A Framework and Positive Results for Query Answering over Inconsistent Description Logic Knowledge Bases (Extended Abstract)

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Answering queries over inconsistent DL knowledge bases has recently received significant attention [4, 2, 6]. Inconsistency-tolerant semantics, like the IAR semantics, have been proposed as means to compute meaningful query answers. So far, query answering under the IAR semantics has mostly been studied over lightweight DLs like DL-Lite, while the problem is coNP-hard w.r.t. data complexity, already in $\mathcal{EL}_\perp$ [5]. In our work we study IAR-answering over DL ontologies and identify positive tractability results. We provide a general algorithm which applies to arbitrary DLs but need not terminate. If it terminates, then the output is a datalog-program extended with negative body atoms, which can be evaluated over the dataset to obtain the IAR-answers. Our algorithm and analysis help us pinpoint the main reason for the difficulty of IAR-answering and hence we were next able to devise a sufficient condition for termination of our algorithm. The aforementioned condition is always satisfied in the DL semi-acyclic-$\mathcal{EL}$, as well as in DL-Lite$_{bool}$, that allows for disjunctions. For DLs for which the condition is not generally satisfied, we exploit recent works that provide ways to check and compute when a given fixed TBox does [3, 1]. Finally, we have implemented a prototype system and conducted a preliminary evaluation.

References

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