

## **The LNCS Journal on Data Semantics**

Computerized information handling has changed its focus from centralized data management systems to decentralized data exchange facilities. Modern distribution channels such as high-speed Internet networks and wireless communication infrastructure, provide reliable technical support for data distribution and data access, materializing the new, popular idea that data may be available to anybody, anywhere, anytime. However, providing huge amounts of data on request often turns into a counterproductive service, making the data useless because of poor relevance or inappropriate level of detail. Semantic knowledge is the essential missing piece that allows the delivery of information that matches user requirements. Semantic agreement, in particular, is essential to meaningful data exchange.

Semantic issues have long been open issues in data and knowledge management. However, the boom in semantically poor technologies, such as the Web and XML, has boosted renewed interest in semantics. Conferences on the Semantic Web, for instance, attract crowds of participants, while ontologies on their own have become a hot and popular topic in the database and artificial intelligence communities.

Springer's *LNCS Journal on Data Semantics* aims at providing a highly visible dissemination channel for most remarkable work that in one way or another addresses research and development on issues related to the semantics of data. The target domain ranges from theories supporting the formal definition of semantic content to innovative domain-specific application of semantic knowledge. This publication channel should be of highest interest to researchers and advanced practitioners working on the Semantic Web, interoperability, mobile information services, data warehousing, knowledge representation and reasoning, conceptual database modeling, ontologies, and artificial intelligence.

Topics of relevance to this journal include:

- Semantic interoperability, semantic mediators
- Ontologies
- Ontology, schema and data integration, reconciliation and alignment
- Multiple representations, alternative representations
- Knowledge representation and reasoning
- Conceptualization and representation
- Multi-model and multi-paradigm approaches
- Mappings, transformations, reverse engineering
- Metadata
- Conceptual data modeling
- Integrity description and handling
- Evolution and change
- Web semantics and semi-structured data
- Semantic caching

- Data warehousing and semantic data mining
- Spatial, temporal, multimedia and multimodal semantics
- Semantics in data visualization
- Semantic services for mobile users
- Supporting tools
- Applications of semantic-driven approaches

These topics are to be understood as specifically related to semantic issues. Contributions submitted to the journal and dealing with semantics of data will be considered even if they are not within the topics in the list.

While the physical appearance of the journal issues looks like the books from the well-known Springer LNCS series, the mode of operation is that of a journal. Contributions can be freely submitted by authors and are reviewed by the Editorial Board. Contributions may also be invited, and nevertheless carefully reviewed, as in the case for issues that contain extended versions of best papers from major conferences addressing data semantics issues. Special issues, focusing on a specific topic, are coordinated by guest editors once the proposal for a special issue is accepted by the Editorial Board. Finally, it is also possible that a journal issue be devoted to a single text.

The journal published its first volume in 2003 (LNCS 2800), its second volume at the beginning of 2005 (LNCS 3360), and its third volume in summer 2005 (LNCS 3534). Volumes I and II, as this volume V, are special issues composed of selected extended versions of best conference papers. Volume III is a special issue on Semantic-based Geographical Information Systems, coordinated by guest editor Esteban Zimányi. The fourth volume is the first “normal” volume, comprising spontaneous submissions on any of the topics of interest to the journal. Currently planned volumes include a special issue on Emergent Semantics.

The Editorial Board comprises one Editor-in-Chief (with overall responsibility) and several members. The Editor-in-Chief has a 4-year mandate to run the journal. Members of the board have a 3-year mandate. Mandates are renewable. More members may be added to the board as appropriate.

We are happy to welcome you to our readership and authorship, and hope we will share this privileged contact for a long time.

Stefano Spaccapietra  
Editor-in-Chief  
<http://lbdwww.epfl.ch/e/Springer/>

## JoDS Volume V – Guest Editorial

To foster the dissemination of the best ideas and results, the *Journal on Data Semantics* (JoDS) pursues a policy that includes annually publishing extended versions of the best papers from selected conferences whose scope encompasses or intersects the scope of the journal.

