Query Rewriting for *DL-Lite* with *n*-ary Concrete Domains (Abstract)*

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Motivated by the fact that real-world datasets contain concrete data values and database queries use built-in predicates on these values, we investigate ontology-based query answering (OBQA) in a setting where both the ontology and the query may refer to values from a so-called concrete domain. In previous work on extensions of *DL-Lite* with concrete domains [1, 3], the concrete predicates were restricted to being *unary*. With unary predicates, one can, for example, express that the systolic blood pressure of a patient is >120 and the diastolic blood pressure is >80, but setting the systolic blood pressure into a relationship with the diastolic one requires a binary predicate.

In this work, we investigate whether relaxing this severe restriction is possible without destroying the important property of query rewritability, which allows one to reduce OBQA to query answering in databases. More precisely, we introduce conditions on the concrete domain and the ontology language under which rewritability holds even in the presence of concrete predicates of arbitrary arity. Using an appropriate binary predicate we can then, e.g., express that the pulse pressure, i.e., the difference between the systolic and the diastolic blood pressure, is 50. While in the general case of predicates of arbitrary arity our rewriting approach yields only combined rewritability, in the special case of unary predicates it provides us with first-order rewritability, which shows that the results in [3] follow from ours. The results in [1] are orthogonal to ours since, one the one hand, they are restricted to the unary case, but on the other hand, they consider a more expressive *DL-Lite* dialect. In [2], the authors also consider a setting with non-unary concrete domains, but where the data complexity is CO-NP-hard in general. They then investigate for which kinds of queries this complexity goes down to P. In contrast, our goal was to find restrictions on non-unary concrete domains that ensure combined rewritability, and thus polynomial data complexity, for *all* queries.

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