



# A novel social media competitive analytics framework with sentiment benchmarks



Wu He<sup>a,\*</sup>, Harris Wu<sup>a</sup>, Gongjun Yan<sup>b</sup>, Vasudeva Akula<sup>c</sup>, Jiancheng Shen<sup>d</sup>

<sup>a</sup> Department of Information Technology & Decision Sciences, College of Business and Public Administration, Old Dominion University, Norfolk, VA 23529, USA

<sup>b</sup> Department of Management and Information Sciences, Roman College of Business, University of Southern Indiana, Evansville, IN 47712, USA

<sup>c</sup> Head of Business Consulting, VOZIQ, Reston, VA 20190, USA

<sup>d</sup> Department of Finance, College of Business and Public Administration, Old Dominion University, Norfolk, VA 23529, USA

## ARTICLE INFO

### Article history:

Received 29 August 2014

Received in revised form 31 January 2015

Accepted 27 April 2015

Available online 12 May 2015

### Keywords:

Social media analytics

Competitive analytics

Sentiment benchmarks

Text mining

Sentiment analysis

User-generated data

Social media

Marketing intelligence

Big data

Social media monitoring

## ABSTRACT

In today's competitive business environment, there is a strong need for businesses to collect, monitor, and analyze user-generated data on their own and on their competitors' social media sites, such as Facebook, Twitter, and blogs. To achieve a competitive advantage, it is often necessary to listen to and understand what customers are saying about competitors' products and services. Current social media analytics frameworks do not provide benchmarks that allow businesses to compare customer sentiment on social media to easily understand where businesses are doing well and where they need to improve. In this paper, we present a social media competitive analytics framework with sentiment benchmarks that can be used to glean industry-specific marketing intelligence. Based on the idea of the proposed framework, new social media competitive analytics with sentiment benchmarks can be developed to enhance marketing intelligence and to identify specific actionable areas in which businesses are leading and lagging to further improve their customers' experience using customer opinions gleaned from social media. Guided by the proposed framework, an innovative business-driven social media competitive analytics tool named VOZIQ is developed. We use VOZIQ to analyze tweets associated with five large retail sector companies and to generate meaningful business insight reports.

© 2015 Elsevier B.V. All rights reserved.

## 1. Introduction

In recent years, we have observed the rapid development of social media, which has drastically transformed the way in which people communicate and obtain information. Currently, social media has become ubiquitous and plays an increasingly critical role in today's business environments. A number of companies use social media tools such as Facebook and Twitter to provide a variety of services and to interact with customers. As a result, a large amount of user-generated content is available on social media sites. User-generated content offers opportunities and challenges to businesses. In the business field, consumers increasingly rely on user-generated reviews to evaluate products and services prior to making a purchase. To increase competitive advantage and effectively assess the competitive business

environment, companies not only need to monitor and analyze the customer-generated opinions about their businesses but also need to track opinions about their competitors. Studies indicate marked performance growth in companies that have strong business analytics capabilities [52].

Marketing intelligence is typically performed by businesses to collect and analyze data from both internal and external information sources. The mechanism for collecting and analyzing these sources is also called business intelligence (the portion that focuses on internal business data) and competitive intelligence (the portion that focuses on external business data) [40]. Marketing intelligence is considered important to the improvement of a firm's organizational performance [45]. In recent years, due to advances in social media technology, the amount of online social media data has grown explosively. Leskovec [29] proposes that user-generated content in the form of blog posts, comments, and tweets establishes a connection between companies and consumers. Thus, companies are expected to harness this user-generated data to extract entities and themes, to understand consumer sentiment, to visualize relationships and to create their marketing intelligence

\* Corresponding author. Tel.: +1 757 683 5008; fax: +1 757 683 5639.

E-mail addresses: [edu@whe.odu.edu](mailto:edu@whe.odu.edu) (W. He), [hww@odu.edu](mailto:hww@odu.edu) (H. Wu), [gyan@usi.edu](mailto:gyan@usi.edu) (G. Yan), [vakula@voziq.com](mailto:vakula@voziq.com) (V. Akula), [jshen@odu.edu](mailto:jshen@odu.edu) (J. Shen).

to excel in the business environment. In particular, a marketing intelligence report can include market information about the popularity of competitors' products and services, consumer sentiments on their products and services, promotional information, and/or activities offered by competitors [14].

As one consequence of social media development, social media analytics has emerged as an important area of study [16,48]. Social media analytics is concerned with using advanced informatics tools and analytics techniques to collect, monitor, and analyze social media data to extract useful patterns and intelligence [31,48]. Therefore, the development of effective and efficient analytics techniques for social media analytics becomes essential. Data mining, text analysis, and sentiment analysis techniques are frequently adopted to conduct social media analytics [3–6,19,46]. Recently, there has been strong interest in the power of social media analytics to create new value, to support decision making and to enhance competitive advantage. For example, Abrahams, Jiao, Wang, and Fan [5] use social media analytics to discover a specific vehicle defect from social media to improve their automotive quality management.