This initiative is motivated by the difference in goals we have between conferences and journals. Conferences usually have a faster turnaround and focused audience, but they have to enforce space limitation and a fixed time frame, with no chances for improving a paper by producing multiple versions. In contrast, journals offer more space, room for debate and refinement, and are usually considered the real archival venue.

Therefore, the publication of an extended version of a conference paper is a much appreciated opportunity for researchers to widely disseminate a significantly improved presentation of their work, where they can develop the appropriate motivations, reasoning, results and comparative analysis.

This issue includes selections from three international conferences: ER 2004, the 23rd International Conference on Conceptual Modeling, which took place in November 2004 in Shanghai, China, ODBASE 2004, the Third International Conference on Ontologies, Databases, and Applications of Semantics, which took place in October 2004 in Ayia Napa, Cyprus, and ICSNW 2004, the First International Conference on Semantics of a Networked World, organized by IFIP WG 2.6 in Paris, France, June 2004.

Papers from these conferences were selected based on their quality, relevance and significance, and the viability of extending their results. All extended papers were subject to a scholarly review process, and the authors were required to respond to all concerns expressed by the reviewers before papers were accepted.

Four papers, showing consistently high reviews from the Program Committee, were selected among those presented at ER 2004.

When reusing ontologies, many superfluous concepts are often included in the final conceptual schema. The first paper, entitled “A Method for Pruning Ontologies in the Development of Conceptual Schemas of Information Systems” by Jordi Conesa and Antoni Olivé presents a formal method of pruning ontologies to remove these superfluous concepts automatically.

The second paper, “XSLTGen: A System for Automatically Generating XML Transformation Via Semantic Mappings” by Stella Waworuntu and James Bailey, presents a method to automatically generate XSLT transformations based on the semantic mappings between input and output documents. Their experimental results show that the XSLTGEN works well with varieties of XML and HTML documents.

Based on the premise that semantically related data are highly likely to be changed as a result of the effort by the same or even different information sources for maintaining freshness and consistency, the third paper, “An Ontology-Guided Approach to Change Detection of the Semantic Web Data” by Li Qin and

Vijayalakshmi Atluri presents an approach that explores the relationship among concepts in guiding the change detection to their data instances for the Semantic Web.

The fourth paper, “Conceptual Modelling Patterns for Roles” by Jordi Cabot, and Ruth Raventós, studies role semantics in conceptual modeling and proposes a pattern based approach.

The selection from the ODBASE conference resulted in two extended papers being accepted for JoDS.

Relationships among concepts, namely inclusion dependencies, are also analyzed in the paper by Andreas Koeller and Elke A. Rundensteiner. The authors present heuristics to scale hypergraph-based inclusion dependencies discovery algorithms. Heuristics are based on the notion of inclusion dependencies between different relations of a database (or different databases) that are discovered by hypergraph-based algorithms, but that do not correspond to a real semantic relationship between such relations.

The paper by de Souza et al. describes a complete solution for the alignment of subdomain ontologies using an upper domain ontology that is built based on a thesaurus of terms. Mappings from the concepts of the individual ontologies to sets of thesaurus terms are established. A novel measure of similarity among concepts is also introduced together with suitable visualization techniques.

Finally, two of the selected papers from the ICSNW conference were accepted after rigorous review. The first one, by Bagüés et al., addresses “Semantic Interoperation Among Data Systems at a Communication Level.” The authors propose to achieve semantic interoperability in a framework of agent-based data systems that exchange messages at a semantic level without requiring pre-established communication patterns. An ontology of communication acts is a key resource for this kind of interoperability. Semantic description of Web services and two case studies are also discussed.

The second paper, “Matching Ontologies in Open Networked Systems: Techniques and Applications,” by S. Castano, A. Ferrara, S. Montanelli, and G. Racca, describes an algorithm and related techniques for performing matching of independent ontologies in open networked systems. A key feature is the capability of dynamically configuring the algorithm taking into account the complexity of the ontologies at hand. Implementation and experimental results are also presented.

