Semantic Social Profile – a Semantic Boost for the Social Information in MediaWiki

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Abstract. Semantic MediaWiki proved its effectiveness as a platform for creating semantically connected hypertexts. Unfortunately, in most wiki engines, information about contributors (wiki authors) remains in shadow for human observers and is not available for program agents. Semantic Social Profile proof of concept introduces a flexible way of integration the social features of MediaWiki and Semantic MediaWiki annotations. In the paper we describe the extension development process and some of the use cases that will become possible with it.

1 Introduction

Wiki systems are getting more and more popular: now Wikipedia is one of the most visited websites on the planet[3], many corporations use wiki in their enterprise systems, almost every project tracker includes a wiki engine; wikis are widely used in education. Despite their usefulness, with constant growth of information wiki systems require new ways of data managing. Most of wiki engines lack tools that provide multi-attribute search and automatic checks for data consistency. Moreover, wikis may benefit from social features, since most users are accustomed to them and communication is essential for better articles quality. In this work, by the example of semanticizing social profiles, we illustrate the fact that the data converted to a suitable format for automatic processing, make the implementation of various practical use cases possible much easier and faster.

The paper is organized as follows: Section 2 briefly introduces the advantages of semantic wikis, in Section 3 we show the importance of social data in wikis and describe the Social Profile extension which allows wiki users to manage thier social profiles and provide them with a set of social networking tools. In Section 4 we show some promising use cases that will be available with Semantic Social Profile extension; namely the improvements in user statistics and search, providing information for better tracking of the revision history, and ability to reuse the profile outside the wiki. Section 5 includes the main aspects of

[3] http://www.alexa.com/topsites

implementation as well as description of the current mapping from Social Profile fields to existing properties in various ontologies.

2 Semantic MediaWiki

One of the main problems of regular wikis is that they are in significant dependence on authors efforts in content management [9]. This disadvantage becomes especially apparent when users create list articles, the type of articles that contain a list of links to other wiki pages that relate to a particular topic. Whenever a new article is created, it needs to be manually added to the corresponding lists. In addition to this, when the information in some of the items is changed, one has to do routine manual work to edit information in the list article. Hence, authors are responsible for data consistency.

Moreover, wikis offer only fulltext search and page categorization as tools for finding information. So, neither can wiki information be reused by machines nor can it be fully accessed by those who need it [9].

The problems of traditional wiki systems mentioned above were already known in the mid 2000s when the first semantic wiki engines were created [8]. Semantic wiki allows querying within the wiki, aggregate data in convenient views (tables, maps, calendars), export data to semantic formats (RDF, OWL) and allow for reasoning with it [10].

One of the most popular semantic wiki engines is Semantic MediaWiki (SMW) created in Karlsruhe Institute of Technology (KIT) and described in [7], [2], [9]. It is an extension for MediaWiki[4] that offers a simple yet powerful mechanism of semantic annotations [2]. These annotations are used to make named links between the articles and to assign datatype properties to them. By combining the traditional MediaWiki features and the tools provided by SMW, it is possible to solve the above-mentioned problems of traditional wiki systems as described in [9].

Semantic MediaWiki provides various datatypes[5] (Page, String, Number, Data, URL, etc) to represent the values of different properties. It also has an expressive query language that can be used both to process non-trivial search and to create list articles automatically. For example, a list of annual events announced on semanticweb.org[6] has been created automatically from already existing data. Of course, in this case, the term "list" should be understood in much broader sense than just one-dimensional table, since SMW coupled with other extensions provides various forms of data retrieval. Another advantage that SMW provides is the ability to export data to RDF and import external vocabularies so that property names can be mapped to OWL ontologies such as FOAF, DC, SKOS.

[4] http://mediawiki.org

[5] http://semantic-mediawiki.org/wiki/Help:Properties_and_types#Data_types_for_properties

[6] http://semanticweb.org/wiki/Concept:Semantic_Web_events_2011

3 Social Information in wiki systems. Semantic Social Profile extension

Social networks play an important role in everyday life of Internet users and significantly influence the structure of the Web. Managing social information is an important part of the Semantic Web vision [3], [5] and the Web 2.0 era we live in now. We believe that wiki systems can also leverage from the social data in a variety of ways.

