Working Group Report on Semantic Technologies in Collaborative Applications STICA 06

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Abstract

The 1st International Workshop on Semantic Technologies in Collaborative Applications STICA 06 brought together researchers in the field of semantics-enabled collaboration. The presentations covered various aspects of the field and showed clear indications for future collaborations.

1. Motivation

With distributed information systems and the Internet continually increasing in significance, collaboratively creating and managing information has become an essential requirement for the success of (virtual) organizations. This situation has led to a plethora of platforms supporting cooperation as well as joint information access among geographically dispersed user communities that have emerged in the last decades: collaborative information spaces, telecooperation, autonomous agents or, more recently, various Web-related forms of communication and cooperation such as discussion forums, community portals, Wikis and blogs.
A fundamental requirement for an effective collaboration is the availability of technologies and tools for representing and managing shared information. The more geographically distributed teams need to work together the more it is important to represent information in an explicit and unambiguous way using formal semantics. The emergence of the Semantic Web has thus marked an important stage in the evolution of semantic technologies. In this context knowledge components i.e. ontologies are formalized in XML-based formats, which allow for semantically unambiguous representation and re-usage across the World Wide Web.
The Semantic Web offers new opportunities for the next generation of collaborative applications: it provides us with novel means to classify information items i.e. by means of ontologies formally representing the consensual understanding of application users w.r.t. a particular domain of interest. Taking advantage of this technology, the first promising implementations of Semantic Web-based collaboration platforms such as Semantic Web portals, semantic Wikis and blogs, to name only a few, have been proposed. This workshop aims at contributing to this young application field by providing a forum for practitioners and researchers to present innovative approaches to applying Semantic Web technologies in collaborative environments and to discuss the opportunities and challenges related to the topic.

2. The Workshop

The WETICE Workshop on Semantic Technologies in Collaborative Applications brought together 10 professionals mostly originating from academia. The workshop program consisted of technical presentations plus discussions.
The workshop organizers, Robert Tolksdorf, Elena Paslaru Bontas Simperl, and Klaus Schild, received 10 submissions of papers in response to the call for papers. 7 of those were selected for publications in this proceedings. The following researchers reviewed the papers as a program committee: Sören Auer, David Aumüller (both University of Leipzig), Chris Bizer (Freie Universität Berlin), Matteo Bonifacio (University of Trento), Alberto J. Cañas (Institute for Human and Machine Cognition), Björn Decker (FhG IESE), John Domingue (Open University), Rainer Eckstein (Humboldt-University Berlin), Nicola Henze (University of Hannover), Martin Hepp (DERI Innsbruck), Peter Mika (Vrije Universiteit Amsterdam), Sofia Pinto (University of Lisbon), Dirk Riehle (Bayave Software GmbH), Sebastian Schaffert (Salzburg Research), Hans Peter Schnurr (Ontoprise), Adam Souzis (Liminal Systems), Steffen Staab (Uni-

versität Koblenz-Landau), Heiner Stuckenschmidt (Universität Mannheim), York Sure, Christoph Tempich (both University of Karlsruhe) and Ludger van Elst (DFKI) The workshop organizers are indebted to their professional expertise which helped to make the workshop a success.
One session of the workshops program was dedicated to an overall discussion of the presentations and to derive conclusions from the workshop. This report summarizes both the presentations as well as that discussion.

3. Technical presentations

The presentations held on this workshop dealt with Methodologies for collaboratively creating and managing shared information, collaborative ontology engineering, Semantic collaboration applications, Semantic community support systems and Semantic Wikis. This section gives a very short overview of the papers that are included in these proceedings divided into three categories: tools, applications, and methodologies.

3.1. Tools

Two papers introduced semantic tools:

Iván Cantador, Pablo Castells, David Vallet: Enriching Group Profiles with Ontologies for Knowledge-driven Collaborative Content Retrieval
This paper proposes a combination of ontology-based user profiles on the basis of a study of social choice theory based strategies [4] for the purpose of generating a shared semantic profile for a group of users. The performance of the strategies is theoretically and empirically evaluated in an existing personalization framework from a knowledge-driven multimedia retrieval system [5]. Early experiments reported in the paper show the benefits of using semantic user preferences representations, and provide initial evidence as to which profiles combination strategies are most appropriate for collaborative content retrieval tasks.

Bi Chen, He Tan, Patrick Lambrix: Structure-based filtering for ontology alignment
An approach is proposed where, in contrast to most other ontology alignment strategies, the structural information is not used during the computation of the similarity between terms in the ontologies, but as a filtering method that removes wrong results. Supporting for effective collaboration, the approach is evaluated in terms of quality and performance.

