Chapter 2
Emergent Ontologies by Collaborative Tagging for Knowledge Management

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ABSTRACT

The massive use of Internet and social networks leads us to a new dynamic environment with huge amounts of unstructured and unclassified information resources in continuous evolution. New classification, compilation, and recommendation systems based on the use of folksonomies and ontologies have appeared to deal with the requirements of data management in this environment. Nevertheless, using ontologies alone has some weaknesses due to the need of being statically modeled by a set of experts in a specific domain. On the other hand, folksonomies show a lack of formality because of their implicit ambiguity and flexibility by definition. The main objective of this chapter is to outline and evaluate a new way to exploit Web information resources and tags for bridging the gap between ontology modeling and folksonomies.

INTRODUCTION

Throughout human history, knowledge has been stored to cover different needs like education, improvement of scientific knowledge, legal support, and entertainment. However, this trend to store resources turns out a need for systems that are able to recover the information in a rapid and effective way.

Currently, according to the statistics presented on the World Wide Web Size (Miniwastts Marketing Group, 2012) about 30% of the world

population is a Web user and taking into account the statistics of January 2012 Internet World Stats (Kunder, 2012) there are about 7 billion pages indexed in search engines like Google, Bing and Yahoo. Taking these data as an indicative number of resources that could be contained by the World Wide Web, it can be said that the Internet is the largest knowledge repository in human history.

The growth of quantity of the information offered through the Internet has resulted in the need for classification and retrieval systems. Ontologies and folksonomies try to answer to the need to classify, but their approaches are completely different. An ontology is a specification of a shared conceptualization (Gruber, 1995), it is a formal description of concepts and relationships involved in knowledge domain. On the other hand, a folksonomy (Wal, 2007) is the result of free classification, unstructured and informal, collaboratively created by a group of users through Web-based systems of tagging different kind of resources like the case of Delicious, Flickr, etc.

The use of ontologies offers several advantages as stated in Uschold and Gruninger (1996), which recognizes the ability of ontologies to improve the communication between systems and to reduce ambiguity. It also offers the advantage to provide interoperability for systems and allows reusability and building standards for different areas of knowledge.

Despite the advantages presented by the use of ontologies, Adam Mathes (2004) stated that the metadata created by professionals are considered to be high quality, however, in terms of time and effort they are very expensive to create, which makes it very difficult to scalability and continuous updating. In the same line of reasoning Brewster, Ciravegna, and Wilks (2003) argue that the creation of ontologies is a slow process, like lexicography, once the product is finished it is rarely updated, which generates a high maintenance cost.

Some studies confirm that user participation and influence of the context are important

indicators of success in ontology effectiveness. In *The Ontolingua Server: A Tool for Collaborative Ontology Construction,* Farquhar, Fikes, and Rice (1996) identified three important indicators of success of ontologies use, when it becomes a commonplace for people in a broad spectrum of communities to build and use ontologies on a day to day basis as spreadsheets and e-mails nowadays. Another indicator of success will be the availability and widespread use of large-scale repositories of reusable ontologies in diverse disciplines. These indicators of success should emerge when the technology has progressed enough so that the benefits provided by using ontologies significantly outweigh the costs of developing them.

In this way, in *Some Ideas and Examples to Evaluate Ontologies,* Pérez (1995) proposes that the natural evaluators of ontologies will be the developers and users taking into account utility as the first criteria. Farquhar, Fikes, and Rice (1996) propose that not only experts have the experience necessary for the construction of ontologies, users must be part as evaluators and are a critical part in the process. In the same way, Thomas and Griffin (1998) argued that those who often use the contents are not those who have or who make it, so, experts and creators are not necessarily the best to describe their content.

The human element is important to define the classification structures (Thomas & Griffin, 1998). As a response to the need for user participation folksonomies appeared. According to Mathes (2004), the most important strength of a folksonomy is that it directly reflects the vocabulary of users, represents a fundamental shift in that it is derived not from professionals or content creators, but from the users and documents. A folksonomy directly reflects the terminology of content users. This faithful reflection of the users terminology increases the importance of context, since, as stated in Benz, Hotho, and St (2010), the same term may be used by different communities with different meanings.

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