

9th International Conference on Theory and Application of Soft Computing, Computing with Words and Perception, ICSCCW 2017, 24-25 August 2017, Budapest, Hungary

Applying fuzzy logic for sentiment analysis of social media network data in marketing

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Abstract

The amount of data freely available from social networking grows on an hourly basis. Much of this data concerns consumers perceptions and opinions of organizations, and as such is of interest to business intelligence gatherers in marketing, for customer relationship management and customer retention. With the use of soft computing, specifically fuzzy logic, it will be possible to design, create and build social bots that can analyse consumer comments in social media networks. Further programming would allow these social bots to interact with consumers, and carefully produced social bots would be able to disseminate marketing campaigns. This paper proposes a model for sentiment analysis of social media network data.

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Peer-review under responsibility of the scientific committee of the 9th International Conference on Theory and application of Soft Computing, Computing with Words and Perception.

Keywords: soft computing application; fuzzy logic; social bots; sentiment analysis; social media networks; customer relationship management.

1. Introduction

The most commonly used social media networks are Facebook, YouTube, Instagram and Twitter. Currently, there are approximately 500 million tweets on Twitter per day, that's 6000 every second. (Internetlivestats, 2017). The exact numbers of users are shown in Table 1 below. Marketers use social media as part of their marketing strategy. Before planning a social media campaign, marketers need to know something about the consumer and their environment. They need to know the personality of the consumer, their past experiences, their responses to

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campaigns, brand loyalty, and perception of brands. This is very important as marketers base decisions on what they know about their target audience (Tuten & Solomon, 2014). The more we understand as marketers, the better decisions we can make. Gathering up information about consumers to create insight into markets, and to analyse competitive intelligence are very important steps in creating a marketing strategy for the organisation. More information means more informed decisions. Social media networks have given us an additional source of information on consumers, their demographics, their perceptions, and their thoughts. The content is created by the users of social media networks, and includes their opinions, experiences, and this data can be in the form of binary input ('likes' on a Facebook post), text, audio or visual. These items are shared, sometimes across social media platforms, and a conversation will build around them.

Table 1. Social media metrics.

Social media network	No of users	Daily metrics
Facebook	1.94 billion	
YouTube	1 billion	
Instagram	700 million	
Twitter	313 million	500 million tweets
Reddit	250 million	
Viber	249 million	
Vine Camera	200 million	
Pinterest	150 million	
Snapchat	200 million	

(Kallas, 2017)

Facebook “likes” allow users of social networks to express their support of a post by a click of the mouse. The notion of “liking” has been extended to “love,” “haha,” “wow,” “sad,” and “angry”. The emoji selected corresponds to a feeling of the user at that point in time. The notion of emojis began in Japan in 1999, where a graphical response or post could be coded as one of 722 Unicode character codes (Perticone et al., 2015). Many of these emojis represent nuances of Japanese culture, and have often been misunderstood or used in a different way by Western users of social media. Many users choose to use emojis for communication, rather than text, and this data can also be collected as business intelligence.

With current technology it is very simple to gain access to the millions of public tweets through Twitter, and to the databases of other social media such as Facebook. Software, known as social bots, can be set up to trawl through these massive databases, using key words to lead data analysts to possible data relating to their organisation.

In the different types of social media, Twitter is known as microblogging, as it has a limited character size for tweets of 140 characters. It is easy to search through the millions of tweets tweeted everyday, and the users' use of hashtags makes the available data easy to categorise.

While the body of literature contains examples of ideas on how to use artificial intelligence and neural networks to analyse tweets, there is little in the form of analysing tweets through fuzzy logic.

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