Introducing Web Intelligence for communities

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1. Introduction

The field of Web Intelligence has grown quickly in the last decade as a crossroads between the researches in Artificial Intelligence and the development of the web. In this field, communities appear as a first-class object as is found in many diverse web applications. The most popular and well known examples are social network sites for entertainment. But their success should not hide other application domains where the concept of communities is central. Education, healthcare, design, knowledge management or virtual enterprises are other domains in which communities appear and require technological support. The contribution of web technologies is obvious as the intrisic nature of the web is precisely to provide and support links between individuals. Research works related to these technologies, especially web intelligence, provide then innovative approaches and contributions to every step of the lifecycle of a community supported by the web.

2. Social component of communities

The main objective of forming a community is social, and a community can be seen according to three social characteristics. It is composed of participants, communication and content.

2.1. Participants

A community brings together participants sharing a same interest regarding the subject of the community. Each participant can be analyzed according to her specific profile, interests or practices. Both the mutual characteristics of participants (for instance, the motivation for which they are all included in the same community) and their differences should be considered. The fact that we consider communities deployed on the web has an impact on the nature of the participants who are not only human users, but maybe software agents. Hybrid communities composed of humans and softwares are now possible.

2.2. Communications

A common motivation of community participants is to share information, thus requiring communication facilities. Adequate communications media have to be developped and the field of Web Intelligence can provide innovative solutions. The implementation of communication protocols is obviously concerned as well as issues related to specific features of communication. These features include security properties, trust management, privacy preservation, information retrieval, . . .

2.3. Content

As explained before, there is a common motivation for individuals to participate in the same community. This motivation is often related to the content circulating inside the community. The content is often information, sometimes services, and the community exists because some content is formalized, exchanged and understood. This raises issues about content modelling, storage, discovery and exchange. Knowledge extraction is another concern mainly for the fields of machine learning or data mining as a way to analyze a community's behavior.

All these aspects can be addressed and their combinations lead to the complex first-class objects that are communities.

3. Papers of the special issue

The six following papers published in Number 1 and 2 of Volume 10 of the Web Intelligence & Agent Systems journal provide a panel of contributions related to communities in conjunction with the Internet and/or Artificial Intelligence techniques. These works attest to the recent rise of interest in the topic of Web Intelligence & Communities, leading to the creation of a dedicated workshop [1].

A first set of papers shows the purpose of using communities as an object of study by the way of Web Intelligence technologies. The problem consists in analysing a community as a social phenomenon in order to extract knowledge and insights.

– The analysis method proposed by Leprovost *et al* [4] aims at discovering communities of interest by studying discussion forums. The identification of terms, topics or concepts that are important within a community gives interesting information about its current opinion trends.
– Social networks are the specific kind of communities addressed by the paper of Forestier *et al* [2]. The analysis of community member interactions provides some insight into the organization and the roles existing in a social network in one specific case [2].
– Tchuente *et al* [6] also consider that social networks are a specific kind of community. In their approach, the analysis of interactions can be used to extract knowledge from the individuals themselves and from their social profile.

Another approach that can be found in this selection of papers concerns the development of models and tools in order to facilitate the functionning of virtual communities. The main functionality expected in a virtual community is the exchange of information and/or services.

– A self-organization of a social network is thus proposed [5] to adapt a user's neighborhood to their personal preferences.
– Bugeaud *et al* [1] propose another tool, called OntoStoria, to support the execution of collaborative services in a community of innovative workers.
– Finally, the fact that people share personal information raises privacy problems, exacerbated by the use of web technologies and its possibilities of information access, propagation and processing. Krupa *et al* [3] address this problem with a multi-agent approach to privacy preservation.

This panel of works gives concrete examples of the contributions of Web Intelligence technologies to modern applications relying on communities, both to understand their functionning and to support them. The progress of technology enables the emergence of new uses that, in turn, need to be understood and bring new technological requirements. This cyclical advance where uses and technology are interwoven constitutes the development basis of the subfield of Web Intelligence & Communities.

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