Abstract of the Invited Talk

There is a clear consensus that the required level of scalability in ontology-mediated querying (OMQ) can only be achieved via query rewriting, a prominent tool that allows us to exploit standard database technology for OMQ purposes. The key idea is to reduce the problem in question to the problem of evaluating a first-order (FO) query over a relational database. This technique was originally proposed in 2005 in the context of DL-Lite. Since then it has been extensively applied, not only to more expressive DLs, but also to existential rules (a.k.a. tuple-generating dependencies and Datalog+/−-rules). The goal of this invited talk is to discuss FO-rewritability of ontology-mediated queries based on the main decidable classes of existential rules, i.e., the classes of linear, (frontier-)guarded, sticky and acyclic sets of existential rules.

The first part of the talk will focus on pure FO-rewritability, where the rewriting process is database independent. For the classes of existential rules that always admit FO-rewritings, that is, linear, sticky and acyclic, I will present algorithms for constructing such rewritings, and discuss their practical relevance. For the classes that do not always admit FO-rewritings, namely (frontier-)guarded, I will discuss the challenging problem of deciding whether a rewriting exists. In view of the fact that the above (pure) FO-rewritings are unavoidably very large, the second part of the talk will focus on combined FO-rewritability, a technique that allows us to construct small rewritings at the price of touching the database (but in a controlled way).

Acknowledgements

This invited talk is based on a long line of research that is still ongoing, and several researchers from different institutions have been involved: Pablo Barceló (University of Chile), Gerald Berger (Vienna University of Technology), Andrea Calì (University of London, Birkbeck College), Georg Gottlob (University of Oxford and Vienna University of Technology), Marco Manna (University of Calabria), Giorgio Orsi (Meltwater), and Pierfrancesco Veltri (University of Calabria).