
Editorial: The web is changing knowledge representation

Paolo Ceravolo* and Ernesto Damiani

Dipartimento di Tecnologie
Dell'Informazione
Università degli Studi di Milano
via Bramante 65, 26013 Crema, Italy
E-mail: paolo.ceravolo@unimi.it
E-mail: ernesto.damiani@unimi.it
*Corresponding author

Biographical notes: Paolo Ceravolo is an Assistant Professor at the Department of Information Technologies of the University of Milan, Italy. He cooperates in several research projects funded by the Italian Ministry of Research or the European Commission. He is involved in the organisation of different conferences such as Innovation in Knowledge-Based and Intelligent Engineering Systems (KES), IEEE/IES Conference on Digital Ecosystems and Technologies (IEEE-DEST) and Knowledge Management in Organizations (KMO). Since 2008, he has been the Secretary of the IFIP 2.6 Working Group (WG) on Database Semantics.

Ernesto Damiani is a Full Professor at the Department of Information Technology of the University of Milan, Italy. He has held visiting positions at several international institutions, including George Mason University, VA (USA), and is an Adjunct Professor at the University of Technology, Sydney, Australia. He coordinates several research projects funded by the Italian Ministry of Research, the European Commission and a number of private companies including Cisco, ST Microelectronics, Siemens Mobile and BT Exact. He is the Chair of the IFIP WG 2.6, Vice-Chair of the IFIP WG 2.12 and the Secretary of the IFIP WG 2.13.

According to the computer science tradition, knowledge representation is an area in artificial intelligence. It concerns the construction of a symbol system to describe 'a domain of discourse', where some automatic validation and inference tasks are committed to a software.

But the advent of the internet radically modified this perspective, widely extending the boundaries of the discipline. As networks proliferate, they become the natural support for more and more human activities. In particular, what is requested today from the network is to underpin the effective exchange of information. This has opened a number of research issues that was proposed in the last decade, but are generally still topical problems.

In general, knowledge representation models are required to enrich software capabilities to better fit the properties of distributed environments and include interactions with real human activities such as, for instance, the business process, the learning process or social and spacial interaction.

One of the explored directions involves the representation and mining of contextual information, including spacial and temporal coordinates. Another point is about the management of heterogeneous data models that need to be compared to highlight the discrepancies and commonalities that are reconciled and evolved over time. Another point involves the definition of the requirements to be achieved and the set-up of a monitoring strategy to verify their achievement.

This special issue of the *International Journal of Web Engineering and Technology* (IJWET) explores the recent solutions to these challenges and presents specific implementations that will show the advancement and best practices of current technologies. After a call for papers, we received ten submissions, of which six were accepted. We believe they offer an excellent overview of the recent research in the area. Specifically, the paper ‘Hybrid reasoning in the CARE middleware for context awareness’ by Agostini *et al.* faces the problem of representing contextual information in a mobile computing environment. This imposes the definition of efficient reasoning strategies dealing with restricted computational resources. In ‘Softening the blow of frequent sequence analysis: soft constraints and temporal accuracy’ Fiot *et al.* propose a methodology relaxing the traditional approach to mining sequential patterns for supporting soft temporal constraints. This approach allows enriching the capabilities of the traditional approaches augmenting precision in the recall of sequences. ‘Comparing two ontologies’ by Ngan *et al.* introduces techniques for finding the relationships between two ontologies. A semantic web service discovery application is introduced to highlight the motivation of the algorithm. In ‘Applying software evolution theory to hypermedia systems’, Molina-Ortiz *et al.* describe a system able to represent the evolution of a system of hyperdocuments and use this information to structure navigation among the nodes of the hypertext. ‘Context information for knowledge reshaping’ by Bolchini *et al.* presents a context model to shape an information space according to the profiles displayed by system users.

In ‘Business rules for semantics-aware business modelling: overview and open issues’, Cisternino *et al.* discuss the relevance of human-friendly languages to express business requirements. They then propose a framework where business rules are used as a basis for driving the design flow from business requirements to software development. To concretely implement this system in a distributed environment, data models are translated according to semantic web standards.

We gratefully acknowledge the strong research community that gathered around web knowledge representation, which is hopefully reflected in the papers of this special issue. We would also like to express our deep appreciation for the referees’ hard work and dedication. Above all, thanks are due the authors for submitting the best results of their work to the *International Journal of Web Engineering and Technology*.