



Avoiding Excessive Description Logics Through Concrete Domains

Presenter: Dr Michael J Lawley, The Australian e-Health Research Centre, CSIRO

Audience

NRCs and others involved in modelling SNOMED CT Concepts, especially those involving medications, where there is a desire to represent meanings involving *negation* and *only* style constructs.

Objectives

Attendees will learn about the potential for modelling using concrete domains to simulate/approximate *negation* and *only* constructs without using a more expressive, less-tractable Description Logic family.

Abstract

One of the key factors underlying the development of SNOMED CT content has been the choice to restrict things to a subset of the Description Logic EL++. In simple terms this means that negation (and its dual, universal quantification) cannot be used for modelling concepts. The advantage of such a restriction to the expressiveness of the logic is that tractable algorithms exist for computing all the inferable relationships for each concept.

Recently Australia's NRC, NEHTA, has produced AMT V3, a re-working of the Australian Medicines Terminology that successfully employs an extension to EL++ involving concrete domains to model the strength of substances in medications, and the quantities in a pack. By observing certain restrictions [1], the extension to concrete domains remains tractable and is supported by open source classifiers such as Snorocket [2].

This presentation will demonstrate how certain use-cases surrounding the modelling of medications (e.g., that they contain *only* the modelled active ingredients) and procedures and findings involving implicit negation (eg mono-, hemi-, and unilateral) can be modelled as *fully-defined* concepts using concrete domain-based features. With this pragmatic approach, the intended meaning of these concepts can be sufficiently modelled so as to avoid undesirable (and incorrect) inheritance relationships from being inferred. We will demonstrate examples of this re-modelling with both SNOMED CT and AMT.

References

1. *Tractable Extensions of the Description Logic EL with Numerical Datatypes*. Despoina, M., Kazakov, Y., and Horrocks, I. in *Journal of Automated Reasoning*, Volume 47 (4), 2011
2. *Snorocket 2.0: Concrete Domains and Concurrent Classification*. Metke-Jimenez, A. and Lawley, M.J. in *Proceedings of the 2nd OWL Reasoner Evaluation Workshop (ORE)*, 2013.