ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 9, September 2015

Implementation of Stock Market Prediction

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ABSTRACT: Today the topic based on Stock Market Prediction is on peak as per as the research field is concerned.. As we know in social media micro logging service has been grown famous which provides the users with number of real time messages. In previous methods we used a factorization machine (FM) to predict stock market trends. FM alleviates the effect of dimensionality as well as captures aspects of basic linguistics..The accuracy of the existing model is not sufficient. The accuracy has been recorded at 81 percent, which means there is higher probability of the wrong predictions. Unlike many existing approaches we proposed a novel kind of model which uses a technology of Artificial Neural network (ANN) with history of stocks data for stock market prediction. The data is used to train the artificial neural network (ANN) which is implemented via Neuroph, an open source library for Artificial Neural network implementation in java. Experiments on real-world data show that our new can achieve 90% accuracy and get significantly more profit than state-of-the-art models.

KEYWORDS: NLP; Neuroph; stock market prediction; Artificial Neural network; factorization machines; KDT.

I. INTRODUCTION

Natural language processing is the field of computer science based on developing systems that allow computers to interact with peoples using everyday languages. Forecasting the direction of future stock prices is a widely studied topic in many fields including trading, finance, statistics and computer science. The motivation for which is naturally to predict the direction of future prices such that stocks can be bought and sold at profitable positions. Professional traders typically use fundamental and/or technical analysis to analyze stocks and make investment decisions. Fundamental analysis is the traditional approach involving a study of company fundamentals such as revenues and expenses, market position, annual growth rates, and so on (Murphy,1999)[1]. Technical analysis, on the other hand, is solely based on the study of historical price fluctuations. Practitioners of technical analysis study price charts for price patterns and use price data in different calculations to forecast future price movements (Turner, 2007)[6]. The technical analysis paradigm is thus that there is an inherent correlation between price and company that can be used to determine when to enter and exit the market. In finance, statistics and computer science, most traditional models of stock price prediction use statistical models and/or neural network models derived from price data (Park and Irwin, 2007)[3]. Moreover, the dominant strategy in computer science seems to be using evolutionary algorithms, neural networks, or a combination of the two (evolving neural networks) [2]. The approach taken in this thesis differ from the traditional approach in that we use a knowledge-intensive first layer of reasoning based on technical analysis before applying a second layer of reasoning based on machine learning. The first layer of reasoning thus performs a coarse-grained analysis of the price data that is subsequently forwarded to the second layer of reasoning for further analysis [4]. We hypothesis that this knowledge-intensive coarse-grained analysis will aid the reasoning process in the second layer as the second layer can then focus on the quintessentially important aspects of the price data rather than the raw price data itself[7]. Recently, a lot of interesting work has been done in the area of applying Machine Learning Algorithms for analyzing price patterns and predicting stock prices and index changes [9]. Most stock traders nowadays depend on Intelligent Trading Systems which help them in predicting prices based on various situations and conditions, thereby helping them in making instantaneous investment decisions. Stock Prices are considered to be very dynamic and susceptible to quick changes because of the underlying nature of the financial domain and in part because of the mix of known parameters (Previous Days Closing Price, P/E Ratio etc.) and unknown factors (like Election Results, Rumors etc.) [5]An intelligent trader would predict the stock price and buy a stock before the price rises, or sell it before its value declines. Though it is very hard to replace the expertise that an experienced trader has gained, an accurate prediction algorithm can directly result into high profits for investment firms, indicating a direct relationship between the accuracy of the prediction algorithm

