

Implementation of Context Ontology in Social Media Monitoring for Crisis Management

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Abstract: Social media have emerged as the biggest innovation in the field of information technology in last decade. Using social media people share their daily life events with other people. All major business companies use social media to advertise their brands. So, social media play an important role in shaping the publicity of their brands, but sometimes also lead to crisis situation for a specific brand. To address this issue, the paper proposes an ontology model to monitor the social media. The main advantage of the model is its language independence. Motivation is early detection of such news automatically before it leads to any crisis situation.

Keywords: Ontology, Context, Social Media, Crisis Management, Multilingual Knowledge

I. INTRODUCTION

So far researchers have always perceived crisis as a situation produced due to some kind of disaster like hurricane, earthquakes, flood etc. All efforts have been made to develop the model to minimize the effects of this crisis. But the scope of crisis is not limited to disaster only.

According to the Munich Research Group (Munich, 2005) website, definitions of the term “crisis” include these characteristics: 1)an unusual volume and intensity of events, 2)disruptive interactions between two or more basic system variables, 3)change in external or internal environment, 4)threat to basic values, 5)awareness of finite time for response, 6)surprise, 7)uncertainty All these things are possible in possible in business world. Today most of the customers pay too much attention to the brand of product or service before they decide to use. All fortune 500 companies spend millions of dollars on advertisements of their brands. According to Computerworld article, one out of every seven people use social network. So, social media play crucial role in publicity of all brands.

But social media can also play a big role in imposing a real threat to brand reputation of any company. It could be a negative comment from a customer that has gone viral, an online reaction to brand action in the ‘real world’ or an accidental post by a staff member. I interviewed 60 social media users about effect of social media on the brands of different companies. 50 of them are affected by the posts or tweets on social networks like Facebook, Tweeter, and MySpace etc. It makes necessary for every company to monitor the social media to avoid such situations from arising or to get early control on the situation.

A number of text mining tools have been applied to recognize tactical, actionable information in tweets (Verma, 2011), to find messages that contain real-world or real-event information (Becker, 2011; Naaman, 2011), or to extract Named Entities (Neubig, 2011) or other news content (Sankaranarayanan, 2009) for single language (mostly for English). While a number of social monitoring tools are already available (e.g. – Hootsuite, TweetReach),

the paper argues that they are insufficient. This paper presents a model for social media monitoring, based on the relationships between ontologies and contexts, which lends itself well to the support of effective probability of multilingual platforms.

The following figure is an example.



Fig. 1 A sample showing a Facebook post which became viral after some time

For the given brand Ryanair, this situation proved less damaging because this brand has stated in the past that it is not particularly bothered about customer service. But it would have been much damaging to a company that prides itself on customer service.

II. ONTOLOGY & MULTILINGUALITY

A common definition of ontology considers it to be “specification of a conceptualization” (Gruber, 1993), where conceptualization is an abstract view of the world represented as a set of objects. The term has been used in different research areas, including philosophy (where it was coined), artificial intelligence, information sciences, knowledge representative, object modeling, and most recently, eCommerce applications. For our purposes, an ontology $O = (V, E)$ is a directed graph, with nodes representing concepts associated with certain semantics and relationships (Russell and Norving, 2003).

Ontology is also considered the de-facto standard for representing semantics information. Their design, however, is a difficult task, requiring the collaboration of

ontology engineers and organization experts. Therefore, ontologies are manually crafted and tuned, which results in a static domain model, infrequently modified. Nevertheless, once designed their universal nature them an excellent mechanism for application interoperability.

The static nature of ontologies conflicts with the dynamic nature of the world. Businesses often change and need to adapt the semantic representation of their occupations to the changing environment. Governments, which change less often, still need to adapt their regulations to a global community, while maintaining some divergence from standard governance, reflecting local interpretations and lingual differences. The research literature has proposed a hybrid approach, in which ontologies are recognized as static entities yet an organization can change its business semantic representation dynamically. To do so, ontology is defined to have two parts: a static part (which is the global ontology) and a dynamic part, which evolves either by exporting ontologies or by discovery. With such a model, organizations can still interoperate using universal part of ontology and continuously change business models using the local component of the ontology.

III. MODEL

The model which we proposed consists of two main parts: Crisis Ontology and Crisis Identification

Crisis Ontology: On social media there is a lot of information. All these information are not relevant for the company. They need to monitor only those data which is relevant for the company. All these relevant information can't be necessarily in one language which necessities the need of an abstract algorithm which has multilingual support and can filter the relevant information i.e. the information which need to be monitored, for the company. The algorithm (Segev,2007) which is being used is language independent and uses a very abstract concept 'context' to identify the information. This algorithm uses internet as a base knowledge. The algorithm consists of the following major phases: collecting data, selecting context for each text, ranking the context, identifying the current context, and obtaining the multiple contexts.

- a) Collecting Data - The information from the information sources is decomposed into words and the keywords are extracted from them.
- b) Selecting Contexts from Each Text (Descriptor) - For each keyword a set of preliminary contexts is extracted from web, which is used as a context database.
- c) Ranking the Contexts - Each preliminary context is ranked according to number of references it receive in the context database and the number of appearances it has in the text.
- d) Identifying the Current Context - The preliminary contexts that have higher number of references and higher number of appearances are included in the current set of contexts.
- e) Obtaining the Multiple Contexts - The current contexts are examined for synonyms and synonymous contexts are united.

Crisis Identification: This part involves using buzz as an early warning system. The first part filters a large volume of information and gives small volume of relevant information which is necessary to be monitored in order to avoid the crisis.

If any sudden peak occurs, or conversation appears to be increasing at an alarming rate - especially if it is of negative sentiment. The following figure illustrates the result of this part:

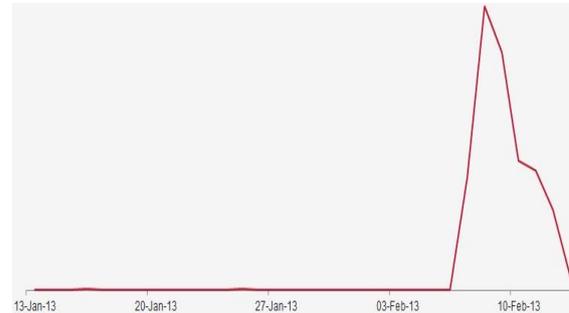


Fig. 2 Graph showing the traffic of relevant information about the brand on the social media

A sharp jump in the graph can trigger the warning system. It can help in early detection of such news which may become the cause of crisis after some time.

IV. COLCLUSION

This paper has addressed the issue of brand crisis through social media. The paper has presented two-step process to monitor the social media in order to detect such information early which may be become a cause of crisis for the given brand.

The proposed model will help the companies to monitor the social media without facing the problem of different languages.

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