Extending RDFHomepage: Semantic Web meets Web 2.0

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ABSTRACT
In 2005, Sven Schwarz coined the term RDFHomepage. Such a homepage uses RDF to encode all the knowledge about a person and their associations. This homepage separates the content from the model allowing users to customise the view of the homepage without editing its content. We decided to take this idea further and immerse it in the world of Web 2.0 technologies: through the union between Semantic Web and Web 2.0 technologies we provide ease of use to average users via powerful but simplistic Web 2.0 interfaces. We overhauled the architecture of the original RDFHomepage and focused on a modular structure which included many standard Web 2.0 applications such as weblog, calendar and search.

Categories and Subject Descriptors  
H.3.5 [Online Information Services]: Web-based services.

General Terms  
Algorithms, Experimentation, Standardization, Languages.

Keywords  
Semantic Web, Web 2.0, RDF, PHP

1. INTRODUCTION
In recent years, there has been an explosion in what has been termed as “social networking”. Through these networks, users can browse people from friend and affiliate listings. In the RDFHomepage project [1], use is made of standardised semantic approaches such as Friend of a Friend [2].

1.1 Web 2.0 and Semantic Web
Web 2.0 is a phrase coined by Tim O'Reilly in “What is Web 2.0?” [3]. Though its name may give hints that there is more than one Web, Web 2.0 is an evolution of the current Web. Though, on the surface Web 2.0 might just look like a ‘cool’ interface, it is fundamentally more than what the Web was. Web 2.0 is a collection of a number of key services built using previously existing technologies which focus on usability and functionality.

The Semantic Web is seen as the next evolution in the life of the Web. It will allow for the sharing of knowledge and will be closer to the original goal of the Web. Berners-Lee et al [4] sum up the Semantic Web as:

“The Semantic Web will bring structure to the meaningful content of Web pages, creating an environment where software agents roaming from page to page can readily carry out sophisticated tasks for users.”

1.2 Technologies Involved
The original RDFHomepage makes use of a number of technologies including:

- BibTeX2RDF – a Java application by Wolf Siberski [5] that converts BibTeX into RDF.
- RDF – describes all the content of the RDFHomepage.
- RDF API for PHP – RAP [6] is a powerful PHP framework that allows for the querying and maintenance of RDF structures.

The extended RDFHomepage utilises these technologies with the inclusion of a number of new technologies such as AJAX (this is the basis of the user interface in the extended RDFHomepage), RSS and Google Maps. We also make use of:

- iCalendar – a standard way of describing calendar information. To utilise this format, we have reused PHPiCalendar [7] for displaying calendars and Monket Calendar [8] for editing calendars.
- RDQL – RDF Query Language is used to query RDF in a powerful manner that is not used in the original RDFHomepage.

2. AIMS AND OBJECTIVES
The main objective of our work was to address the limitations of the original RDFHomepage. This required that we make use of technologies such that the complexities of working with RDFHomepage become transparent to the user. In our work we also strive to achieve easy deployment of the RDFHomepages on any operating system and the possibility of viewing them in any modern Web browser.

3. DESIGN
The original RDFHomepage basically consisted of a number of schemas that defined information about the researcher, and an engine consisting of Template Classes which allowed the mapping of RDF into HTML. This approach required a separate class for each schema and was generated with the help of RDFTempGen [9]. The HTML representation was customisable through the use of CSS and the actual pages that make up the RDFHomepage; such as the projects.php file.

Schwarz et al have proposed a number of possible future extensions in their paper [1]. The original extensions proposed for RDFHomepage included:

- Photo streams.
- RSS support and weblog.
- Calendar support.

We took these as our starting point, but also developed a number of other extensions over the course of our work, that were not specified in the original paper by Schwarz et al [1]. These
extensions have been developed through discussions with the original RDFHomepage team at DFKI.\(^1\) Initially our intention was to use a database approach over the existing RDF file approach. However, such an approach would have taken away many of the advantages of RDFHomepage, such as portability and ownership. We thus settled on the following extensions:

- Extending the RDFHomepage vocabulary.
- Adding RDF editors for these schemas.
- Creating a new and more fully featured RDFHomepage API with RDF querying and schema inference engines.
- Creating a content manager for the files in RDFHomepage.
- Capability to customise the RDFHomepage.
- Adding an RDF powered search.
- An improved caching system.
- The capability to migrate content between RDFHomepage installations.

Figure 1 RDFHomepage Framework.

4. EVALUATION
After development and testing, we evaluated RDFHomepage against a number of similar applications. The applications that were evaluated consisted of both Semantic Web (OntoWiki, Personal Reader, GroupMe!) and Web 2.0 (EditSite, Weebly) applications that are similar to certain services offered by RDFHomepage. From our results, we concluded a distinct trend between the Semantic Web applications and the Web 2.0 applications – Semantic Web is the side of thinkers, whilst Web 2.0 is about developers. This can be seen as a key issue with the uptake of Semantic Web applications. The extended RDFHomepage succeeds in merging these two worlds by offering a large feature set that is powered by Semantic Web technology.

5. CONCLUSIONS
Our research has focused on replacing the “old” (still applicable) idea of reliance on databases with a Semantic Web approach through the use of RDF as the representation of data. The most distinct advantage offered by RDF over a database approach is that we are adding semantics to data. We can do inference over such data more easily than what can be done in databases – like updating all financial data. The result is a break from LAMP\(^2\) servers and the birth of the LARP server; a union of Linux, Apache, RDF, and PHP.

Future work on RDFHomepage should focus on adding semantics to new popular Web 2.0 applications; such as startpages like iGoogle\(^3\). This can lead to many applications in-ofts such as RDFForum or RDFBlog. Semantic networking can also move forward by using agents to aggregate the information for better query results. Another interesting idea is to utilise RDF’s portability in other areas such as desktop computing – such as dragging and dropping data between Web pages. This would be more than a clipboard – this application would retain the relationships involved.

Whatever is the future of RDFHomepage, it has to remain true to its cause: an easy to use application of Semantic Web technology.

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7. REFERENCES
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\(^1\)Deutsches Forschungszentrum für Künstliche Intelligenz (German Research Center for Artificial Intelligence)

\(^2\) Linux, Apache, MySQL, and PHP / Perl / Python.

\(^3\) http://www.google.com/ig