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and the profit made from using the algorithm. Prediction of stock trend has long been an intriguing topic and is extensively studied by researchers from different fields. The purpose of the thesis is to create a stock price prediction model for the Oslo Stock Exchange. The resulting model is intended to be used as a decision support tool or as an autonomous artificial trader if extended with an interface to the stock exchange. The developed model employs a two-layer reasoning approach. The first reasoning layer is a knowledge-intensive Feature Generation module based on domain knowledge from technical analysis and certain other statistical tools. This is implemented by a set of artificial agents where each agent employs a specific subset of expertise from technical analysis [10]. The resulting output is a set of quintessentially important feature-values derived from the price data (such as price is trending up, a trend reversal is expected to occur, the stock is trading on high volume, etc.). The generated feature-values are then forwarded to the second layer of reasoning called the Feature Aggregation module [5]. In the Feature Aggregation module machine learning is employed to learn a classification model that aggregate and place the derived feature-values in context of each other. The resulting output is an investment strategy that can be used to select stocks to trade on the Oslo Stock Exchange. In the Portfolio and Money Management module the performance of the investment strategy is evaluated in terms of profitability by simulating portfolio runs using trade signals generated by the investment strategy. Moreover, the module includes a money management strategy used to assess the strength (i.e., confidence) of generated predictions and to determine the amount of capital to invest on a generated trade signal. Globalization deepens the interaction between the financial markets around the world. Shock wave of US financial crisis hit the economy of almost every country and debt crisis originated in Greece brought down all major stock indices.

II. RELATED WORK

Ellmer, E.[1] Reuse of the valuable knowledge gained through the realization of software projects is an important step in overcoming well-known problems of the software industry such as wrong schedules and cost estimations, low productivity, and low product quality. To promote this kind of reuse the authors propose an approach relying on an explicit representation of the software processes by process descriptions and to organize and classify them in a software process library for further use within software projects. A process description is divided into an informal process definition document and a formal process model. The process definition document constitutes the basis for the classification process that is performed by using an artificial neural network. They present an exposition of their approach and discuss the promising results of a case study in structuring a software process library.

Li Zhao [8] Natural language is used to represent human thoughts and human actions. Business rules described by natural language are very hard for machine to understand. In order to let machine know the business rules, parts of business process, we need to translate them into a language which machine can understand. Object constraint language is one of those languages. In this paper we present a statistical machine learning method to understand the natural business rules and then translate them into object constraint language. Subsequently a translation algorithm for business process modeling is also provided. A real case, air cargo load planning process is proposed to illustrate the efficiency and effective of the method and the algorithm. The result has shown that this method and algorithm enrich business process modeling technology and enhance the efficiency of software developers in business process modeling.

III. PROPOSED WORK

At first stage, a detailed literature study would be conducted on the stock prediction algorithm and data classification methods; and to know their advantages and disadvantages. Literature study will lead us towards refining the structure of the proposed security solution design to overcome the shortcomings of the existing schemes, while keeping their advantages interact in order to build a robust system. Afterwards, the proposed solution will be implemented with all essential input and output parameters. Then the implementation will undergo a thorough performance analysis and detailed comparison with the existing models.

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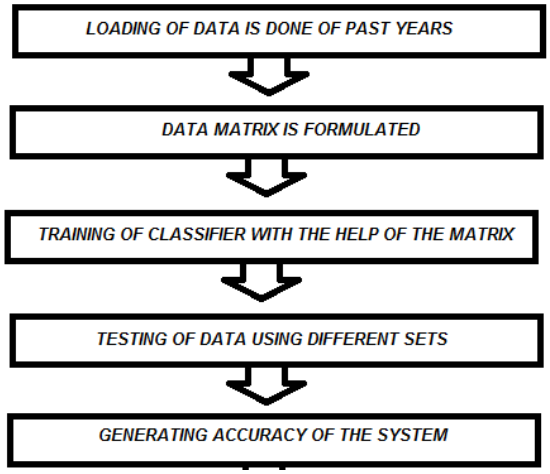

FIG 1: FLOW CHART OF PROPOSED WORK

IV. EXPERIMENTS AND RESULTS

The experiment was performed by developing a program in JAVA and then testing it for prediction accuracy check. Since, stock market prediction is never pin point accurate, a range is used and if the prediction is in the range than it is assumed to be correct prediction.

