



JeromeDL and FOAFRealm - Taking Advantage of Semantic Social Collaborative Filtering in Digital Libraries

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Author(s)	Kruk, Sebastian Ryszard;Decker, Stefan
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Sebastian Ryszard Kruk and Stefan Decker

Digital Enterprise Research Institute, NUIG, Ireland
<firstname.lastname>@deri.org, <http://www.deri.org>

Abstract. In this paper, we present FOAFRealm, a user management library based on social networking and FOAF metadata, and its deployment in JeromeDL, a digital library with semantics. We will demonstrate the most important features of FOAFRealm as applied to JeromeDL - semantically-enhanced search features, semantic social collaborative filtering and semantic query expansion - to exemplify the advantages of semantic technologies in digital libraries.

1 Introduction

The Semantic Web effort, which partially originated from the digital library community (e.g. Dublin Core), is providing technology that can be potentially applied to the problem of managing resources. In this paper, we present JeromeDL (www.jeromedl.org), an open-source digital library which uses Semantic Web technology, and FOAFRealm (www.foafrealm.org), a user management system providing semantic social collaborative filtering based on FOAF. With FOAFRealm users find a unique information retrieval tool in JeromeDL.

Related Work There are a number of existing implementations of digital library systems, for example, DSpace, Fedora, e-Prints, Greenstone, and SIMILE. The JeromeDL system aims to support the whole range of different features found in these systems, while being designed with Semantic Web technologies in mind.

Recent approaches in collaborative filtering include social network information. Online communities are an underlying key concept of semantic social collaborative filtering. The FOAF format has been introduced to describe interpersonal connections, and FOAFRealm extends basic social networking approaches by integrating an automated interest collection mechanism tailored towards digital libraries.

Contribution The paper makes the following contributions to the field of digital libraries, collaborative filtering and users' profile management systems: (1) We present JeromeDL, a sophisticated open-source digital library. (2) We introduce the semantic social collaborative filtering which solves some typical privacy and security issues. (3) We explain how information from a user's profile preferences can be used in a semantic search algorithm.

2 JeromeDL and FOAFRealm

JeromeDL - e-Library with semantics. JeromeDL is a joint project between the Main Library of the Gdansk University of Technology (www.bg.pg.gda.pl) and DERI International (www.deri.org). The main requirements for JeromeDL from both librarians and library users were: (1) support for legacy library systems (e.g. MARC21 and BibT_EX) (2) provide user-oriented browsing features, (3) allow efficient searching, (4) cover security and accounting constraints, (5) support multiple formats of resources, (6) enable communication with other digital library systems, (7) utilize the latest results in Semantic Web, communications and information management research.

While a user is browsing through information from a JeromeDL database, the semantically-enabled user profile is annotated with statistical information. The search algorithm consists of three major steps: **Step A** – a fulltext index search on resources and users’ annotations. **Step B** – a search on bibliographic descriptions. **Step C** – a user-oriented search with semantic query expansion. So far, it is limited by the lack of ”critical mass” of existing semantic description of resources. The work on the MarcOnt Initiative (www.marcont.org), will deliver semantic descriptions from existing MARC21 and BibTeX ones.

Semantic social collaborative filtering. The FOAFRealm library for distributed user management with social collaborative filtering is based on the FOAF vocabulary. Online communities introduced the idea of connecting users with each other. Registered readers are able to annotate and evaluate the resources stored in the JeromeDL database. FOAF-based user management supports the creation of personal bookshelves: a tree-structured collection of bookmarks. Readers can link categories created and managed by friends into their own bookmark structure. It is possible to protect collections by applying ACLs (access control lists) based on distances and trust levels between the owner of the category and the reader.

In many cases, especially when a reader has just registered on the JeromeDL system, it is very likely that the profile information is incomplete. To provide a search experience that will suit new users as well, JeromeDL can extrapolate user profiles with information found in profiles of direct friends of the user.

Plan of the Demonstration The presentation of the JeromeDL and FOAF-Realm user management system, will include:

1. a general overview of JeromeDL system,
2. registration and configuring of the user profile with FOAFRealm,
3. uploading new resources to JeromeDL,
4. creating private bookshelves with FOAFRealm collaborative filtering features,
5. performing a search operation.