

Preface

Modularity has been and continues to be one of the central research topics in ontology engineering. The number of ontologies available, as well as their size, is steadily increasing. There is a large variation in subject matter, level of specification and detail, intended purpose and application. Ontologies covering different domains are often developed in a distributed manner; contributions from different sources cover different parts of a single domain. Not only is it difficult to determine and define interrelations between such distributed ontologies, it is also challenging to reconcile ontologies which might be consistent on their own but jointly inconsistent. Further challenges include extracting the relevant parts of an ontology, re-combining independently developed ontologies in order to form new ones, determining the modular structure of an ontology for comprehension, and the use of ontology modules to facilitate incremental reasoning and version control.

Modularity is envisaged to allow mechanisms for easy and flexible reuse, combination, generalization, structuring, maintenance, collaboration, design patterns, and comprehension. This is analogous to the role of modularity in software engineering, where there are well-understood notions of modularity that have led to generally accepted and widely supported mechanisms for the named tasks. In contrast, modularity for ontologies is still an active research field with open questions because existing approaches are heterogeneous and less universally applicable. For ontology engineering, modularity is central not only to reducing the complexity of understanding ontologies, but also to maintaining, querying and reasoning over modules. Distinctions between modules can be drawn on the basis of structural, semantic, or functional aspects, which can also be applied to compositions of ontologies or to indicate links between ontologies.

In particular, reuse and sharing of information and resources across ontologies depend on purpose-specific, logically versatile criteria. Such purposes include “tight” logical integration of different ontologies (wholly or in part), “loose” association and information exchange, the detection of overlapping parts, traversing through different ontologies, alignment of vocabularies, module extraction possibly respecting privacy concerns and hiding of information, etc. Another important aspect of modularity in ontologies is the problem of evaluating the *quality* of single modules or of the achieved overall modularization of an ontology. Again, such evaluations can be based on various (semantic or syntactic) criteria and employ a variety of statistical/heuristic or logical methods.

Recent research on ontology modularity has produced substantial results and approaches towards foundations of modularity, techniques of modularization and modular developments, distributed and incremental reasoning, as well as the use of modules in different application scenarios, providing a foundation for further research and development. Since the beginning of the WoMO workshop series, there has been growing interest in the modularization of ontologies, modular development of ontologies, and information exchange across different modular ontologies. In real life, however, integration problems are still mostly tackled

in an ad-hoc manner, with no clear notion of what to expect from the resulting ontological structure. Those methods are not always efficient, and they often lead to unintended consequences, even if the individual ontologies to be integrated are widely tested and understood.

WoMO aims at bringing together researchers and practitioners from the formal ontology community and related disciplines to discuss these issues in a multi-disciplinary forum. The goal of the workshop is to present latest research developments, to discuss current directions in the field, and to collect first-hand feedback from the community.

Submissions to WoMO 2014 were peer-reviewed by at least two members of the Program Committee. The accepted papers, bound in these proceedings were carefully selected based on their quality, relevance to the workshop topic, and their potential to bring forward interesting ideas to be discussed at the workshop.

Thanks to the invaluable and much appreciated contributions of the authors, the invited speaker and the Programme Committee, WoMO 2014 provides participants with an opportunity to position their contributions with respect to one another. Hopefully, this will encourage further cross-pollination and set out the constitution of a truly interdisciplinary research-community around the different aspects and approaches to modularity in ontologies.

(Boston, Brisbane, Orono, Rio de Janeiro – September 2014)

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