The Guest Editors

ER 2004

Paolo Atzeni, Università Roma Tre, Italy

Wesley W. Chu, University of California Los Angeles, Los Angeles, USA

ODBASE 2004

Tiziana Catarci, Università di Roma “La Sapienza”, Italy

Katia P. Sycara, Carnegie Mellon University, USA

ICSNW 2004

Stefano Spaccapietra, EPFL, Switzerland

Paolo Atzeni and Wesley Chu would like to dedicate this issue to the memory of Hongjun Lu, ER04 Program Co-chair, who passed away a few months after the conference, to which he had dedicated a lot of effort, especially in coordinating the overall program and the relationships between the Chinese and the international research community.

## Reviewers

We are please to mention the reviewers who contributed their voluntary effort to the timely completion of this volume:

Karl Aberer, EPFL, Switzerland  
James Baley, University of Melbourne, Australia  
Roberta Benassi, Università di Modena e Reggio Emilia, Italy  
Athman Bouguettaya, Virginia Tech, USA  
Diego Calvanese, Free University of Bozen-Bolzano, Italy  
Jordi Conesa, Universtat Politènica Catalunya, Barcelona  
Jerome Euzenat, INRIA, France  
Csilla Farkas, University of South Carolina, USA  
Enrico Franconi, Free University of Bozen-Bolzano, Italy  
Antonio L. Furtado, Pontificia Universidade Católica do Rio de Janeiro, Brazil  
Jianming He, UCLA, USA  
Lalana Kagal, MIT, USA  
Hannu Kangassalo, University of Tampere, Finland  
Andreas Koeller, Montclair State University, USA  
Fabrice Jouanot, IMAG Grenoble, France  
Domenico Lembo, Università di Roma “La Sapienza”, Italy  
Diego Milano, Università di Roma “La Sapienza”, Italy  
John Mylopoulos, University of Toronto, Canada  
Antoni Olivé, Universitat Politècnica de Catalunya, Spain  
Li Qin, Western New England College, USA  
Sudha Ram, University of Arizona, USA  
Pavel Shvaiko, University of Trento, Italy  
Sergio Tessaris, Free University of Bozen-Bolzano, Italy  
David Toman, University of Waterloo, Canada  
Petko Valtchev, University of Montreal, Canada

The Guest Editors

## **JoDS Editorial Board**

Carlo Batini, Università di Milano Bicocca, Italy  
Tiziana Catarci, Università di Roma La Sapienza, Italy  
Lois Delcambre, Portland State University, USA  
David W. Embley, Brigham Young University, USA  
Jerome Euzenat, INRIA Alpes, France  
Dieter Fensel, University of Innsbruck, Austria  
Nicola Guarino, National Research Council, Italy  
Jean-Luc Hainaut, FUNDP Namur, Belgium  
Ian Horrocks, University of Manchester, UK  
Larry Kerschberg, George Washington University, USA  
Maurizio Lenzerini, Università di Roma La Sapienza, Italy  
Tok Wang Ling, National University of Singapore, Singapore  
Salvatore T. March, Vanderbilt University, USA  
Robert Meersman, Vrije Universiteit Brussel (VUB), Belgium  
John Mylopoulos, University of Toronto, Canada  
Shamkant B. Navathe, Georgia Institute of Technology, USA  
Antoni Olivé, Universitat Politècnica de Catalunya, Spain  
José Palazzo M. de Oliveira, Universidade Federal do Rio Grande do Sul, Brazil  
Christine Parent, Université de Lausanne, Switzerland  
John Roddick, Flinders University, Australia  
Klaus-Dieter Schewe, Massey University, New Zealand  
Bernhard Thalheim, Brandenburg University of Technology, Germany  
Yair Wand, University of British Columbia, Canada  
Esteban Zimányi, Université Libre de Bruxelles (ULB), Brussels, Belgium

Journal on Data Semantics V

Spaccapietra, S.; Atzeni, P.; Chu, W.W.; Catarci, T.;  
Sycara, K.P. (Eds.)

2006, XIII, 237 p., Softcover

ISBN: 978-3-540-31426-4