

An Initial Analysis of Semantic Wikis

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ABSTRACT

Semantic wikis augment wikis with semantic properties that can be used to aggregate and query data through reasoning. Semantic wikis are used by many communities, for widely varying purposes such as organizing genomic knowledge, coding software, and tracking environmental data. Although wikis have been analyzed extensively, there has been no published analysis of the use of semantic wikis. We carried out an initial analysis of twenty semantic wikis selected for their diverse characteristics and content. Based on the number of property edits per contributor, we identified several patterns to characterize community behaviors that are common to groups of wikis.

Author Keywords

Semantic wikis; semantic web; RDF; social knowledge collection.

ACM Classification Keywords

H.5.2 [Information Interfaces and Presentation]: User Interfaces - Interaction styles.

INTRODUCTION

Wikis offer a simple user interface to organize information and have become one of the most popular frameworks for collaboration on the Web. Wikis are easy to use, track the provenance and the history of all user changes, and scale well to thousands of users. Semantic wikis augment wikis with the ability to structure information through semantic annotations, and with reasoning capabilities that exploit that structure to organize the wiki's knowledge [1]. In a regular wiki, infoboxes provide a very basic structure which is a form-based organization of some parts of the content for the corresponding wiki topic page. For example, Wikipedia has infoboxes for athletes, politicians, and countries. However, the infobox is just a form for users to organize information, and the system cannot understand its structure or reason about its contents. In contrast, in semantic wikis users can define classes, properties for those classes, and restrict the values that those properties can take. The entries of a wiki infobox can be turned into structured properties in a semantic wiki. Semantic wikis are becoming

very popular, as they offer the simplicity of the user interface of a wiki with additional capabilities to organize content. Some semantic wikis have a serious use, such as scientific knowledge organization. Others have practical use, for example gardening or restaurant finding. Some wikis have users that are on the younger side, such as teens who are Yu-Gi-Oh card traders and want to organize all the information about the different characters in the cards. Semantic wikis can be seen as a microcosm of the Semantic Web, since users exploit semantic technologies while retaining a very accessible Web collaboration interface.

While there are many published analyses of wikis focusing on various topics such as content, edits, or user behaviors (e.g., [2,3]), there is no prior work on analyzing user behaviors in semantic wikis.

We conducted an initial analysis of twenty semantic wikis, focusing on how the users edit the wiki to add structure to the content. The semantic wikis focus on a variety of topics and with diverse communities

BACKGROUND: SEMANTIC WIKIS

A semantic wiki allows users to organize topic page categories as classes in an ontology, and to define properties that apply to each class. Semantic wikis allow users to constrain properties by the range of values that they can take, which are called *structured properties*. As content is added using these structured properties, the semantic wiki can use reasoning and inference. Users can create queries about those structured properties and use them to generate dynamic content for wiki pages. [1] gives a detailed overview of semantic wikis and a thorough comparison of semantic wiki frameworks, which include Semantic MediaWiki, OntoWiki, and AceWiki.

ANALYSIS

The goal of our work is to understand the degree of adoption of semantic technologies in semantic wikis. Towards this goal, we set out to analyze the use of structured properties in existing semantic wikis.

We used Semantic MediaWiki data. There is a site that compiles 489 Semantic MediaWikis¹. For each wiki, the

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¹ <http://smw.referata.com/wiki/Special:BrowseData/Sites>

contributor data is publicly accessible through the history pages. Semantic MediaWiki has an API to access this data. We selected 20 wikis with different topics and sizes.

We analyzed how many editors created or changed semantic properties in the wikis. Figure 1 shows the proportion of property edits done by each editor in descending order. The wikis follow four distinct patterns. In one pattern, shown in Figure 1(a), one, two, or three editors are responsible for all the edits to the structured properties. These editors control the structure of the wiki, sometimes reversing the edits of other users. We refer to this pattern as a *monarchy*, as a very small set of users controls the structure of the wiki. In other wikis, shown in Figure 1(b), more than 3 but less than 10 editors are responsible for the edits to the semantic properties. We refer to this pattern as an *oligarchy*. Figures 1(c) and (d) show two additional sets of wikis, one set with 10-40 editors and another set with >40 editors. We describe these patterns as a *republic* and a *democracy* respectively. The total number of users and the size of the wikis varies in each of the four categories. We also found that the number of structured property editors does not increase in proportion with the number of editors.

