Erratum for ‘Ontology-Based Access to Probabilistic Data with OWL-QL’

Jean Christoph Jung and Carsten Lutz

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This erratum reports about a mistake in [3]. It concerns Section 5 of the paper and affects Theorem 6, Lemma 1, and Theorem 7 in the main body of the paper. These results state a dichotomy for the data complexity of conjunctive queries (CQs) \( q \) over assertion-independent probabilistic ABoxes (ipABoxes) in the presence of an \( \mathcal{ELI} \)-TBox \( \mathcal{T} \). Informally, ipABoxes can be viewed as an open world counterpart of tuple-independent databases [2]. The stated dichotomy is between \( \text{PTime} \) and \( \# \text{P-hardness} \) and also says that, notably, UCQ-rewritability of \( q \) w.r.t. \( \mathcal{T} \) is a necessary condition for \( \text{PTime} \).

The source of the problems is the claim in the proof of Lemma 12 in the appendix about which we say that it can be proved by induction on \( i \). While this is true and not very hard for the fragment \( \mathcal{EL} \) of \( \mathcal{ELI} \) without inverse roles, it is actually false for \( \mathcal{ELI} \). This implies that Theorem 6, Lemma 1, and Theorem 7 also apply only to \( \mathcal{EL} \), but not to \( \mathcal{ELI} \).

Nevertheless, the results stated in Theorem 6 and 7 hold also for \( \mathcal{ELI} \) and even beyond, such as for \( \mathcal{ALCI} \). This is a consequence of results on evaluating infinitary UCQs on tuple-independent databases in [1]. The authors establish the hardness part using a combination of reductions from two different \#P-hard problems, depending on the properties of universal models. These problems are counting the number of satisfying assignments for a monotone bipartite DNF formula and source-to-target reliability in an undirected graph. Our proof in [3] uses only a reduction from the former problem and it seems that this does not suffice for \( \mathcal{ELI} \).

References

