OntoClippy: A User-Friendly Ontology Design and Creation Methodology

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ABSTRACT

In this article, the author describes OntoClippy, a tool-supported methodology for the user-friendly design and creation of ontologies. Existing ontology design methodologies and tools are targeted at experts and not suitable for users without a background in formal logic. Therefore, this research develops a methodology and a supporting tool to facilitate the acceptance of ontologies by a wider audience. In this article, the author positions the approach with respect to the current state of the art, formulates the basic principles of the methodology, presents its formal grounding, and describes its phases in detail. To demonstrate the viability of our approach, the author performs a comparative evaluation. The experiment is described, as well as real-world applications of the approach.

Keywords: Ontology, Ontology Acceptance, Ontology Design, Ontology Design Methodology, Tool-supported Methodology

INTRODUCTION

The acceptance and use of ontologies is hindered by the fact that they are very complex and can only be created by trained ontology engineers. Our goal is making ontologies accessible by designing a methodology and, equally important, a supporting tool, which enable domain-experts and users without a background in logic to design ontologies. We don’t want to replace ontology engineers in the ontology building process, but we want to make their work easier by enabling users to build skeleton ontologies, which can be further refined by them.

We envision three use-cases for our approach:

• Average users without a background in computer science, who want to contribute knowledge on their subjects of interest to the semantic web (Berners-Lee, Hendler & Lassila, 2001).
• Domain-experts who create formalized knowledge that is to be used in a software system. Traditionally such ontologies would be created by ontology engineers interviewing domain experts in an iterative process. Enabling domain experts to create initial versions of those ontologies themselves potentially leads to cost and time benefits when compared to the traditional way.
• Ontology engineers using the methodology for rapid prototyping of ontologies.

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We want to reach our goal of increasing the acceptance of ontologies by hiding, as much as possible, the formalism required to build them. Therefore we developed OntoClippy, a user-friendly, tool-supported ontology design and creation methodology with the aim to make ontologies usable by non experts. We want to convey to everybody interested in building ontologies, that ontology design doesn’t need to be complex and that by using our tool-supported methodology user will be more productive than with existing methodologies and tools. Eventually we want to test this with an empirical evaluation through experiments and supported by questionnaires.

**STATE OF THE ART**

In our earlier work we formulated criteria for user-friendly ontology design and creation methodologies and conducted a survey comparing existing methodologies. In the following section we give a short overview over our work and position our work with respect to other approaches for making ontology design and creation more user-friendly.

**Criteria for User-Friendly Ontology Design and Creation Methodologies**

An ontology creation methodology for domain experts should be efficient to use and easy to learn. The following section gives requirements for such a methodology in the form of criteria the methodology has to meet. These criteria are based on experiences made in the course of the STASIS project (http://www.stasis-project.net). During the project they were discussed and evaluated with users from both academia and industry. Subsequently they have been presented and discussed at the I-ESA conference (Dahlem, Guo, Hahn & Reinelt, 2009).

Besides the methodologies themselves the presented criteria also cover aspects of ontology construction tools and the underlying ontology languages. A methodology should use *adequate terminology*. It should be *well structured, self-descriptive, transparent and supported by a tool*. The methodology, as well as the supporting tool should help users to *avoid errors*, they should be *robust and consistent* and finally they should support *conceptualization flexibility* (cf. the basic principles of our methodology).

The supporting tools should offer *look-ahead features*, it should *hide formality* as much as possible and it should *present ontology assumptions in a comprehensible manner*.

Finally **expressiveness** is an inherent property of the underlying ontology language, but is also reflected in the methodology itself, as it might restrict the expressiveness to a subset of the underlying language.

**Existing Methodologies and Tools**

In our earlier work (Dahlem & Hahn, 2009) we conducted a survey comparing ontology creation methodologies found in literature. These methodologies were developed in various communities and with various foci: CommonKADS (Wielinga, Schreiber & Beuker, 1992), Cyc (Lenat, 1995) and KBSI IDEF5 (Benjamin, Menzel, Mayer, Fillion, Futrell, DeWitte & Lingineni, 1994) are geared towards Knowledge Based Systems. The methodologies of Grüninger and Fox (1995) and Uschold and King (1995), as well as METHONTOLOGY (Fernández, Gómez-Pérez & Juristo, 1997), Ontology Development 101 (Noy & McGuinness, 2001) and UPON (De Nicola, Missikoff & Navigli, 1995) are designed for building ontologies from scratch. DILIGENT (Vrandecic, Pinto, Sure & Tempich, 2005) and HCOME (Kotis, Vouros & Alonso, 2005) put the focus on the evolution and collaborative development of ontologies, while SENSUS (Swartout, Patil, Knight & Russ, 1996), KACTUS (Schreiber, Wielinga, Jansweijer, 1995) and ONIONS (Gangemi, Pisanelli & Steve, 1999) build ontologies by deriving domain-ontologies from large scale ontologies, reusing existing ones and reusing other knowledge sources. Finally the On-To-Knowledge methodology (Sure & Studer, 2002) is build for creating and maintaining Knowledge Management applications.
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