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Introducing Defeasibility into OWL Ontologies

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Abstract

In recent years, various approaches have been developed for representing and reasoning with exceptions in OWL. The price one pays for such capabilities, in terms of practical performance, is an important factor that is yet to be quantified comprehensively. A major barrier is the lack of naturally occurring ontologies with defeasible features - the ideal candidates for evaluation. Such data is unavailable due to absence of tool support for representing defeasible features. In the past, defeasible reasoning implementations have favoured automated generation of defeasible ontologies. While this suffices as a preliminary approach, we posit that a method somewhere in between these two would yield more meaningful results. In this work, we describe a systematic approach to modify real-world OWL ontologies to include defeasible features, and we apply this to the Manchester OWL Repository to generate defeasible ontologies for evaluating our reasoner DIP (Defeasible-Inference Platform). The results of this evaluation are provided together with some insights into where the performance bottle-necks lie for this kind of reasoning. We found that reasoning was feasible on the whole, with surprisingly few bottle-necks in our evaluation.