Statement of interest

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Abstract

Description Logics (DL) is a family of logics, supporting sound and complete reasoning algorithms. They are well tailored towards modelling class based knowledge. In my research, I focused on expressive DLs, which include general form of axioms, and, in particular, on DLR, a DL equipped with n-ary relations.

I used DLR to formally model UML class diagrams, in order to allow the automatic reasoning on the knowledge bases (KBs) obtained from them. I thus exploited the state-of-the-art reasoning systems, namely FaCT and Racer, to reason on them. Among the reasoning services available on a KB, I focused on classification. The results of my experiments have been published in Proceedings of KI-2001 Workshop on Applications of Description Logics.

Together with other researchers, I also studied the complexity of reasoning on UML class diagrams using DLR, thus giving an explanation of the performances of the reasoners. In particular, we showed that class consistency in UML Class Diagrams is EXPTIME-hard: this implies that powerful reasoning tools are required as the core of advanced CASE tools that support the designer with sound and complete inference services.

Finally, I exploited DLR to reason on CIM (Common Information Model), in a project in collaboration with IBM Tivoli. CIM is a model based on UML, defined by DMTF (Distributed Management Task Force). Its purpose is to provide a rigorous approach for modelling systems and networks, using the object-oriented paradigm. Also in this case, the reasoning service I was interested in is the classification of a KB. The reasoners are able to classify all the KBs presented in a few seconds.