Ontology-Driven Generation of Guidelines for Content Creation Purposes

S

Kambiz Badie
Knowledge Management & e-Organizations Group, IT Research Faculty, ICT Research Institute, Iran

Maryam Tayefeh Mahmoudi
Multi Media Group, IT Research Faculty, ICT Research Institute, Iran & Department of Computer Engineering, Alzahra University, Iran

Mahmood Kharrat
Knowledge Management & e-Organizations Group, IT Research Faculty, ICT Research Institute, Iran

INTRODUCTION

Creating contents with different purposes is a topic, which has drawn much attention by the community of researchers, developers, and planners in the area of information and knowledge technology. The significance of this topic is mostly due to multiplicity & the high variety of tasks and also the high variety of users with different goals & motivations. Contents should therefore be created on-line in a way customized to user's conditions. Regarding this point, a variety of methods & tools should be developed to realize this issue in a reliable & efficient way. A salient point here is that efficient contents can be formed on the ground of interplay between a variety of knowledge sources each emphasizing a particular aspect. Taking this point into account, the contents should be created in a way that such an interplay can come true systematically. Out of the existing schemes for representing knowledge, ontology has been shown to be capable of supporting such a characteristic.

In this article, a framework is discussed based on interplay between (i) ontology of key segments that is generally meaningful with no particular emphasis on the application domain, and (ii) ontology of problem context, which addresses the conditions under which a task is to be performed (constraints), and focal entities ruling over a problem. Concept of interplay between ontologies will be discussed in 4.2 in details.

To get insight into the way guidelines are provided for content creation using the above framework, a variety of tasks significant to the content's user as task performer, are considered. Having discussed ontologies as sources of essential knowledge (Guarino, 1998), it will be shown how guidelines can be generated based on the type of key segments significant to a certain task. At the end, an example will be presented which shows how such a framework can be used in cyber pedagogy/learning environment as a significant application domain.

BACKGROUND

Peculiarities of Ontology-Oriented Approach in Creating Knowledge

Making advantage of ontologies' capacity may help our knowledge be understood by machines as well; the effect which is called machine readability (Ningombam et al., 2011; Fu et al., 2010). This fact leads us to the point that interplay between ontologies, as an approach to interaction between machines, or let say non-human agents, can achieve a high role in creating new knowledge as well. This is because the interplay between ontologies, like any other type of interplay, has basically the potential to form some sort of added knowledge different from both the explicit and implicit knowledge originally embedded in these ontologies. As an example, when interplay occurs between the "ontology of user model" on the one side, and the "ontology of IT services technologies" on the other side, a new knowledge can be created regarding "cus-

DOI: 10.4018/978-1-4666-5888-2.ch654

tomized technologies," which originally does not exist explicitly in these two ontologies.

Requirements for Creating Contents

By "content" we mean any kind of information that may provide value for an end-user in specific situations that are significant to him/her in some way. Although the nature of "content" in this sense is not limited to "textual information," our emphasis in this article is however on texts or written materials. Our main aim of content creation in this article is to supply appropriate guidelines based on which contents can be created to help users receive adequate information for performing their tasks.

A variety of approaches have been proposed for content creation among which approaches based on information mining, ontology-based reasoning, deductive/rule-based reasoning, analogical/case-based reasoning, and conceptual blending (Fauconnier & Turner, 1998; Pereira & Cardoso, 2002), / fusion (Ravi et al., 2009; Pizzi et at., 2008) /composition (Mahmoudi & Badie, 2004; Mahmoudi et al., 2008; Badie et al., 2009), are of particular significance. In all these approaches, it is somewhat important to project the requirements of a task and the related content into some textual segments that are significant to that task in some way. What is principally different in these approaches is (i) the way essential types of knowledge for creating content is represented, and (ii) the very type of reasoning/inference actually used in such a process.

In our approach, chunks of textual information called key segments, should be meaningful in a general sense with no particular emphasis on the application domain for which guidelines are to be generated. Therefore, those segments should be considered which are realized to be consistent for a wide range of possible contents, emphasizing aspects such as (i) whether the content has been benefited by a glance of the part to show the genealogy of the problem, (ii) the focal points of the existing approaches with regard to our existing problem (including their strengths &weak-points), (iii) the key point of the ongoing approach, (iv) the way the ongoing approach can show its strengths with regard to the existing problem, (v) the format according to which the ongoing approach can be assessed, and (vi) the new horizons for the ongoing approach with regard to possible application domains that may somewhat be important in the future trend of the existing problem. Issues such as "general background," "existing viewpoints," "key issue," "realization," "comparative analysis & capability interpretation," and "conclusion & prospect anticipation" can be helpful in this regard.

It should be mentioned that the contents include some kind of knowledge that, if processed well, can support users in performing their tasks appropriately. Creating contents based on using ontologies with different characteristics is expected to fulfill this objective. As examples of task, one can mention activities like "research/development," "innovation," "planning," and "analysis/evaluation," which call for a high human skill to be performed. Our assumption is that contents can support well such sort of mental

Table 1. Types of tasks and their relations with the key segments

Type of Task Key Segments	Research\ Development	Innovation	Planning	Analysis\ Evaluation
General background	✓	✓	✓	✓
Existing viewpoints	✓	-	-	-
Key issue	✓	✓	✓	✓
Proposed approach realization/ implementation	✓	-	✓	✓
Validation/ verification	✓	✓	-	-
Comparative analysis & capability interpretation	✓	-	-	-
Conclusion & prospect anticipation	✓	-	-	-