Semantic Wikis: Advantages and Issues

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ABSTRACT

In this paper we will look at the current state of semantic wikis by examining a few currently implemented systems. We will look at the novel features of all systems and appraise the quality of each implementation as well as briefly discussing the motivation behind the features. We will then make recommendations as to how an ideal semantic wiki should be implemented and suggest the direction of further research.

Author Keywords

Report, wiki, semantic wiki, semantic web, user generated content.

ACM Classification Keywords

INTRODUCTION

Wiki Wiki Webs

Wiki Wiki Webs, or wikis for short, are webpages which are easily created and maintained and are editable by anyone. They are essentially a system of creating collaboratively created and maintained documents which support versioning. In order to better support collaboration, wiki systems also use a simplified version of HTML markup language and support editing thorough a web browser, meaning that it is not necessary to obtain any special software, or have any special technical training in order to be able to edit a page.

Semantic Wikis

Semantic wikis differ from traditional wikis in that they support of adding semantic data to the information entered into a wiki. This idea of adding semantic descriptions to documents comes from the idea of the semantic web[5]. By adding semantic descriptions to content it becomes possible for software 'agents' to search through this data in a more meaningful way than current keyword based search allows, allowing machine-to-machine communication. It also allows for content to be more reusable and takes away some of the problems involved with maintaining documents.

The semantic web and semantic wikis are still taking their first steps, however there have been several implementations of semantic wikis which we will examine critically. An up to date list of current semantic wiki can be found at [7]. We will particularly look at whether these new semantic wikis retained the characteristics, e.g. ease of use, of traditional wikis while adding another layer of information to wiki pages. In general the wiki systems we will look at have features in common, they do however differ in the way in which these features are implemented. There are also features which are unique to particular wikis.

In the next section I will look at the advantages offered by adding semantic data to wiki content, followed by a section examining the problems and challenges that would be encountered by adding semantic data. The section after that describes each of the five wiki systems examined in detail, discussing whether they remained true to the original spirit of wiki wiki webs and also looking at novel features in each system. Then, we describe further work which should be taken to further advance the field of semantic wikis and describe our own ideal semantic wiki. The paper concludes in the last section with some general thoughts about semantic wikis.

ADVANTAGES OF SEMANTIC WIKIS

Improved search

Improved searching capability is one of the main driving factors behind semantic wikis. The addition to semantic information to content would enable to user to construct queries which are closer to natural human language. e.g. “How old is Helen Clark?”. Using ontologies, a software agent could inference that “how old” refers to the difference in time between todays date and the date the thing/person was created/born. Thus, having identified the object we are interested in (Helen Clark) and the information that we need (date of birth), the software agent could search through the wiki page about “Helen Clark” looking for the data corresponding to the semantic information “Date of Birth”[1]. The addition of semantic data in this example serves as a method of 'translating' natural language queries into machine understandable queries. This of course benefits the user, because they don't have to sort through the results of a keyword search.

Navigation, stored search and maintenance

In the current wiki systems, links between pages are all made explicitly by the user. This creates more work for the user in creating and maintaining those links. Using semantic information we could create a system where a new page is automatically linked to on the other relevant pages without users explicitly having to add the links. This is possible because the semantic information is structured and hierarchal in nature. A page in a wiki represents a concept, which can be thought of as a class in a class diagram. By formally defining this class, its attributes and its relationships with other concepts/classes we can, for example, have a section on each page of a wiki which links to all other pages which share the same parent class[1,2,3].

We might also, extend this feature so that searches could be embedded into the text of the wiki itself, allowing users to construct links which would be automatically updated[1,2]. e.g. an embedded search on Helen Clark's wiki page displaying the results of “All female prime ministers of UK and New Zealand”. This is similar to database views that relational databases employ.

In traditional wiki systems, translation is supported by having different versions of a page corresponding to different languages. When, information is updated on one page the information on other pages, describing the same concept in a different language has to be updated as well[1]. For our example, if we wanted to update the English language wiki page about Helen Clark, to reflect that her new residence is Wellington, we would have to manually update the German, Spanish etc... pages to reflect this change. Semantic wikis would solve this problem, when dealing with information such as birth dates, version numbers, place names etc...

The semantic labeling of concepts would therefore, require more effort when initially creating content but would lead to less effort in the long term, due to the decreased amount of effort needed to maintain the wiki pages explicitly.

