

Embedding Knowledge Patterns into OWL

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Abstract. We describe the design and use of the Ontology Pre-Processor Language (OPPL) as a means of embedding the use of Knowledge Patterns in OWL ontologies. We illustrate the specification of patterns in OPPL and discuss the advantages of its adoption by Ontology Engineers with respect to ontology generation, transformation, and maintainability. The consequence of the declarative specification of patterns will be their unambiguous description inside an ontology in OWL. Thus, OPPL enables an ontology engineer to work at the level of the pattern, rather than of the raw OWL axioms. Moreover, patterns can be analysed rigorously, so that the repercussions of their reuse can be better understood by ontology engineers and tools implementers. Thus the delivery of patterns with OPPL can provide a means of addressing the opacity and sustainability of OWL ontologies.

1 Introduction

The current focus of discussion about ontology engineering is on topics such as: the *sustainability* of the knowledge maintenance process; the *opacity* of the design of the underlying reusable knowledge models; and the lack of tool support in these and other areas. To cite one recent work:

Today, one of the most challenging and neglected areas of ontology design is reusability. The possible reasons include at least: size and complexity of the major reusable ontologies, opacity of design rationales in most ontologies, lack of criteria in the way existing knowledge resources (e.g. thesauri, database schemata, lexica) can be reengineered, and brittleness of tools that should assist ontology designers. [1]

The evidence that knowledge models expressed in OWL can be, and indeed are, opaque to their users comes (indirectly) from the interest sparked by work on entailment justifications. Some models are so hard to interpret that researchers have recently focused on automatically generating explanations that are better suited for users' interpretation and understanding [2]. Whereas justifications seek to make the inferences from the raw OWL more comprehensible, patterns seek to raise the level of abstraction at which the ontology is formulated. This is