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Contexts and Ontologies Representation and Reasoning C&O:RR-2007

Working notes of the workshop
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Foreword

Contexts and ontologies play a crucial role in knowledge representation and reasoning. Computer systems which act intelligently need the ability to represent, utilize and reason about contexts and ontologies. Recently we have seen a number of projects devoted to the definition and usage of contexts as well as ontologies in intelligent KR systems. With the advent of the web and the ubiquitous connectivity it brings, contexts and ontologies have become a relevant notion also in other, more recent, applications. Many such applications, including for example, information integration, distributed knowledge management, semantic web, multi-agent systems, distributed reasoning, data grid and grid computing, pervasive computing and ambient intelligence, and peer-to-peer information management systems, have acknowledged the need for methods to represent and reason about knowledge which is scattered in a large collection of contexts and ontologies.

The workshop Contexts and Ontologies: Representation and Reasoning (abbreviated as C&O:RR) is the result of a merge of two successful lines of workshops (Contexts and Ontologies: Theory, Practice and Applications (C&O) and Context Representation and Reasoning (CRR)) investigating these issues. The previous workshops have focused on the themes of combining ontologies, contexts, and contextual reasoning. The new workshop keeps the focus on the combination of contexts and ontologies, but also emphasizes the representation and reasoning aspects of this research. The Context and Ontologies Representation and Reasoning workshop welcomes papers on contexts and ontologies, with a focus on approaches to semantic heterogeneity and on the analysis and understanding of the combination of contexts and ontologies from the knowledge representation and reasoning perspectives.

The organizers would like to thank the members of our programme committee for their careful work and our invited speakers, Professors Frank Wolter and David Robertson for their inspiring contributions.

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- Frank Wolter, University of Liverpool, UK

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Invited Talk: Modularity in logical theories and ontologies
Frank Wolter, University of Liverpool, UK

Modularity of logical theories is a classical subject in mathematical logic and philosophy of science. Due to the ever increasing size and complexity of logical theories that are used to represent ontologies and software specifications, the problem of defining appropriate notions of modularity and of providing reasoning support for dealing with modularity has recently become an important research topic also in these areas. In this talk, we introduce and survey recent progress in the field. We start with a general introduction to modularity in the context of propositional and first-order logic, highlighting the connection to classical notions such as conservative extensions and interpolation. We then switch to ontologies and description logics, introduce different notions of modularity, analyze their interrelation and possible use, and consider a variety of reasoning tasks such as the extraction of a module from an ontology.

Biographical Note:

Frank Wolter is Professor for Logic and Computation at the Department of Computer Science, University of Liverpool. He works in Knowledge Representation and Reasoning and Logic in Computer Science. His main interests are in Modal Logic (theory and applications), Description Logic and their application as ontology languages, Spatial and Temporal Reasoning, and Combining Logics. Frank Wolter is co-editor of the Handbook of Modal Logic (Elsevier, 2007) and co-author of the research monograph Many-dimensional Modal Logic: Theory and Applications (Elsevier, 2003). He is member of the Steering Committees 'Advances in Modal Logic (AiML)', 'Description Logic Workshop (DL),' and 'Frontiers of Combining Systems (FroCoS)'.

Invited Talk: Interaction as context: the OpenKnowledge experience
David Robertson, University of Edinburgh, UK

Context often is viewed by traditional knowledge engineers as a problem: our beautifully crafted ontologies tend to break as we shift them from one context to another and then we become frustrated in our attempts to prevent such breakages by attempting to standardise across ontologies. The OpenKnowledge project (www.openk.org) has taken a different view; it accepts that context will radically influence the semantics of the knowledge conveyed during interaction between systems (both automated and human) and requires all knowledge sharing to be situated with respect to a (standardised) model of the interaction for which that knowledge is being shared. We have provided a lightweight infrastructure in which this sort of context can be shared at very low cost, providing a form of web service choreography in the process. With this infrastructure we then have a different starting point for addressing problems such as ontology mapping, service matchmaking and assessment of reputation of services.

Biographical Note:

Dave Robertson is the Director of the Centre for Intelligent Systems and their Applications, part of the School of Informatics at the University of Edinburgh. His current research is on formal methods for coordination and knowledge sharing in distributed, open systems - the long term goal being to develop theories, languages and tools that out-perform conventional software engineering approaches in these arenas. He is coordinator of the OpenKnowledge project (www.openk.org) and was a principal investigator on the Advanced Knowledge Technologies research consortium (www.aktors.org), which are major EU and UK projects in this area. His earlier work was primarily on program synthesis and on the high level specification of programs, where he built some of the earliest systems for automating the construction of large programs from domain-specific requirements. He has contributed to the methodology of the field by developing the use of "lightweight" formal methods - traditional formal methods made much simpler to use in an engineering context by tailoring them to a specific type of task. As an undergraduate he trained as a biologist and continues to prefer biology-related applications of his research, although methods from his group have been applied to other areas such as astronomy, simulation of consumer behaviour and emergency response.