PROBLEMS WITH SEMANTIC WIKIS

The added overhead of adding semantic data

The success of wikis comes from their gross simplification of the HTML protocol, enabling almost anyone that can read and write to create web pages. The key characteristics of wikis is their open access, ease of use and focus on modification [1]. Any system that seeks to emulate the success of wikis must remain true to those characteristics. So in fact, there is a trade off between authoring effort and the benefit of the annotations. This does not only mean simplifying the semantic syntax as much as possible and standardising the interface[4], but also using methods like instant gratification[1] and visualisation[2,3] to help make wikis more appealing to the user.

Not enforcing constraints

While a semantic wiki should reuse existing ontologies and even use those ontologies to help the user add semantic information [6], the system should not force the user to commit too early in the creation process. e.g. a system which forces a user to define all the ontological links to other concepts/pages before allowing them to start creating content requires too much commitment from the user before they have even begun to create content. The system needs to even be flexible enough to be able to create content without any meta data , allowing the possibility for someone else to add this information at a later date.

CURRENT IMPLEMENTATIONS

IkeWiki

The layout of the IkeWiki[7] interface tries to closely copy the in Wikipedia interface. For the purposes of editing information IkeWiki uses two interfaces. One is interactive

WYSIWYG editor created with AJAX technology aimed at non-technical users, while the other is a traditional, web form based editor where users can edit wiki markup. The reason behind the use of the WYSIWYG editor is that it leads to greater acceptance among non-technical users.

The Wiki syntax of IkeWiki being compatible with that of Wikipedia, allowing users to copy/paste Wiki markup language between the two systems. IkeWiki also differs itself from other wiki systems in that it implements machine reasoning on it's knowledge base.

The most interesting decision made when designing IkeWiki was the decision of the creators of the system to create a kind of separation between technical and non-technical users in the form of creating two different content editors and adding the ability to hide functionality from some users. Administrators have the ability to restrict the editing options that the users see. These features go against the original wiki idea of universal accessibility by creating two tiers of users.

SemperWiki

SemperWiki[1] differs from the other wiki systems reviewed in that it is not a web based system. It implements the standard features such as stored searches which are embedded in the text and view of the data. Due to the system being desktop based as opposed to web based, any changes in the structure of the ontology are presented in real time to the user. Also, the system has a feature where a user is able to import classes from other ontologies.

Semantic Media Wiki

Semantic Media Wiki[9] is a system which aims to be as compatible as possible with the WikiMedia wiki system, almost to the point where it seems as if it is merely an extension of the WikiMedia system. It adds semantic data to content as well as standard features of semantic wikis such as semantic search and embedded queries, but does not strive to introduce any ground breaking features.

Platypus Wiki

An outstanding feature with Platypus Wiki[10] is the “site links” feature which allows a user to specify words which should be automatically linked to URL's either internal or external. This idea could be taken further by scanning the content for words which are the names of other concepts either in the current wiki system or some other ontology and automatically linking to those.

WikSAR

WikSAR[3] added the feature of showing interactive graphs on a page, which shows how concepts are inter-related. This appeals to the instant gratification aspect of designing collaborative systems. In the graph it is possible to see, using fish eye techniques, the concepts in the ontology and how they are related to other concepts. We can navigate through the wiki by clicking on the nodes in the graph which represent the concepts.

IDEAL SEMANTIC WIKI

The ideal semantic wiki should retain the characteristics of the original wiki wiki webs. This criteria applied to semantic wikis means that it should support all the functionality of traditional wiki systems as well as adding the semantic layer. This means that a semantic wiki should not take away any features of traditional wikis, but simply build on them.

It should encourage collaboration, meaning that it should be web based and only have one method of editing the content and only one set of user options, so as not to create a two-tier user base. Also, the editing of content and semantic data should not occur separately, but should be done using the same editor.

The interface should be intuitive and nor require any specialised software to view or edit a wiki. i.e. it should be browser based. The syntax should remain simplified.

The wiki should have the ability to reuse previous content and previous ontologies, as well as have the ability to be reused itself. This means that an ideal semantic wiki should have the ability, as well as serving web pages, to serve up documents, perhaps in XML form, representing it's ontology.

Also, features such as the interactive graph view in WikSAR and “site links” in Platypus Wiki should be further examined to see if they provide any further benefit to the user experience.

CONCLUSION

In conclusion, for semantic wikis to be successful, we must always keep in mind why traditional wiki systems became a popular way do create, edit and store documents. The move from traditional wikis to semantic wikis should be a smooth

transition, not a violent revolution. As such researchers should focus on usability and not try to "push" complex features or constraints on users.

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