

Reasoning in ORM Schemes

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Abstract

ORM (Object-Role Modeling) is a rich and well-known conceptual modeling method. As ORM has a formal semantics, reasoning tasks such as satisfiability checking of an ORM schema naturally arise. Satisfiability checking allows a developer to automatically detect contradicting constraints.

In this research, First, we propose nine patterns of constraint contradictions that lead to unsatisfiability in ORM. Although this does not yield a complete procedure – there may be ORM schemes passing the pattern checks while containing unsatisfiable roles – it yields an efficient and easy to implement detection mechanism (specially in interactive modeling tools) for the most common conceptual modeling mistakes.

Second, we present a preliminary work on mapping ORM into the DRL description logic, which enables a complete satisfiability reasoning on ORM schemes, i.e. detecting all possible constraint contradictions. We show three types of satisfiability checking: schema satisfiability, concept satisfiability, and role satisfiability.

At the end, we discuss the differences between the patterns-based approach and the DRL-based approach to reason about the satisfiability ORM schemes.

Although ORM was originally developed as a database modeling approach, it has been also successfully reused in other conceptual modeling scenarios, such as ontology modeling, business rule modeling, XML-Schema conceptual design, etc. Hence, we regard an ORM schema, in this research, as a general conceptual model independently of a certain modeling scenario or domain.