Chapter 26
Understanding Online Communities by Using Semantic Web Technologies

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ABSTRACT

During the last few years, the Web that we used to know as a read-only medium shifted to a read-write Web, often known as Web 2.0 or the Social Web, in which people interact, share and build content collaboratively within online communities. In order to clearly understand how these online communities are formed, evolve, share and produce content, a first requirement is to gather related data. In this chapter, we give an overview of how Semantic Web technologies can be used to provide a unified layer of representation for Social Web data in an open and machine-readable manner thanks to common models and shared semantics, facilitating data gathering and analysis. Through a comprehensive state of the art review, we describe the various models that can be applied to online communities and give an overview of some of the new possibilities offered by such a layer in terms of data querying and community analysis.

INTRODUCTION

Social media is now a part of the everyday lives of people who are using Web technologies. People read and comment on blogs, participate in editing wiki pages, use social networking to interact with their friends (or to get new ones), and share pictures, memories and more via services such as

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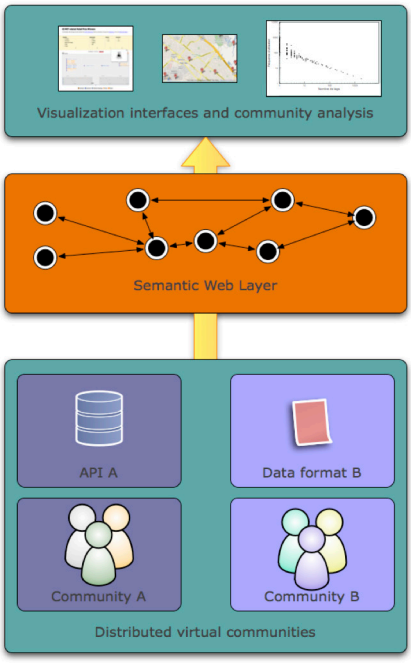
Flickr or YouTube: the whole paradigm often being known as Web 2.0 (O'Reilly, 2005). Moreover, this phenomenon goes further, for example, impacting research communities with services such as the Nature Network - http://network.nature.com/ - and enterprise information systems in a shift known as Enterprise 2.0 (McAfee, 2006). The more that both data and people interact and connect via Web 2.0, the more scientists (both from Social Science and Computer Science) try to understand how online communities are formed, how they evolve, what do they share, and what valuable information can be extracted from these analyses. Yet, the diversity of tools, communities and services makes the process of gathering the data, and consequently understanding these communities, a complex task. For each ecosystem, new algorithms must be built, new links must be mined, new applications must be designed, etc.

Nevertheless, another trend from the research community during the last ten years, the Semantic Web (Berners-Lee et al., 2001), aims to provide models for interoperable data between applications and can be of great interest for communities from the Social Web. By relying on standard models to represent data as well as shared semantics between applications, it offers a means to better integrate and query data from various systems, as well as creating links between them. Using Semantic Web technologies can help us to better understand these online communities, by providing common means to represent, link and mine information from various distributed systems and heterogeneous data sets, as emphasised by Figure 1.

Thus, the goal of this chapter is to provide readers - especially advanced undergraduate and graduate students in Computer Science, Social Science and more generally in Web Science (a term that we will describe later) – with a comprehensive state-of-the-art study on how Semantic Web technologies can be used to model, export and analyse virtual communities in distributed environments such as the Web or Web-based Information System (e.g. corporate organisations).

Figure 1. Using the Semantic Web to facilitate community analysis



The chapter is structured as follows. In the first part, we will focus on current practices to understand and model virtual communities and their related content as well as describing the shortcomings of these approaches, such as relying on vendor-specific APIs. It will hence provide us with incentives to introduce the core of this chapter, i.e. the need for Semantic Web technologies for modelling virtual communities and identifying the advantages they offer regarding data and content analysis as well as interoperability between social applications. In the second section, we will then introduce Semantic Web principles and provide a comprehensive state–of-the-art review of existing models from the Semantic Web that are dedicated to Social Web data. In the third part, we will then discuss use cases on how to use these technologies to better understand communities. We will thus give the reader an overview of possibilities that are offered by such methods: querying communities, mining profiles from distributed social

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