Building the Ontology Dictionary using the Inference Engine RACER

Abstract

The term ontology is used with several different meanings. One of the first definitions was given by R. Neches and colleagues, who defined an ontology as follows: An ontology defines the basic terms and relations comprising the vocabulary of a topic area as well as the rules for combining terms and relations to define extensions to the vocabulary. This article aims to study the relationship of semantic and non-linguistic relationships in the ontology dictionary. Then we compare these relations with lexical relations occurring in the information languages used in the Polish library catalogs (for example: language subject headings of the National Library, language subject headings KABA). This goal is realized by building the ontology dictionary (conceptual schema) that contains concepts, the definitions of the concepts, and the specification of relationships among the concepts. Terms included in the subject index of Encyclopedic dictionary of information, language and information retrieval systems were used in the creation of ontologies. Some of these terms have been translated into English by using English-Polish dictionary of scientific information and librarianship.

The inference engine RACER (Renamed ABox and Concept Expression Reasoner) was used to build the ontology. The RACER implements TBox and ABox reasoner for the logic SHIQ. This paper discusses the basic functions of management knowledge base, which consists of terminological axioms (forming the so-called Tbox) and assertions (assertions forming the Abox). This ontology dictionary presents the ability to find words or phrases by means of functions and macros available in the engine RACER (see Fig. 1).

Fig.1: Screenshot of the engine RACER: start-up TBox Semantyka

---

The logical relations defined in the description logic SHIQ enable semantic queries which can discover not just exact matches but logically related concepts. These relationships are similar to the relationships in information languages used in the Polish library catalogs (syntactic categories and grammatical categories). Analysis of the semantics of questions leads us to the conclusion that the inference engine RACER is an effective software for information classification, search and retrieval. The approach has been evaluated and can be used in studies of information languages in Poland.