First of all communication between authors leads to quality improvement of articles created by them. System of ranks, points and encouragement of the best authors stimulates efficient work. Furthermore, social information can be used for recommendation algorithms, offering users information they may be interested in. It also can be used as additional input data for contextual advertising algorithms. Finally, administrators and analysts get a possibility to retrieve useful information about the groups of wiki editors to manage the development of wiki content.

Social Profile[7] is an extension that represents social information of wiki users and adds interfaces to manage their social data. It provides such features as storing profile information (personal information, interests, avatar), user-specific statistics, rank system, relationships between wiki users (friends or foes), and a wall to leave messages.

Although Social Profile extension provides many features, user data is still not so easy to access, since it is stored in a database and the only way to use it is to implement new MediaWiki extension. We propose an approach of semanticizing social data that will allow the profile information to be used more efficiently. Semantic Social Profile[8] is an extension that is designed to utilize Semantic MediaWiki and Social Profile extensions to automatically benefit from both of them. Social Profile provides us with forms for data input, interfaces for communication and relationship management and other useful social features, whereas Semantic MediaWiki offers a ready-to-use system of querying the data and displaying results in various formats. SMW can also be used to make profiles portable between different social networks.

This extension deals with social data: it reacts on profile changes, e.g., avatar uploads, adding/removing friends, personal information editing and adds semantic annotations to the user page.

To sum up, Semantic Social Profile has two main goals:

1. To represent the information in the social profile in a format that is good for reuse inside the wiki. In other words we want to represent users profile in a form suitable for Semantic MediaWiki queries.
2. To implement profile portability by applying import vocabulary feature of SMW to the profile information.

Achieving the goals listed above will enable the use cases that were hard to implement before. We discuss these use cases in the next section.

[7] `http://www.mediawiki.org/wiki/Extension:SocialProfile`
[8] `http://code.google.com/p/semantic-social-profile`

4 How to use semantic social information

4.1 User statistics improvement

Semantic Social Profile allows one to query non-trivial statistics about wiki users. For example, our extension makes it possible to ask "Get the users who are over 22 years old, located in Greece and interested in chemistry". Much easier examples will work as well: "Get all avatars of users and show in a map where those users live".

In order to retrieve such statistics, the user ought to have some knowledge of how to work with Semantic MediaWiki query language. Usually, administrators and experienced wiki users are those who are able to get this task done. Wiki administrators are always aware of what kind of people are using wiki as it allows them to tune the engine, to run the projects on content creation, and to find out what kind of topics need more attention.

This feature is also useful for the automated services, bots and extensions that use data mining methods to provide recommendations of friends, and recommendation of articles they may be interested in or context ads. We suppose that with lots of structured data its much easier to divide a community into groups with similar interests. For example, one can adjust the weighting coefficients in such recommendation algorithms as collaborative filtering [4] based on users social profiles.

4.2 Turning wiki into FOAF editor

Since MediaWiki makes it possible to export the semantic properties of the given page and since we align those properties with commonly used ontologies, the wiki becomes a full-fledged FOAF editor, like FOAF-a-MATIC[9]. FOAF profiles created on the wiki can be used in other websites that support FOAF.

4.3 Providing information for the semantic history

In [1] Jie Bao et. al presented a tool called Semantic History (SH) that enables one to track the semantic history in SMW. Implemented as SMW extension, Semantic History facilitates the construction of the complex queries related to the revision history. The questions like "How many Ph.D students participated in creation of this page during the last 10 months?" is just one of the possible examples of such queries.

Note that in order to address such kind of questions as the one presented above, semantic history needs formally described information about the users. Of course, this can be done directly from the user page but Semantic Social Profile make this process much easier.