One of the challenges in uncovering actionable insights is to properly interpret the meaning of both positive and negative sentiments in unsolicited customer opinions on social media. While there are advances in improving the sentiment accuracy itself, the core challenge for businesses to identify areas of improvement based on sentiment analysis remains. Furthermore, companies often want to determine how their performance stacks up against their key competitors' performance. Effective social media benchmarking can be used as a means to compare a company's performance with that of its key competitors or with the industry as a whole. In an effort to help companies understand how to perform social media competitive analysis, transform social media data into actionable knowledge, and develop the ability to benchmark effectively, we propose a social media competitive analytics framework with sentiment benchmarks. This framework, first, calls for creating a sentiment benchmark of the industry (or of comparable businesses) and then using that industry sentiment benchmark to compare whether a business's social media sentiment is higher or lower. To further enhance the ability to drive business decisions, the framework uses industry-specific lexicons to quickly identify topics that might be of interest to businesses based on the verticals in which they operate. The entire framework leverages emerging technologies, including text mining, sentiment analysis, and social network analysis. Based on the idea of the proposed framework, new social media competitive analytics tools can be developed to identify actionable marketing intelligence.

The remainder of the paper is organized as follows. Section 2 provides a review of text mining and sentiment analysis. Section 3 proposes a social media competitive analytics framework for marketing intelligence. Section 4 describes an innovative social media competitive analytics tool named VOZIQ that we developed and offers an example of using VOZIQ for analyzing social media performance in five large retail sector companies. Conclusions and future research are given in Section 5.

## 2. Literature review

### 2.1. Text mining

Today, numerous customers and users share their experiences using various social media sites such as Twitter, Facebook and blogs. It has become a challenge for organizations to monitor and understand what people post on social media sites. Traditional content analysis methods are no longer able to meet organizations' needs to analyze the large amount of new content

on a daily basis. Applying automatic methods to quickly analyze such content is increasingly needed by organizations. As users continue to post textual information on various social media sites, there is a growing interest in using text mining, sentiment analysis and social network analysis approaches to process large amounts of user-generated data and extract meaningful knowledge and insights.

As an emerging technology, text mining aims to extract meaningful information from unstructured textual data [19,23,33]. To glean useful information from a large number of textual documents quickly, it has become imperative to use automated computer techniques [20,33]. Text mining is focused on finding useful models, trends, patterns, or rules from unstructured textual data [2,23,39]. Different from traditional content analysis, the main purpose of text mining is to automatically extract knowledge, insights, useful patterns or trends from a given set of textual documents [21,50].

Text mining techniques have been used to analyze large amounts of textual data. Morinaga et al. [36] present a framework for mining public opinions related to product reputation on the Internet. They find that text mining techniques offer both a dramatically reduced cost and increased knowledge discovery from public opinion, compared with the conventional survey approach. Kloptchenko et al. [27] use data and text mining methods to analyze the textual part of a company's financial report. They find that the mining results can be used to predict the company's future financial performance to some extent. Abdous and He [2] use text mining techniques to analyze the online questions posted by video streaming students and identify a number of learning patterns and technology-related issues. Hung [22] uses clustering analysis as an exploratory technique to examine e-learning literature and visualizes patterns by grouping sources that share similar words, attribute values and coding rules.

Some major applications of text mining include: cluster analysis, categorization, information extraction (text summarization), and link analysis [22,50]. In particular, cluster analysis is a key application of text mining and includes four main building blocks: feature selection, the clustering algorithm, the validation of the results, and the interpretation of the results [17]. By dividing a population into clusters that are different from one another (maximal distance between clusters) but whose members are similar (minimal distance within each cluster), cluster analysis can enhance the understandability of datasets and support effective decision making [25]. Currently, there are a wide range of tools that can be used for text mining and analytics, such as IBM SPSS Modeler (formerly Clementine), Semantria, Lexalytics, Leximancer, Clarabridge and SAS Enterprise Miner. Due to the powerful capabilities of text mining, it is believed that applying text mining to textual data, including messages posted on social media such as blogs, can yield interesting findings [6,11,21].

### 2.2. Sentiment analysis

Sentiment analysis is the computational detection and study of opinions, sentiments, emotions, and subjectivities in texts [30,32,37]. As a special application of text mining, sentiment analysis is concerned with the automatic extraction of positive or negative opinions from texts [37]. Given that texts often contain a mix of positive and negative sentiments, it is often useful to identify the polarity of sentiment in texts (positive, negative, or neutral) and even the strength of the sentiments expressed [37,44]. Sentiment analysis mainly relies on machine learning techniques, such as Support Vector Machine (SVM), Naive Bayes, Maximum Entropy and Matrix Factorization, to classify texts into positive or negative categories [30,38].

Download English Version:

<https://daneshyari.com/en/article/553773>

Download Persian Version:

<https://daneshyari.com/article/553773>

[Daneshyari.com](https://daneshyari.com)