OPINION MINING ON STOCK MARKET NEWS

[1]SV.Shri Bharathi, [2]G.Charlyn Puspa Latha

[1]Department of Computer Science and Engineering, Saveetha School of Engineering,
Saveetha University, Thandalam, Chennai, Tamil Nadu, India.

E-Mail: ***shribharathi01@gmail.com, charlyn.latha@gmail.com***

ABSTRACT

Stock News play a vital role in the stock market. The proposed paper aims to predict news polarity which may cause changes in stock price movements. The proposed approach is efficiently predicting the emotions from all relevant available real time stock news. Our method uses the sentiment analysis in stock news data that has an impact on stock market. Hence for a period of time stock market news data is collected. The proposed work establishes the algorithm for opinion mining to find the sentiments in stock news data. In our experimental study, to predict the stock news sentiment stock price fluctuations are considered, whether up or down.

Index Terms—Sentiment Analysis, Opinion Mining, Stock Market News**.**

I. INTRODUCTION

Opinion Analysis (OA) is a sub-discipline of text mining which is concerned not with the topic, a document is about, but with the opinion it expresses. It is also called sentiment classification, sentiment analysis, opinion mining for text or sentiment orientation analysis. News document is an interesting area to explore is opinion analysis. Opinion analysis is often used in opinion mining to predict sentiment, affect, subjectivity, and other emotional states in online text.

In the finance field, stock market and its trends are extremely volatile in nature. To capture the volatility and predicting its next moves researcher focuses the financial field. Investors and market analysts study the market behaviour and plan their buy or sell strategies accordingly. As stock market produces large amount of data every day, it is very difficult for an individual to consider all the current and past information for predicting future trend of a stock. Mainly there are two methods for forecasting market trends. One is technical factor and other is fundamental factor.

This research follows the fundamental analysis to discover future trend of a stock by considering news articles about a company as prime information and tries to classify news as good (positive) and bad (negative). If there is a positive sentiment then stock news is positive, and the stock price will go up and if the news sentiment is negative, then stock price may go down.

This paper is structured as follows: Section 2 surveys the related study. Section 3 discusses the Opinion Analysis and stock News data. Section 4 explains the Stock Market news. Section 5 describes Architecture of Opinion Mining on stock market news data. Section 6 presents the experimental results. Finally, Section 7 gives the conclusion of work.

II. RELATED WORK

In recent years, significant efforts have been put into developing models that can predict the future trend of a specific stock or overall market. Most of the existing techniques make use of the technical indicators. Micro blog feeds predict the public mood of Chinese stock market [1].

Karamibekr explores the subjectivity analyses of social issues [2]. The subjectivity of a document strongly depends on its sentences. A lexical-syntactical approach is proposed to recognize and classify subjectivity at the sentence level .A generic stock price prediction framework is proposed by Li et al., to enable the use of different external signals to predict stock prices [3]. Evaluations were performed at individual stock, sector index, and market index levels.

Another approach was proposed to mine Twitter data [4]. Ambiguous textual tweet data are extracted through NLP techniques to define public sentiment. To discover pattern data mining techniques are used between public sentiment and real stock price movements. Al-radaideh et al explored one of the data mining technique called a decision tree classifier that helps to take the decision in the stock market [5].

The proposed approach was a model to score news articles regarding public emotions, and to identify which news sections and emotions cause movements in a stock market index [6].

A fuzzy logic approach based on grid partition is adopted to deal with the uncertainty factors in this paper while predicting the stock price of any company. Also using a hybrid neural learning mechanism the learning rules are optimized in an adaptive fashion [7].

Cheng et al focused on the Joint Aspect/Sentiment (JAS) model and is used to extract aspects and aspect-dependent sentiment lexicons from online customer reviews [8].

For model optimization a novel stock selection model with discrete and continuous variables algorithm is introduced [9].

To predict future stock price different textual representations of news articles were examined, which was compared to linear regression with SVM [10].

III. OPINION ANALYSIS AND STOCK NEWS

Opinion mining or sentiment analysis automatically identifies a sentiment (such as a negative or positive sentiment) from a group of words such as a sentence or a document. Newspapers generally attempt to present the news objectively, but textual affect analysis in news documents shows that many words carry positive or negative emotional charge.

Sentiment classification also be done in word level, sentence level and document level. Subjectivity analysis is divided into two categories: objective and subjective, whereas sentiment analysis attempts to divide the language units into three categories; negative, positive and neutral.

Three levels of sentiment analysis are,

Document level: The whole opinion of the document is identified as positive, negative or neutral.