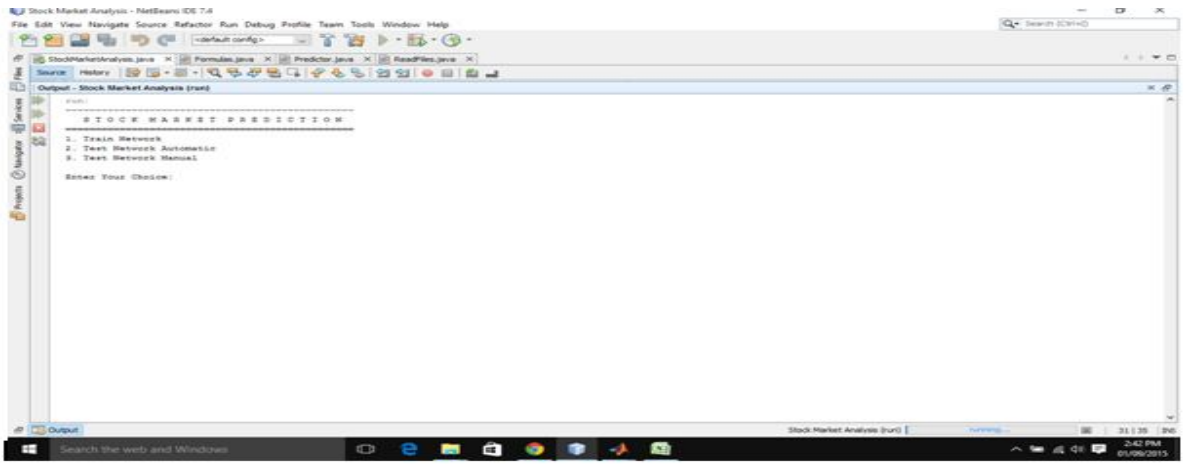

Figure 2: Program Running Phase, Training Data Matrix

The figure above shows the training data to be passed to neural network for training it. The training data has 5 columns (Leave 1st and last column): Open, High, Low, Close and Volume. The last column is Adjusted Close which is actually predicted by our ANN predictor. In the training data, this data is provided for supervised training.

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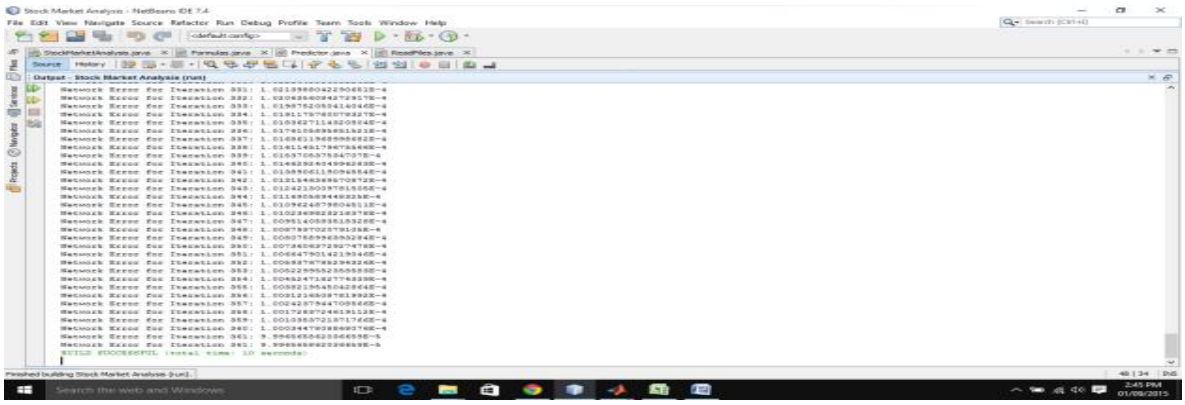

Figure 3: Training Phase of Artificial Neural Network

The figure above shows the training data to be passed to neural network for training it. The training data has 5 columns (Leave 1st and last column): Open, High, Low, Close and Volume. The last column is Adjusted Close which is actually predicted by our ANN predictor. In the training data, this data is provided for supervised training.

```
run:
------------------------------------------------------
    S T O C K   M A R K E T   P R E D I C T I O N
======================================================
1. Train Network
2. Test Network Automatic
3. Test Network Manual

Enter Your Choice: 3

------------------------------------------------------
              T E S T    N E T W O R K
======================================================

Input First Parameter (OPEN): 27440.099609
Input First Parameter (HIGH): 27442.820312
Input First Parameter (LOW): 27131.439453
Input First Parameter (CLOSE): 27366.070312
Input First Parameter (VOLUME): 14000.0
Input First Parameter (Adj. CLOSE): 27366.070312
------------------------------------------------------
              N E T W O R K    R E S U L T S
======================================================
Expected value : 27366.070312000003
Predicted value : 26918.23544385544
======================================================
BUILD SUCCESSFUL (total time: 1 minute 16 seconds)
```

