Chapter 8
Business Intelligence through Opinion Mining

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ABSTRACT

Business organizations have been adopting different strategies to impress upon their customers and attract them towards their products and services. On the other hand, the opinions of the customers gathered through customer feedbacks have been a great source of information for companies to evolve business intelligence to rightly place their products and services to meet the ever-changing customer requirements. In this work, we present a new approach to integrate customers’ opinions into the traditional data warehouse model. We have taken Twitter as the data source for this experiment. First, we have built a system which can be used for opinion analysis on a product or a service. The second process is to model the opinion table so obtained as a dimensional table and to integrate it with a central data warehouse schema so that reports can be generated on demand. Furthermore, we have shown how business intelligence can be elicited from online product reviews by using computational intelligence technique like rough set base data analysis.

INTRODUCTION

Organizations spend a lot of money for conducting surveys on their products to get feedback, to know defects in the products and for future enhancements. Firstly, customer opinions help one to know how a particular product or service is perceived by the customers, reflecting customers’ satisfaction and expectations that can be used to determine their current and future expectations (Das, Acharjya & Patra, 2014). Secondly, it can provide opportunity to improve one’s products and services to satisfy customers and build loyalty. Third, they may be of help in understanding the product dimensions or attributes that are important to different customer segments, and even to discover new segments based on customers’ liking/disliking of similar product attributes. Fourth, businesses gather essential information about the products and services offered by competitors to improve upon their products and services to remain competitive.

Companies do different types of surveys like product fulfillment survey, competitive products and market survey, brand equity survey, customer service survey, new-product acceptance survey, customer

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trust and loyalty survey etc. for product enhancements (Das & Kumar, 2013). Such surveys demand lofty budget, manpower and time, though the report so generated may not be trustworthy.

Therefore, the main objective of this work is to reduce expenditure on survey by using on-line social networks. On-line social networks (OSNs) such as Facebook, Google+, and Twitter provide lot of information which can be exploited for effective business. The objective is to analyze posts, tweets and other public discussions on products and elicit business intelligence. The results of analysis are depicted in the form of cumulative graphs, pie charts and tables to facilitate easy interpretation by the end-users. The purpose is to help businesses understand customer responses on their products and services. Reports generated through this process are unbiased and genuine as compared to other approaches to survey and analysis. The proposed method can yield solutions which is cost effective and time saving.

OPINION MINING

Opinion mining popularly known as sentiment analysis has been evolved as an interesting research area in recent years. Most research has focused on analyzing the content of either product review (Dave, Lawrence & Pennock (2003) or movie reviews(Pang et al, 2004). Furthermore sentiment analysis has been extended to other domains such as news, blogs and debates also. Sentiment analysis or opinion mining refers to the application of natural language processing, computational linguistics and text analytics to identify and extract subjective information implicit in source materials. It is an excellent means for handling many business intelligence tasks as it describes sentiment analysis as a process that categorizes a body of textual information to determine feelings, attitudes and emotions towards a particular issue or object. Generally speaking, sentiment analysis aims to determine the attitude of a speaker or a writer with respect to some topic or the overall contextual polarity of a document. The attitude may be one’s judgment, assessment, sensitiveness or emotional state of the author when commenting about a subject. Opinion mining deals with detection and classification of sentiments in a text (Bifet & Frank, 2010). Sentiment analysis research achieves two things: i) identifying the polarity of the underlying subject in the text, and ii) determining the strength of the polarity (severity or intensity). Generally, the sentiment polarity is classified as positive, negative or neutral classes and the strength of polarity is expressed in numeric figures. Keywords like dazzling, brilliant, phenomenal, excellent, fantastic, spectacular, cool, awesome, thrilling obviously expresses a favorable context of the subject while keywords like terrible, awful, worst, horrible, stupid, waste express unfavorable sentiment. Sentiment elicitation is done at different levels focusing on either single words, phrases, complete sentences or a complete document by adopting techniques such as unigrams, bi-grams, N-Grams, and opinion words.

INTELLIGENT TECHNIQUES FOR OPINION MINING

One can use supervised techniques (Pang, Lee & Vaithyanathan, 2002), unsupervised techniques (Paltoglou & Thelwall, 2012) or a hybridization of them (Zhang et al, 2011) for opinion mining. Classification of sentiments generally done by supervised techniques by using machine learning approach. Pang et al (2002) first applied machine learning methods to perform sentiment analysis. In this approach, we build and train a sentiment classifier to determine positive, negative and neutral sentiments. This method is quite successfully applied to classification of sentences and documents. By this method, an inductive
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