Approximate Unification in the Description Logic $\mathcal{FL}_0$

Pavlos Marantidis

Department of Computer Science, TU Dresden

Abstract

Description Logics [1] are a well-investigated family of logic-based knowledge representation formalisms. They can be used to represent the relevant concepts of an application domain forming so-called ontologies. Unification in description logics [2] has been introduced as a novel inference service that can be used to detect redundancies in ontologies, by finding different concepts that may potentially stand for the same intuitive notion. It was first investigated in detail for the description logic $\mathcal{FL}_0$, where unification can be reduced to solving certain language equations. In order to increase the recall of this method for finding redundancies, we introduce and investigate the notion of approximate unification [3], which basically finds pairs of concepts that "almost" unify. The meaning of "almost" is formalized using distance measures between concepts.

In this talk, we demonstrate how approximate unification in $\mathcal{FL}_0$ can be reduced to approximately solving language equations. The latter problem utilizes language distances and is of independent interest. We devise algorithms for two particular distances, that, intrestingly enough, make use of many different tools from mathematics.

This is joint work with Franz Baader and Alexander Okhotin.

References

[1] Baader, F., Calvanese, D., McGuinness, D., Nardi, D., Patel-Schneider, P.F. (eds.): *The Description Logic Handbook: Theory, Implementation, and Applications.* Cambridge University Press (2003)

[2] Baader, F., Narendran, P.: *Unification of concept terms in description logics.* J. of Symbolic Computation 31(3), 277305 (2001)

[3] Baader, F., Marantidis, P., Okhotin, A.: *Approximate unification in the description logic $\mathcal{FL}_0$.* In: JELIA 2016. LNCS vol. 10021, pp. 4963. Springer (2016)