


Chapter 65

Evaluation of Pattern Based Customized Approach for Stock Market Trend Prediction With Big Data and Machine Learning Techniques

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ABSTRACT

The stock market is very volatile and non-stationary and generates huge volumes of data in every second. In this article, the existing machine learning algorithms are analyzed for stock market forecasting and also a new pattern-finding algorithm for forecasting stock trend is developed. Three approaches can be used to solve the problem: fundamental analysis, technical analysis, and the machine learning. Experimental analysis done in this article shows that the machine learning could be useful for investors to make profitable decisions. In order to conduct these processes, a real-time dataset has been obtained from the Indian stock market. This article learns the model from Indian National Stock Exchange (NSE) data obtained from Yahoo API to forecast stock prices and targets to make a profit over time. In this article, two separate algorithms and methodologies are analyzed to forecast stock market trends and iteratively improve the model to achieve higher accuracy. Results are showing that the proposed pattern-based customized algorithm is more accurate (10 to 15%) as compared to other two machine learning techniques, which are also increased as the time window increases.

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INTRODUCTION

Stock market plays a major role in the economy of various countries and contributes a lot. Predicting a trend of future stock prices are widely considered and studied a topic in the area of trading, finance, statistics, computer science. Mainstream traders usually conduct fundamental analysis and technical analysis to observe stocks and make an investment decision. Fundamental analysis is a too mainstream approach which analyzes fundamental of companies such as earning, revenues, Future growth, return on equity, Profit margin and other data to decide its value and potential for future growth (Barak & Ortobelli, 2017). Whereas Technical analysis is a way of evaluating companies based on statistics of market activity such as price, volume. It uses charts and other tools to recognize the patterns that can be helpful for investment decision (Dash & Dash, 2016). Variation and volatility of stock price depend on multiple factors such as news, Social media data, and fundamentals, Production of the company, Government bonds, historical price and country's economics (Nayak et al., 2016). The feature selection significantly helps to handle overfitting. Decision Tree algorithms is applied for feature selection and it suggests a subset of stock technical indicators are critical for predicting the stock trend (Gerleni et al., 2016). It is very crucial to identify the best feature set which enhances the performance of prediction of the stock price. In order to conduct these processes, a real dataset obtained from Istanbul Stock Exchange is used with technical and macroeconomic indicators. Had investigated the ability of ANN in forecasting the daily NASDAQ stock exchange rate (Boyacioglu & Avci, 2010; Kara et al., 2011; Uygur & Tas, 2014).

In order to decide the final best feature subsets, a different number of feature subsets obtained by different filter methods is used. This approach conducts the following process: combining filter methods, applying classification and obtaining final feature subsets according to voting scheme (Pehliyanit et al., 2016). Prediction model which considers only one factor might not be accurate. There are two common methods to predict stock market prices, first one is technical analysis and the second one is fundamental value analysis. Two models are introduced as part of the research. First is daily prediction model considers both sentiment and historical data which forecasts the trend for next day. The second model is monthly prediction model considers only historical data (Nayak et al., 2016). Several networks for NASDAQ index prediction for two input datasets (four prior days and nine prior days) were developed and validated as shown in (Moghaddam, 2016) created two models. First is for Next-Day model in which 50% accuracy was obtained and second was a Long-term model in which 79% accuracy was obtained overall. Logistic Regression, SVM, Gaussian Discriminant Analysis, Quadratic Discriminant Analysis were applied and 70% of the data was used as a training data and remaining data was testing data. Overall, the highest accuracy was obtained by SVM. As a conclusion, it can be easily seen that fewer, more appropriate and stable indicators are obtained, and they produce better prediction accuracy than the full feature space (Pehliyanit et al., 2016). By considering various patterns like continuous up/down, volume traded per day and also including sentiment of the company a model has been built and tested with different stock market data available open source as shown in (Nayak et al., 2016). The performance of ANNs was evaluated using the determination coefficient (R^2) and the mean square error (MSE) as shown in (Moghaddam et al., 2016). It is concluded that stock technical indicators are very effective and efficient features without any sentiment data in predicting short-term stock trend as per trend Deterministic Data Preparation Layer proposed by (Patel et al., 2015) paper exploits inherent opinion of each of the technical indicators About stock price movement.

A large amount of data available for different Stock market transactions which can be used to predict the price of a stock in advance. Traditional data analytics model for stock market price prediction basi-

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