

Antipattern Detection in Web Ontologies: an Experiment using SPARQL Queries

Catherine Roussey*, Oscar Corcho**, Ondřej Šváb-Zamazal***, François Scharffe****, Stephan Bernard*

*Irstea/Cemagref, 24 Av. des Landais, BP 50085, Aubière, France

**Ontology Engineering Group, Universidad Politécnica de Madrid, Spain

***Knowledge Engineering Group, University of Economics Prague, Czech Republic

****LIRMM, Université de Montpellier, France

Abstract. Ontology antipatterns are structures that reflect ontology modelling problems because they lead to inconsistencies, bad reasoning performance or bad formalisation of domain knowledge. We propose four methods for the detection of antipatterns using SPARQL queries. We conduct some experiments to detect antipattern in a corpus of OWL ontologies.

1 Introduction

The concept of knowledge modelling pattern or ontology design pattern is used to refer to modelling solutions that allow solving recurrent knowledge modelling or ontology design problems, Presutti et al. (2008). Antipatterns are patterns that are ineffective or far from optimal in practice, representing worst practices about how to structure and design an ontology. There are several tools that can be used for the detection of antipatterns. Pellint¹ focuses on the detection and repair of antipatterns to improve ontology reasoning performance. Tools like Explanation Workbench described in Horridge et al. (2008), or SWOOP described in Kalyanpur et al. (2005), provide justifications of inconsistencies in ontologies based on the outputs of DL reasoners. However, all these contributions need a reasoner to provide their justifications.

Our antipattern detection methods implement a more general approach, that can work on any antipattern and can be applied without the use of a reasoner, something that is very useful with large ontologies and when the number of errors in an ontology is so large that the previous justification systems are not able to handle them properly, providing timeouts. To detect the selected antipattern, we have transformed it into sets of SPARQL queries. In general, antipatterns correspond to several queries, because they are abstract structures that can have several logical forms when expressed in Description Logics (DL). Moreover we have proposed several detection methods. We can switch on or off inferences before running SPARQL queries. We can also transform the original ontologies into a form where simpler SPARQL queries can be run.

This paper is structured as follows. Section 2 briefly describes the antipattern that will be used to run our experiments. Section 3 will describe the methods we have followed in order to run the experiments. Section 4 describes the experiment setup and the results of the

1. <http://pellet.owldl.com/pellint>