3.2. Applications

Two contributions dealt with semantic applications:

Danius Michaelides, Simon Buckingham Shum, Ben Juby, Clara Mancini, Roger Slack et al: Memetic - Semantic Meeting Memory
This paper presents an environment for recording and replaying meetings held over Internet-based video conferencing technologies, and making these navigable in linear and nonlinear ways. The paper introduces the tools and technologies that form the toolkit and discusses the semantics of the information they capture. Users are able to make notes using a graphical tool during a meeting and also whilst watching a replay of the meeting. These annotations are one of many indexes that can be used to navigate and search.

Sebastian Schaffert: IkeWiki - A Semantic Wiki for Collaborative Knowledge Management
The semantic IkeWiki application facilitates collaborative knowledge engineering through providing the possibility of semantically annotating links, context representation, semantic searches, enhanced navigation, and creating implicit knowledge by reasoning on the knowledge base. The paper describes the architecture and design principles of IkeWiki, where its outstanding features are its support for collaborative knowledge engineering, its ease of use, its support for different levels of formalization ranging from informal texts to formal ontologies, and its sophisticated interactive user interface. While IkeWiki has been developed primarily as a tool for ontology engineering, it can be used in a variety of application areas such as in knowledge management or in educational environments, which are discussed at the end of the paper.

3.3. Methodologies

Three papers were classified as contributing to semantic methodologies:

Sören Auer: RapidOWL - an Agile Knowledge Engineering Methodology
This paper presents RapidOWL, a new, agile knowledge engineering methodology that supports adaptive, semantic collaboration between domain experts and knowledge engineers. This methodology is based on the idea of iterative refinement, annotation and structuring of a knowledge base. A central paradigm for the RapidOWL methodology is the concentration on smallest possible information chunks. The collaborative aspect come into play, when those information chunks can be selectively added, removed, annotated with comments or ratings. Design rationales for the RapidOWL methodology are to be light-weight, easy-to-implement, and support of spatially distributed and highly collaborative scenarios.

Michael Engler, Denny Vrandecic, York Sure: A Tool for DILIGENT Argumentation - Experiences, Requirements and Design
A tool for capturing argumentations in distributed ontology engineering processes is presented in this work. Unlike most other ontology engineering methodologies, the DILIGENT methodology [6] aims specifically at the collaborative and distributed building of ontologies, providing a rich argumentation framework in order to quickly proceed with building the ontology and track all relevant discussions about the conceptualization. Based upon first experience with the DILIGENT methodology, the authors designed a tool to support engineers and domain experts to follow the DILIGENT processes more easily. They present the requirements, persons and scenarios their work is based upon, derived from their experience with ontology building, and the resulting design and state of the ongoing implementation, in order to get timely feedback for the further development of an DILIGENT based collaborative ontology engineering environment.

Ernesto Jiménez Ruiz, Rafael Berlanga: A View-based Methodology for Collaborative Ontology Engineering - an Approach for Complex Applications (VIMethCOE)
The paper introduces a view-based methodology for the collaborative, distributed and modular development of large ontologies, which achieves the identified requirements for the proper evolution and use of very large ontologies.

This last contribution on VIMethCOE has been selected as the best workshop paper based on the reviews received.

4. Results and Conclusion

The main results of the STICA workshop as discussed by the participants can be summarized as follows:

1. It is worthwhile to formalize at least parts of collaborative applications in an ontology.
2. It seems to be beneficial to keep argumentations from ontology-engineering processes for reference.
3. Currently, the main benefit for using Semantic Web technologies in applications is to “future proof” the data that users are investing their resources in creating added value. Many of the other published benefits are either not relevant or are not being exploited. For example, there is very little use of reasoning beyond that driven by ontologies and the taxonomic classification of individuals.
4. Semantic Web and Semantic Wikis dominate current work.
5. Currently, applications and tools are mostly centralized and organization based. However, methodologies propose distributed approaches.

5. Open Issues Identified

The following open issues have been identified:

1. The added value from application of semantic technologies cannot be pin-pointed today.
2. Further semantic technologies and collaboration styles have to be explored (semantic blogs, semantic mindmaps, etc.).
3. Semantic interoperability is not taken into account sufficiently. Therefore, inter-organizational semantic collaboration is not enabled so far.

6. Collaboration between Works

Figure 1 summarizes possible collaborations that might evolve because of the discussions conducted during the STICA workshop.
Starting from the methodology of ViMethCOE we can distinguish some possible collaboration with other works presented in the STICA workshop. We emphasize the relations with the DILIGENT tool and methodology, the RapidOWL, and the Semantic Group Profiles tool (see Figure 1).

