks	Predicted Value	Value after 15 days	Accuracy (%)
S1	2.06	2.04	99.03
S2	3102.74	3281.15	94.25
S3	258.80	253.60	97.99
S4	402.71	421.60	95.31
S5	1398.15	1446.90	96.51
S6	2613.25	2746.40	94.90
S7	931.74	967.85	96.12
S8	531.78	554.30	95.76
S9	162.12	164.96	98.24
S10	55.61	56.50	98.40
Average Accuracy			96.65

The average accuracy of the system has found to be 96.65%.

V. CONCLUSION

This paper was an endeavor to decide the future costs of the loads of an organization with more prominent precision and unwavering quality utilizing AI procedures. Our framework will decide the future costs of the supplies of an organization with more prominent exactness and dependability utilizing AI strategies. The outcomes are very encouraging and has prompted the end that it is feasible to foresee financial exchange with more precision and effectiveness utilizing AI procedures. Later on, the correctness of the financial exchange expectation framework can be additionally improved by using a lot greater dataset than the one being used at present. The model produces higher benefit contrasted with the chose benchmarks.

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