STRATEGIZED INTRADAY STOCK MARKET PREDICTION

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Abstract : Stock market is highly fluctuating and there are a lot of uncertainties involved which makes intraday trading a challenging task for the traders. Analyzing the data with the help of technical indicators becomes tedious and in such scenario machine learning can play a vital role in identifying the patterns of stock market. The prediction problem has been mapped to being a classification problem and a unique strategic method has been proposed in this paper in order to solve the same. Various combinations of technical indicators have been used as the input variables and objective functions of various types serve as target variable. Standard classification algorithms have been used such as Random Forest and Support Vector Machine. Various preprocessing techniques have been applied to the input vectors and optimal hyper parameter search techniques have also been used. Some heuristics have also been implied in order to get better results. An accuracy of 64 percent in Random Forest and 60 percent in Support Vector Machine has been obtained.

IndexTerm - OHLC, RF, SVM, technical indicators

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I. INTRODUCTION

Stock market prediction is one of the classic problems and involves major challenges. There are many factors that influence the trend of a particular stock in a particular way such as political events, economic factors such as interest rates, economic outlook, inflation, deflation etc. All these factors adds up to cause random and frequent fluctuations in the price of a stock, making the market susceptible to change quickly and due to the such random and noisy nature of stock behavior, investments in share market comes with high risk. Thus the trend in a stock market price is considered to be a random process with fluctuations which are more pronounced for short time period.

However, stocks usually tend to behave in repetitive trends over long-term time period and so if the direction of the stock is predicted correctly, the investors can yield enough profits out of market and make a fortune.

There are various methods used to predict the stock market trend such as usage of technical indicators and time series forecasting etc.

Technical analysis is a way of forecasting the future stock price based on the past price movement of the particular stock. There are many technical indicators that help investors to predict the stock market movement namely Moving Average Convergence Divergence, Simple Moving Average, Exponential Moving Average, Bollinger Band etc. These indicators help the investors in making decision of buying, selling or holding stocks.

There are various machine learning methods that can be used in stock market predictions such Linear Regression, Random forest , Support vector machine, K-Nearest Neighbor, Artificial Neural Network etc.

In this paper, the focus is on determining which model suits better for the nature of the stock market.

II LITERATURE SURVEY

Studies conducted for analyzing the stock market, predicting trends, applications and the techniques used are discussed in this section.

In [1], a study was conducted to determine the performance in equity price direction prediction. It involves the usage of continuous-valued indicators and basic trading rules. Minute to minute data was used with Random Forest Ensembler. Complex trading rules were applied and a relative comparison was made among different stocks. In [2], feature selection techniques are proposed. Two methods were proposed which are Recursive Feature Elimination methods for Random Forest and for Support Vector Machine that eliminated the unnecessary features. Shares from Shanghai stock exchange were used and it seemed to show SVM performing better than RF for trend prediction. The study conducted in [3] involves formulation of a trading strategy for predicting stocks. The strategy helps identify stock indices with accuracy and the technical indicator that is used is Multiple Regression Analysis. Support Vector Machine Classifier had been used and ensembling techniques were applied that gave a lower error rate. The study conducted in [4] developed predictive models for 5 days ahead and 10 days ahead using Random Forest classifier. Historical index data of CROBEX was used involving Stratified folding method with 10 folds for validation and achieved accuracy in average. In [5], the methods used for prediction of stocks involves Support vector Regressor with the usage of windowing functions and operators. Different types of windowing functions and operators were used in order to minimize the error rate. In [6], yet another study was conducted where statistical learning theory was implied along with the usage of mathematical functions. From the implied theory a certain loss of accuracy was obtained when different samples of data was used. In [7], a model was built that was qualitative in nature where a generalized genetic algorithm was used which was based on fuzzy neural networks and Artificial neural networks. Determination of intelligent factors posed a major challenge in the study. In [8], the model built predicted stocks on the basis of Artificial Neural Networks. A feed forward network was constructed by back propagation and z-score was the metric used in order to pre process the data. Activation functions were incorporated.

The above are some studies, works and research material on Stock Market Prediction and techniques used for it. The models to be built are studied using different classifiers which are then analyzed.

III METHODOLOGY

A. Data

Nifty OHLC (Open High Low Close) is the considered input data along with various technical indicators such as MACD, ADX, CCI and BB etc. which are calculated from the Nifty Close. These indicators are used as features. Certain derived features are also used which are derived from the technical indicators. For example, histogram is a derived feature used as input and is derived from MACD.

B. Approach

A unique strategy is used for preparing the dataset. Technical indicators are calculated for every 'n' minutes and the target is whether the market goes up or down or does stay neutral in next 'm' minutes.

C. Implementation

In order to address the mapped classification problem, standard algorithms such as Random Forest and Support Vector Machine were used. Splitting of the dataset is done and the best split is found. Various preprocessing techniques have been applied such as scaling, under sampling and bucketing of the features if suitable to the algorithm that is in consideration. Various optimal hyper parameter searching techniques have also been used and a new combined optimal hyper parameter search technique has been used.

D. Experimentation

Various combinations of splitter, pre processing techniques and optimal hyper parameter search techniques described above have been tried out and from these the top prediction accuracies gained from certain combinations are taken further to generate a few domain specific heuristics. Finally, the points gained or lost are then being calculated. If these same considered combinations give similar profit points on unseen data, then these are chosen for live trading after building the model for that particular combination of settings.

IV RESULT AND ANALYSIS

The obtained predictions, using Support Vector Machine and Random Forest were analyzed and represented in graphs as shown in the fig. 1 and fig. 2 that shows the comparison of the actual and predicted graph representation of Nifty Close. A maximum accuracy of 64 percent in Random Forest and 60 percent in Support Vector Machine has been obtained.

Fig. 1. Actual Graph representation of Nifty Close

Fig. 2. Predicted Graph representation of Nifty Close

The following graph shown in fig. 3 represents an example of the outcome of live trading done on 10th April 2018.

Fig. 3. Obtained prediction Results

V CONCLUSION

It can be inferred from the results obtained that feature selection plays an important role. Also the hyper parameters chosen specific to a model has a major impact on the predictions. Increase in some of the hyper parameter values led to an increase in accuracy.

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