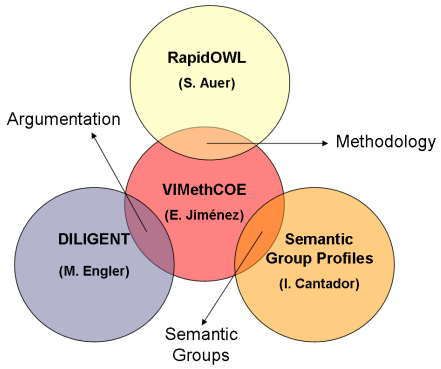

Figure 1. Possible Collaborations between Submitted Works

6.1 Argumentation Process

DILIGENT proposes a complete methodology to follow an argumentation process with a formal model, extending the

well-known Ibis model [2]. The argumentation process uses an OWL DL-based ontology [3] (see Figure 2) in order to track the arguments brought forward. It thus supports the participants of an ontology engineering process to avoid contradicting argumentations without knowing at later stages of an ontology engineering process. Therefore inconsistencies can be found more easily.

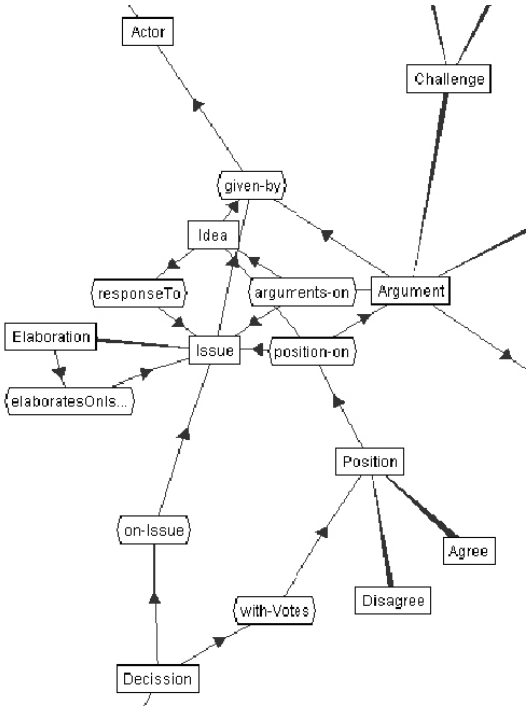

Figure 2. Main concepts of the argumentation ontology

The ViMethCOE methodology demands the existence of an argumentation phase in the development process. Changes over the local knowledge (local adaptation of an ontology) will be published when participants consider them appropriate, and next, these changes should be evaluated by the community. To achieve a consensus, different developers must follow a formal or a semi-formal argumentation model like Ibis, or an extension of it. By means of this model, developers can argue the proposed changes and, optionally, they can propose alternatives. The union of the VIMethCOE methodology with the DILIGENT methodology may be a good option to carry out the argumentation process.

In addition, the graphical note taking tool, Compendium, used in Memetic also uses the IBIS approach to capturing argumentation an may provide a different view or interface for the participants in the ontology engineering process.

6.2 Semantic Group Definitions

VIMethCOE proposes a local adaptation of the global ontology by means of views, that way different developers may have overlapped knowledge (views) between them. In order to control the set of overlapped views, VIMethCOE proposes the definition of semantic groups, already introduced in [1]. The semantic group mechanism must allow us to group a set of views that share some knowledge. Notice that with these groups, communication, argumentation and actualization tasks will only imply the views (and the owner user) belonging to a group.

The work on Semantic Group Profiles proposes several strategies based on social choice theory [4] for the combination of ontology-based user profiles to generate a shared semantic profile for a group of users. These strategies may be used in order to classify different ontology developers inside a working group with a determined profile depending on the defined knowledge of their views.

6.3 Methodology Aspects

RapidOWL proposes a methodology for knowledge engineering and suggests some characteristics or aspects similar to VIMethCOE. The main characteristics related to VIMethCOE are:

- **Joint Ontology Design and Community Modelling**: in order to make easier the collaboration between knowledge engineers, domain experts and users, promoting the communication between developers (*Argumentation and Consensus in VIMetcCOE*).

- **View Generation:** to provide domain specific views for human users and software systems, enabling domain experts to timely review the representations from different perspectives (*Allows the Operation through Views in VIMetcCOE*).

7. Conclusion

The workshop demonstrated that semantically enabled collaboration is a promising field for future collaborative systems. They can automatically help in typing subjects and objects of collaborations and the interaction processes themselves precisely and with added value. Currently, semantically enhanced Wiki systems seem to be the major focus of work. The research presented was surprisingly complementary in the aspects covered. We take this as an indication that the field will be developing continuously in the future and integrate currently unrelated efforts.

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