Statement of interest

Daniela Berardi
Dipartimento di Informatica e Sistemistica
Università di Roma "La Sapienza"
Via Salaria 113, I-00198 Roma, Italy
E-mail: berardi@dis.uniroma1.it

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 $\mathcal{DLR}$, a DL equipped with n-ary relations.

I used $\mathcal{DLR}$ 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 $\mathcal{DLR}$, 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 $\mathcal{DLR}$ 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-orinted 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.