Sentence level: Identify if a sentence is opinionated and whether the opinion is positive, negative or neutral.

Entity and Aspect level: Extract the object attribute that are the subject of an opinion and the opinion orientations.

If there is positive news data then this tends to have a positive effect on stock markets. On the other hand, if there is negative news data is negative then this tends to have a negative impact on stock markets and makes the stock market values go down.

IV. STOCK MARKET NEWS

Stock market prediction is one of the most difficult tasks in the financial markets which are influenced by many external social-psychological and economic factors.

A. *Impact of News on Stock Market*

Market and stock exchange news are special messages containing mainly economic and political information. Some of them are carrying information that is important for stock market prediction. There are various types of financial information sources on the Web which provide electronic versions of their daily issues. All these information sources contain global and regional economic news, citations from influential bankers, as well as recommendations from financial analysts.The economic news always has a positive or negative effect on the number of traded stock. There are different economic news available for public information. Sentiment polarity news provides an efficient result to the stock market forecasters when to buy or sell their stocks.

V. PROPOSED WORK

The system automatically identifies the news opinions from the news and predicts the stock market movement whether rises up or down. The Fig. 1 describes system for Opinion Mining on Stock market News Prediction.

A. *Stock News*

From the relevant web sites, Stock news data are collected. All the collected stock news are stored inside the document.

B. *Sentence Splitting Module*

The sentence splitting module cleans the news data and splits it into individual sentences. A text document is used to collect all the parsed news data for the testing purpose. The document contains the news data in the form of sentence by sentence

C. *NLP Module*

Natural language processing (NLP) is generally identify and extract subjective information in source materials. In order to identify the new opportunities and to maintain the reputations, business people usually view the reviews, ratings, recommendations and other forms of online opinion.

Positive/negative/neutral sentiments are determined in this module. Here to find the polarity of the sentence, part-of-speech tagger, and dictionary based approach is used to conclude whether the sentence is positive, negative and neutral.

Part-of- Speech Tagger: A Part-Of-Speech (POS) tagger is also known as grammatical tagging or word-category disambiguation. It is a software that reads text in some language and assigns parts of speech to each word, such as noun, verb, adjective, etc.,

Dictionary based Approach: The dictionary is used to find the opinion words and their polarities. To determine word sentiments Dictionary-based techniques are used where synonyms, antonyms and hierarchies in WordNet (or other lexicons with sentiment information) found. There are three sentiment numerical scores used are: Obj(s), Pos(s), and Neg(s) and describing how Objective, Positive and Negative synset are.

D. Sentence Polarity

Each sentence polarity value is calculated in this module. In general, the score ranges from 0.0 to 1.0 and their sum is 1.0 for each synset. If the polarity value of that sentence is positive then that sentence is considered as a positive sentence. If polarity value is negative then it is considered as negative sentence. If it is 0.0, then it is considered as a neutral sentence.