Figure 4: The prediction of a stock with Expected and Predicted Values

This image shows the expected value of a test case and its predicted value by ANN. The result is very close to the expected value and thus is considered an accurate prediction.

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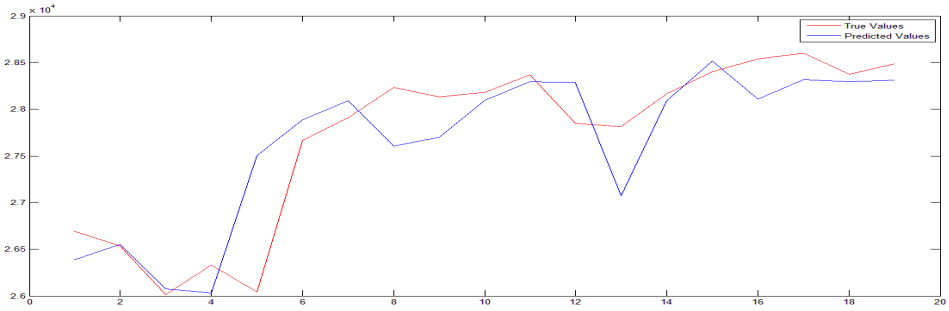

Figure 5: The Graph of Actual and Predicted Value by the System on Stock's Adjusted Close Value. The Blue is Predicted Values and Red is Actual or True Values.

The graph shows 20 tests on Stock's Adjusted Close Value prediction with True and Predicted Values. The values are staying pretty close with only a few points having considerable distance. This shows a very high accuracy of the System.

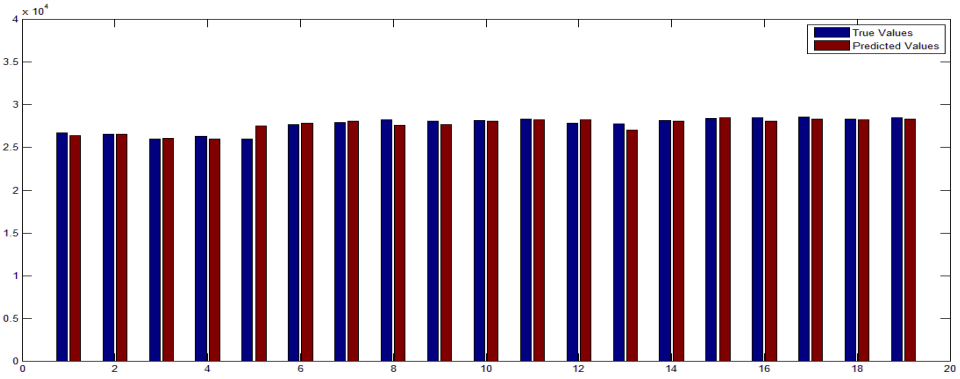

Figure 6: The Figure of a Bar Chart of the Actual Values (Blue) and Predicted Values (Red)

This figure shows the comparison between the true values and the predicted values in form of a bar chart. We can see that the true values and the predicted values are very near to each other and thus are considered a good accuracy.

V. CONCLUSION

In this thesis, we have studied the Stock Market Prediction Systems. We have found out that Artificial Neural Networks are very good at predicting Market Fluctuations if trained with sufficient amount of data. The results are very accurate and the error rate is minimal. To this point, the proposed system with ANN based prediction method the system's error rate is close to not more than 10% which implies a very high 90 % prediction accuracy.

VI. FUTURE SCOPE

In future work we are going to design the algorithm for stock classification and prediction to overcome the demerits of the existing system to create a new and robust stock prediction system. We also increase the accuracy of the stock market prediction by applying trending factor data to the online source stock data.

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