

JOWO 2015

The Joint Ontology Workshops - Episode 1

Four Workshops held at the

24th International Joint Conference
on Artificial Intelligence – IJCAI 2015

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PREFACE

JOWO – The Joint Ontology Workshops

JOWO, ‘The Joint Ontology Workshops—Episode I: The Argentine Winter of Ontology’, was held for the first time in Buenos Aires, at the 24th International Joint Conference on Artificial Intelligence – IJCAI 2015. Its mission is to join forces of the diverse communities interested in building, reasoning with, and applying formalised ontologies in the wide spectrum of Artificial Intelligence theory and applications.

The present edition of JOWO 2015 collocated four workshops that cover a broad spectrum of contemporary ontology research ranging from philosophical foundations to theoretical investigations of reasoning problems to a variety of AI applications of ontologies. **JOWO** included

OntoLP¹ Workshop on Ontologies and logic programming for query answering;

OntoChange² Workshop on Belief Change and Non Monotonic Reasoning in Ontologies and Databases;

WoMO³ Ninth International Workshop on Modular Ontologies;

FOFAI⁴ Workshop on Formal Ontologies for Artificial Intelligence.

A more detailed description of these workshops can be found below.

Workshop on Ontologies and logic programming for query answering (OntoLP)

The aim of this workshop is to bridge knowledge representation and reasoning in artificial intelligence and web of knowledge communities in order to encourage the emergence of new solutions for reasoning with lightweight ontologies. The workshop focuses on languages and techniques that allow for:

- Query answering while taking ontologies into account.
- Non monotonic reasoning for inconsistency handling and exception handling and expressing default negations in ontologies.

Concerning the first point, a challenging issue is how to adapt or extend Answer Set Programming to represent ontological knowledge. In particular, can (a fragment of) ASP cover lightweight ontological languages while keeping decidability and efficiency?

Concerning the second point, a challenging issue is how to extend lightweight ontological languages with non-monotonic features, while keeping a good computational complexity. In particular,

- i) how to embed exceptions-based and inconsistency tolerant-based reasoning in a tractable ontological language?
- ii) how to integrate uncertainty information in lightweight ontological languages?

- iii) how to define merging operations where both inputs and outputs are in lightweight ontological languages?

Workshop on Belief Change and Non Monotonic Reasoning in Ontologies and Databases (OntoChange)

Recent advances in the formal representation of ontologies have made it possible to perform standard reasoning tasks over real-world large-scale ontologies, and users of large ontologies are starting to adopt such reasoning tools. One of the consequences of the increasing uptake of these tools is the need to go beyond classical reasoning, and in particular, the ability to manage changes to ontologies as they evolve over time. Appropriate solutions for this problem have the potential to enrich the use of ontologies in real world scenarios. The seminar topic is therefore especially relevant for application domains in which ontologies have already proved to be beneficial, such as the biomedical domain.

Managing change in ontologies is an important emerging area. It is clear also that there are problems of common interest to the ontology, belief change, and database communities. A Dagstuhl seminar on this topic was held in October 2012 (<http://tinyurl.com/lwzqzng>), and was followed up by a Research School on the same topic in February 2014 (<http://tinyurl.com/ojkpg6c>). The success of these two meetings makes it clear that is necessary to set up a more regular forum for discussing and presenting work in this area.

The aim of this workshop is to set up a regular forum for discussing and presenting work in this area, to bring together researchers working in the areas of logic-based ontologies, belief change, and database systems, along with researchers working in relevant areas in nonmonotonic reasoning, commonsense reasoning, and paraconsistent reasoning. Additionally, the integration with JOWO provides an exciting and unique opportunity to create a bridge between this area, and other related areas in ontologies, resulting in a fruitful symbiosis.

In this first edition, Corman, Aussenac-Gilles and Vieu studies how prioritized base revision can be effectively applied in order to restore consistency, coherence, or get rid of undesired consequences. The technique proposed is based on kernel contraction. The next two papers deal with Paraconsistent Semantics: Croitoriu and Rodriguez, investigate the use of kernel consolidation in order to operate with Inconsistent OBDA Ontology Based Data Access. Kaminsk, Knorr and Leite address the problem of efficiently obtaining meaningful conclusions from (possibly inconsistent) hybrid KBs. Finally, Peñaloza and Thuluva deal with the problem of iteration of updates in an ontology and propose a context-based method that stores the information about all the possible outcomes of an update.

Workshop on Modular Ontologies (WoMO)

Modularity, is an important enabling technology for knowledge repositories and collaborative knowledge development environments. In formal and applied ontology, modularity is central to reducing the complexity of designing and understand-

ing ontologies, as well as facilitating ontology verification, reasoning, maintenance and integration.

This workshop continues a series of successful events that have been an excellent venue for practitioners and researchers to discuss latest and current work on theoretical and practical aspects of modularity in ontologies, bringing together an interdisciplinary crowd of researchers from various subareas of AI spanning knowledge representation, reasoning and logic (description logics, first-order logics, context-based reasoning, rule-based reasoning, automated theorem proving) and web and knowledge-based repositories and information systems (ontologies, semantic web, linked data) as well as researchers from philosophy, logic, cognitive science, and linguistics and from various application domains.

Topics of interest to the workshop are modularity in ontologies in the broadest sense. Submissions were welcome irrespective of the ontology language of interest (ranging from informal ontologies such as taxonomies, glossaries, folksonomies, and conceptual models, to formal ontologies specified in languages such as RDF, OWL, SKOS, first-order logic, Common Logic). Papers may touch on any aspect of modularity, including but not limited to:

- philosophical, cognitive, linguistic and social aspects of ontology modularity;
- theory, algorithms and implementations of ontology modularity, including those that apply methods beyond classical knowledge representation, such as machine learning and natural language processing;
- modularity in reasoning over ontologies;
- modularity in ontology engineering; and
- modular ontologies in applications.

Formal Ontologies for Artificial Intelligence (FOfAI)

The 1st workshop on Formal Ontologies for Artificial Intelligence - FOfAI - took place at IJCAI 2015 in Buenos Aires as part of JOWO, Episode I.

In the last 20 years, ontologies have played key roles in the design of complex information systems and in the development of methodologies for the management of heterogeneous information. There has been an explosion of results that are broadly related to ontologies in a large number of communities like Knowledge Representation and Reasoning, Natural Language Processing, Multiagent Systems, Cognitive Modeling, Decision Theory, Social Studies, Computer Vision, Knowledge Engineering, Industrial Design, Robotics, Planning and Conceptual Modeling.

Ontologies have here to be understood as general theories of the types of entities and relations in a domain. At the center of the discipline of formal ontology lies the systematic study of the formal characterization of ontologies (representations, axiomatics, reasoning techniques) as well as their link with naive realism, epistemology, cognition, commonsense, empirical methods, and data-analysis.

The FOfAI workshop aims to establish a venue for researchers in AI with an interest in formal ontology. In particular, it aims to foster an interdisciplinary discussion and cross-fertilization among a number of communities by proposing a venue to exchange foundational, methodological, and applicative perspectives.

FOfAI 2015 was generously supported and sponsored by the International Association for Ontology and its Applications, IAOA, as well as by the Association for Logic, Language, and Information, FoLLI.

Acknowledgements

Keynotes.

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