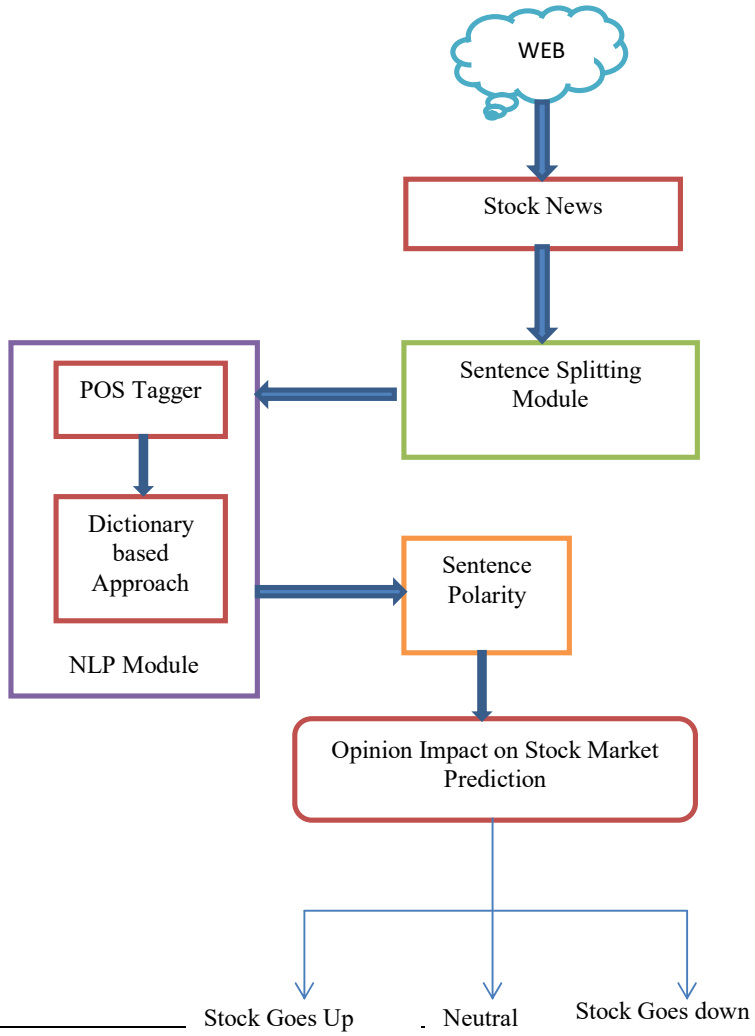


Figure 1. Architecture of Opinion Mining on stock market news data

Equation (1) is used to calculate the Sequence of words.

$$\text{Sequence of words}(W) = W_1 + W_2 + \cdots + W_n \qquad (1)$$

$S(W_{+ve})$ = Set of Positive Sentiment words.

$S(W_{-ve})$ = Set of Negative Sentiment words.

n = Number of words.

E. Stock Market Opinion Prediction

After identifying the opinionated score of each sentence, the polarity score value is classified as positive opinion, negative opinion and neutral. If the opinion is positive then the stock rise up and if the opinion is negative the stock goes down. Based on the results the stock market trend goes up, down or neutral.

VI. EXPERIMENTAL RESULTS

In the experimental part the stock market predicting is collected from different stock website. The polarity value is calculated for specific month of 200 sentences.

(a)

(b)

Figure 2. The selection of month and year for opinion analysis (a), (b)

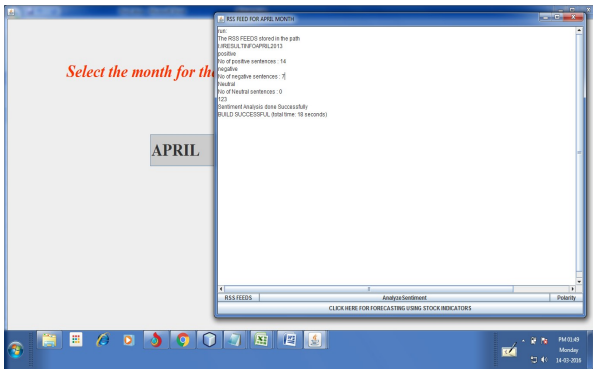


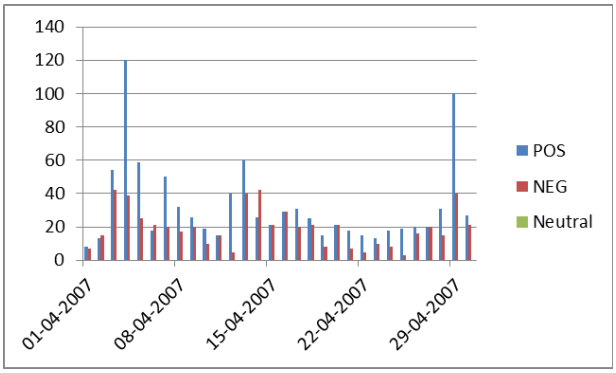
Figure 3. Calculation of Over all Positive and negative scores.

The selection of sentiment analysis for the specific month is shown in Fig.2 (a), (b). Also the overall positive and negative polarity scores are shown in Fig. 3. The below Table I shows the opinion score value for the month of April 2007. From this graph the positive score value is greater than negative one. This result shows that the stock value goes up for that month. The Left column shows the number of sentences and the bottom value shows the date of the month. Highest line score is for positive value and second line is for negative score value.

Accuracy refers to the closeness of a measured value to a standard or known value. Precision refers to the closeness of two or more measurements to each other. Equation (2) is used to calculate the precision score values.

$$\text{Precision} = TP/ (TP+FP) \qquad (2)$$

Compared with the above tabular value the proposed system produces better than the previous one.



VII. CONCLUSION

This paper builds a predictive model to predict sentiment around stock news. First the relevant real time stock news has been filtered from the web and then they have been analyzed to predict the sentiments score values whether it is positive, negative or neutral. Such proposed model can be a helpful tool for the investors to take the right decision regarding their stocks. Finally an efficient result to the stock marketers are provided by sentiment polarity news when to buy or sell their stocks. The future of the system focuses on the evaluating the impact of using negation and valence shifters in addition with sentiment news which may improve the accuracy.

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