We wondered if these patterns are also followed for general edits. Our data showed similar kinds of patterns for general edits. However, the pattern that a given semantic wiki community follows for structured property edits does not necessarily correspond to the pattern of all edits.

Further analysis is needed to understand the behaviors of the semantic wiki user communities. An interesting question is whether spikes in the growth of semantic wiki contents result from the creation or edit to a structured property. Analyzing this will require finer grained data about the nature of the edits. These kinds of analyses can help improve the design of semantic wikis and their use.

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REFERENCES

- [1] F. Bry, S. Schaffert, D. Vrandečić and K. Weiand. "Semantic Wikis: Approaches, Applications, and Perspectives." Reasoning Web: Semantic Technologies for Advanced Query Answering. Lecture Notes in Computer Science, Volume 7487, 2012.
- [2] A. Kittur, R. E. Kraut. "Harnessing the wisdom of crowds in Wikipedia: Quality through coordination." Proceedings of the ACM Conference on Computer-Supported Cooperative Work, 2008.
- [3] J. Leskovec, D. Huttenlocher, J. Kleinberg. "Governance in Social Media: A case study of the Wikipedia promotion process." Proceedings of the AAAI International Conference on Weblogs and Social Media (ICWSM), 2010.

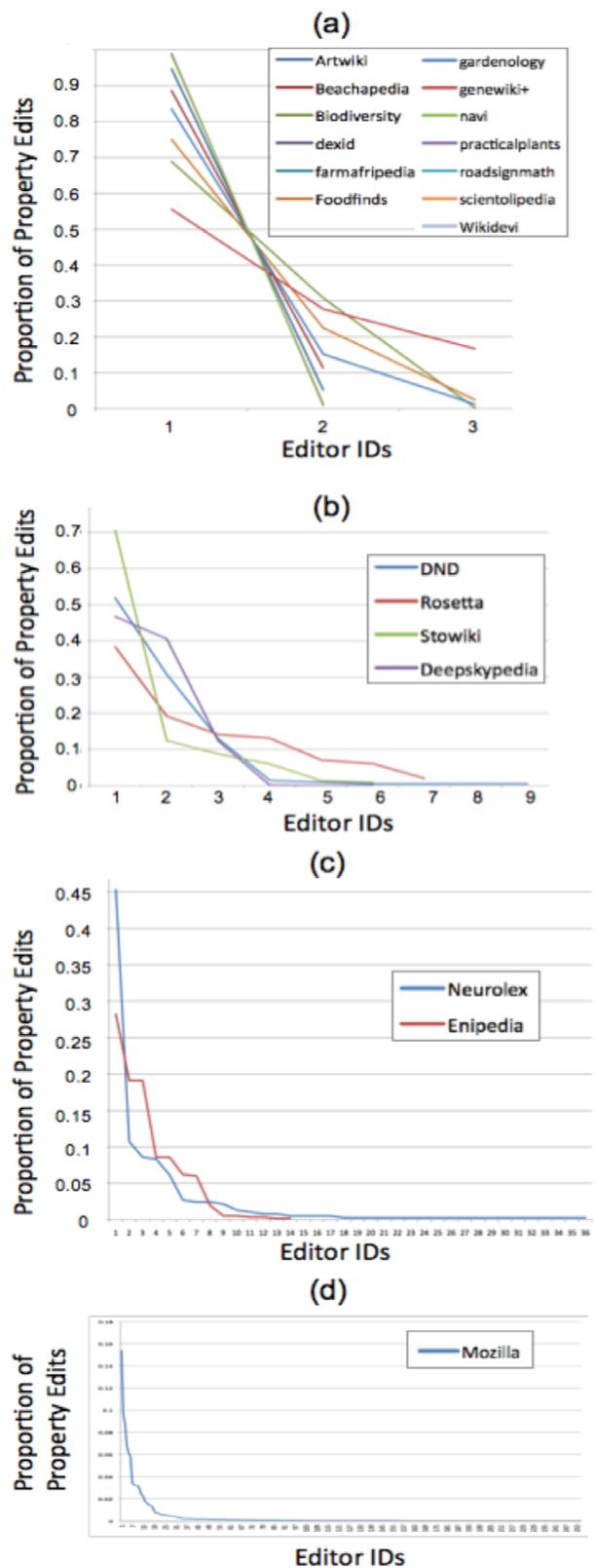


Figure 1. The proportion of property edits by editor varies widely across semantic wikis: (a) 2-3 editors, (b) 4-9 editors, (c) 10-40 editors, and (d) >40 editors.