ABSTRACT

With the emergence of tools for collaborative ontology engineering, more and more data about the creation process behind collaborative construction of ontologies is becoming available. Today, collaborative ontology engineering tools such as Collaborative Protégé offer rich and structured logs of changes, thereby opening up new challenges and opportunities to study and analyze the creation of collaboratively constructed ontologies. While there exists a plethora of visualization tools for ontologies, they have primarily been built to visualize aspects of the final product (the ontology) and not the collaborative processes behind construction (e.g., the changes made by contributors over time). To the best of the authors’ knowledge, there exists no ontology visualization tool today that focuses primarily on visualizing the history behind collaboratively constructed ontologies. Since the ontology engineering processes can influence the quality of the final ontology, they believe that visualizing process data represents an important stepping-stone towards better understanding of managing the collaborative construction of ontologies in the future. In this application paper, the authors present a tool – PragmatiX – which taps into structured change logs provided by tools such as Collaborative Protégé to visualize various pragmatic aspects of collaborative ontology engineering. The tool is aimed at managers and leaders of collaborative ontology engineering projects to help them in monitoring progress.
in exploring issues and problems, and in tracking quality-related issues such as overrides and coordination among contributors. The paper makes the following contributions: (i) They present PragmatiX, a tool for visualizing the creation process behind collaboratively constructed ontologies (ii) the authors illustrate the functionality and generality of the tool by applying it to structured logs of changes of two large collaborative ontology-engineering projects and (iii) they conduct a heuristic evaluation of the tool with domain experts to uncover early design challenges and opportunities for improvement. Finally, the authors hope that this work sparks a new line of research on visualization tools for collaborative ontology engineering projects.

Keywords: Collaborative Ontology Engineering, Ontology Engineering Visualization, Ontology Evaluation, Ontology Monitoring, Ontology Tool, Pragmatic Analysis

INTRODUCTION

While collaboration, negotiation, and consensus represent an integral part of ontology engineering processes, it is only recently that disciplined tools and infrastructure for collaborative ontology engineering have emerged. Tools such as Collaborative Protégé (Tudorache, Noy, Tu, & Musen, 2008) not only provide an infrastructure for collaboration and coordination, but also provide a structured log of all ontological changes, which users have made via the tool. These logs can, for example, include records of concepts added, properties changed, or relationships qualified. In aggregation, such logs can essentially capture the entire evolution of an ontology from its inception to its final stages on a very fine-grained level. At the same time, the availability of fine-grained logs poses new challenges and opportunities for studying and analyzing the history of collaborative ontology engineering projects. While there exists a plethora of visualization tools for ontologies, they have primarily been built to visualize aspects of the final product (the ontology) and not the collaborative processes behind construction (e.g. the changes made by contributors over time). To the best of our knowledge, there exists no ontology visualization tool today that focuses primarily on visualizing the creation processes behind collaboratively constructed ontologies.

This application paper sets out to present a visualization tool that primarily focuses on visualizing pragmatic aspects of collaborative ontology engineering, i.e. the social processes that yield collaboratively constructed ontologies. We present a tool – PragmatiX – that taps into structured log of changes provided by tools such as Collaborative Protégé and visualizes them via network-based and other kinds of visualizations. The tool is aimed at managers and leaders of collaborative ontology engineering projects to help them in monitoring progress, exploring issues and problems, and tracking quality-related issues such as overrides and coordination among contributors. PragmatiX is the successor of iCAT Analytics (Pöschko, Strohmaier, Tudorache, Noy, & Musen, 2012) and provides additional functionality such as the heat-map (as described in Section Concept Network Visualization), the possibility of importing multiple data sets into one instance of our tool, the support for multi-language data sets (see Section Category and Author Views) as well as various statistical overview pages such as the dashboards (see Section Dashboard). Additionally, a heuristic evaluation has been performed on our tool, providing interesting results for future work.

Our initial prototype demonstrates its capabilities by tapping into change-logs produced by variants of Collaborative Protégé, where changes and notes as well as comments on changes are represented in the Change and Annotation Ontology (ChAO) (Noy, Chugh, Liu, & Musen, 2006). Because several large collaborative ontology-engineering projects in the bio-medical domain use Collaborative Protégé (and its derivatives) for tool support, we have access to change-log data from a series of different projects. For example, the International Classification of Diseases (ICD-11) project uses WebProtégé, a Web version of Protégé that is built on the collaborative framework of Collaborative Protégé, to collaboratively engineer a bio-medical ontology consisting of more than 30,000 concepts (Tudorache, Falconer, Nyulas, Noy, & Musen, 2010). Almost all changes
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