[9] `http://www.ldodds.com/foaf/foaf-a-matic`

4.4 Search improvement

Another important thing is that semantic social data can be used to improve search abilities of the wiki. For instance, it is possible to use the user page properties as facets in faceted search. Such kind of search is implemented in popular social networks and it was proved to be efficient when dealing with fixed structure of the data. To implement the faceted search, it may be reasonable to use the SMW extension called Semantic Drilldown[10] which groups wiki pages by their properties.

5 Implementation

Semantic Social Profile has simple design. Basically, it is a group of callback functions related to the hooks in Social Profile extension. When profile information changes, callback functions update the semantic properties of the user page. Based on this information one could easily implement statistics features described in the first use case.

Since social information needs to be saved in a standard way for each user, Semantic Social Profile keeps properties in the template, instead of setting them directly. The mechanism of MediaWiki templates is explainted in [6]: "the template defines the logic and the appearance of a part of a page. It keeps placeholder variables, which are filled by the instantiating page. Inserting annotations in the template entails the annotation of all pages using the template with the same annotations." Semantic Social Profile uses a template which stores all social properties on one page, and transcludes it automatically inside each user page. Using templates allows the extension to add properties in a flexible way and thus prevents from manual maintenance of the text consistency.

To implement the FOAF editor use case, we have used the Import vocabulary feature of SMW. With this feature it is possible to reuse vocabulary that belongs to existing Semantic Web documents in a way of associating the vocabulary's elements with wiki terms. After making the FOAF vocabulary available for import, the RDF exported from the profile page will directly use elements of the FOAF specification, thus allowing users to edit FOAF profiles through wiki.

The installation script of the Semantic Social Profile creates the properties necessary for a persons description and aligns these properties with the elements of imported vocabularies.

By now we have the following mapping between the Social Profile fields and properties of the ontologies used to describe people in RDF. This is a very basic variant, though it is being constantly developed.

The mapping refers to the following vocabularies: Friend of a friend (FOAF)[11], Address Schema[12], ResumeRDF[13], and Relationship[14].

[10] `http://www.mediawiki.org/wiki/Extension:Semantic_Drilldown`
[11] `http://xmlns.com/foaf/spec/`
[12] `http://schemas.talis.com/2005/address/schema`
[13] `http://rdfs.org/resume-rdf/`
[14] `http://vocab.org/relationship/`

Table 1. Social Profile to FOAF mapping

Social Profile field	Ontology Element
Avatar	foaf:img
Name	foaf:name
Login	foaf:nick
E-mail	foaf:mbox
Birthday	foaf:dateOfBirth
Interests	foaf:interest
Websites	foaf:homepage
City (Location)	ad:localityName
State (Location)	ad:regionName
Country (Location)	ad:countryName
City (Hometown)	cv:birthPlace
State (Hometown)	cv:birthPlace
Country (Hometown)	cv:birthPlace
About Me	cv:aboutPerson
Friends	rel:friendOf
Foes	rel:enemyOf

6 Conclusion and future work

One can say that wikis are very popular tools but they are still not nearly as popular as the social networks – in order to check that fact it is enough to compare the number of users on Wikipedia and Facebook. Social relationships and actions get people involved in what they do. Our hypothesis is that properly adjusted social features can make a big improvement to the process of collective knowledge creation.

However, social features should be more tightened with the rest of the wiki providing new opportunities for the end-users. In this paper we have described our first step – to convert social information in a machine readable form.

In the current implementation of SSP we have very simple representation of the geodata. In the next releases we plan to add geographical coordinates support and to use URIs of cities, countries etc instead of just names of the geographic objects.

Also, custom fields and interests are going to be linked with URIs of the Linked Data objects. For example, if a user inputs “soccer”, the system will offer to chose Soccer term from DBPedia. Future work also includes integration of the ratings (so called karma) in the wiki and development of the tools for emphasizing the information about the authors of the wiki articles. Both of these tools can motivate the user to participate in the content creation process.

Wikis are designed specially for storing the common knowledge of communities. By developing and promoting social wiki tools we hope to turn many people from chaotic activity to supporting semantic evolution of data.

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