

Emotional Computing and Discourse Analysis: A Case Study About Brexit in Twitter

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Abstract. During the last years, emotional computing has emerged as a field of Human Computer Interaction, where algorithms are able to recognize emotions in order to take better decisions in a given context. However correctly recognizing emotions is known to be a difficult task, specially in social networks which is plenty of stereotypes, metaphors, ironies and multi-word expressions that make the process hard to succeed. In this paper, we propose to pre-process the data by using emotional computing algorithms to then employ discourse analysis for the study of the information viralyzed through social networks. We provide interesting results using as case study the Brexit.

Keywords: Emotional computing · Affective computing · Discourse analysis · Social networks

1 Introduction

During the last years, emotional computing has emerged as a field of Human Computer Interaction, where algorithms are able to recognize emotions in order to take better decisions in a given context [2,3]. This approach is particularly useful for entities that need to carefully analyze the information that is viralyzed through Internet, particularly via social networks. For instance, from companies that want to receive feedback from customers about their recently launched products to governments that need to gather people opinions about a new law project or an important situation. However, the information reproduced via social networks is known to be hard to precisely analyze as people employs stereotypes, metaphors, different writing styles, multi-word expressions, and ironies expressed in an informal language that are hard to interpret and as a consequence to automatically analyze.

In this paper, we present how emotional computing can smartly be combined with discourse analysis to study the complex information viralyzed through social networks. Discourse analysis is a qualitative and interpretive methodology that has largely been employed to analyze different socio-cultural phenomena in an effective manner via different communication mechanisms. Particularly, we employ as case study the Brexit. We collect a corpus from a set of randomly chosen Twitter accounts. Such a corpus is firstly preprocessed by state-of-the-art

sentiment analysis (opinion mining) algorithms. We tag sentences by using different levels of negativeness and positiveness in order to improve the accuracy of evaluations. Then such evaluations are refined via discourse analysis. Interesting results are discussed about the use of this synergy in order to get helpful negative/positive feedback particularly for the analyzed study case and in general for any communication context.

The remainder of this paper is organized as follows: Next section provides the analysis and results followed by conclusions and some directions of future work.

2 Analysis and Results

Brexit is a portmanteau of “Britain” and “exit” referred to the prospective withdrawal of United Kingdom from the European Union. The Brexit is an interesting case study from which we have gathered a corpus of about 200 tweets that used the #Brexit hashtag from randomly selected accounts in order to avoid an unfair evaluation. The evaluation is done on two stages, in the first stage the data is analyzed via SentiStrength [4] which performs automatic sentimental analysis on texts, while in the second, discourse analysis is employed. Table 1 illustrates the evaluation given by SentiStrength for the analyzed tweets. Negative sentiment are valued from -1 (not negative) to -5 (extremely negative) and 1 (not positive) to 5 (extremely positive) is used to positive sentiments. Let us note that sentences have positive and negative evaluation at the same time, process based on the natural evaluation done by the human being [1].

Table 1. Strength of positive and negative sentiment

	number of tweets
-5 value	0
-4 value	0
-3 value	1
-2 value	24
-1 value	167

	number of tweets
1 value	179
2 value	12
3 value	1
4 value	0
5 value	0

Our purpose in applying sentiment analysis was to determine the opinion of people on the Internet about #brexit, trying to identify users who are against or in favor of the movement. The results obtained show that most users who used #brexit did so by posting messages that were rated “not negative” in 167 opportunities and as “not positive” 179. Only 24 times these were rated -2 and in 12 as $+2$, which leads us to determine that the comments are framed within a neutrality of opinions and have both positive and negative elements in their comments.

Let us note that sentiment analysis leaves out the stopwords because they are considered as lacking information to the message, however, in some cases these

connectors can change the meaning of the sentence. After applying the automatic sentimental analysis, we study the data with content analysis to obtain a more detailed result of the posted messages.

From the set of analyzed tweets we may highlight the following ones:

- RT @UKIPNFKN: Free health cover for Britons in Europe is under threat via @theeconomist #Brexit #EHIC #Holidays <https://t.co/FbImliHPod>
- RT @HansOudijk1: The #English seem to have lost their mind. They want #brexit no matter what. Including breaking up their country. <https://>

We emphasize the previous messages, since we observed that a strategy very used in social networks in this subject is to emphasize the negative effects that this implementation would bring to the British. One of them could be the lack of free health insurance in Europe and the fact that Brexit is going to split its country in two. The first thing we observe is that they are based on assumptions, not on facts that are already proclaimed to determine the harm that this would cause in British citizens, therefore, they try to generate fear in the population without a certain base.

In the following tweets that we emphasize, we do not observe an open criticism, however, other strategies are used to deliver their position on this issue in the social network.

- RT @RCorbettMEP: Daily Express is forced to retract entire article claiming #Brexit has some benefits:
- RT @Bonn1eGreer: As I've said before: #Brexit is a Tory proxy war. A very old one. V.dangerous.
- RT @POLLiticss: Do you want more Mosques in your country or neighbourhood?? #brexit

The first tweet states that a mass media is being forced to publish positive information of this fact, generating doubt about the independence of the mass media. In the second tweet, it is affirmed that the Brexit would be producing a “conservative war”, putting in alert that within this sector there are diverse opinions divided in relation to the subject.

The last message highlighted has a different tone, as it is openly xenophobic, asking if they want mosques in their neighborhood. This discrimination is directly addressed against Muslims and their way of life and religion.

In short, we can conclude that although messages were not openly published with a negative tone with #brexit, and that the tool of sentiment analysis is of great help for the analysis, the language is so complex and ambiguous that sometimes it is almost impossible that a computer tool analyzes the different nuances of grammar, slang, colloquial expressions, sarcasm, etc.

3 Conclusions and Future Work

In this paper we have studied the combination of sentimental and discourse analysis, sentimental analysis allows one to systematically study affective states

by using natural processing techniques, while discourse analysis is a qualitative and interpretive methodology to analyze different socio-cultural phenomena. We have employed the #brexit as case study. We have collected a set of tweets, which have firstly been analyzed by using the SentiStrength sentimental analysis tool and then analyzed by discourse analysis. We may conclude that the sentiment analysis tool is of great help for such an study, however the language is so complex and ambiguous that sometimes it is hard to perform a deep study with automatic tools and as a consequence classic manual techniques are still required.

This is ongoing work and a straightforward line of research is to deeply analyze this combination by exploring other similar thematics using a large amount of input data.

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