PERSEUS – Personalization Services Engine

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Abstract. PERSEUS is a standalone personalization service provider. It follows the idea of separating the adaptation logic from the AHS and offering it as an on-demand service. PERSEUS provides full abstraction from the adaptation models and methods. Since its first deployment, PERSEUS has seen intensive use and has been the primary source of personalization in about 20 course-semesters. It offers a set of adaptive guidance and recommendation services. The target of this demo is to demonstrate PERSEUS's potential of providing personalized access to the interactive educational resources.

Keywords: service-based personalization, adaptation, adaptive hypermedia

1 Introduction

Modularization and component reuse is one of the major and most promising trends in the field of adaptive educational hypermedia. This process has started even before adaptive hypermedia systems came to existence. Early user modeling shells separated from the user-adaptive systems in the 1980s. In the late 1990s, open-corpus hypermedia allowed content to be added at the run-time rather than at the design time. Today we are witnessing the emerging split of the adaptation models and methods themselves form the adaptive hypermedia system (AHS) that changes from all-in-one tool to the open integrator of the interactive technology

In this demo we are presenting PERSEUS, a personalization server that offers an abstraction of the adaptation methods to the AHS developers. With PERSEUS adaptation can be consumed rather than built-in and can be reused in many contexts and easily replaced without changing the structure of the content. PERSEUS reduces the problem of adaptation provision to the problem of configuration. A recently added innovative feature of PERSEUS – an embedlet – allows adaptation to be built even into static HTML page.

2 PERSEUS – Personalization Services Engine

The conceptual idea of how PERSEUS works is shown in Fig.1. A content management system (here Knowledge Tree portal) provides access to a pre-

constructed hyperspace. To render a personalized view of a particular page, the portal consults the personalization service engine. To do that, the portal sends the structure of the currently viewed page (as an RSS1.0/RDF feed) and context information (user/group id, personalization algorithm code, etc.). PERSEUS queries user modeling server(s) (and/or other data sources known to it) and performs the adaptation that was requested. The returned result is an original RSS1.0/RDF page feed with personalizing updates. The new feed may have original links reordered or removed, new links inserted, annotations added to links. The portal parses the feed and renders a personalized page for the user.
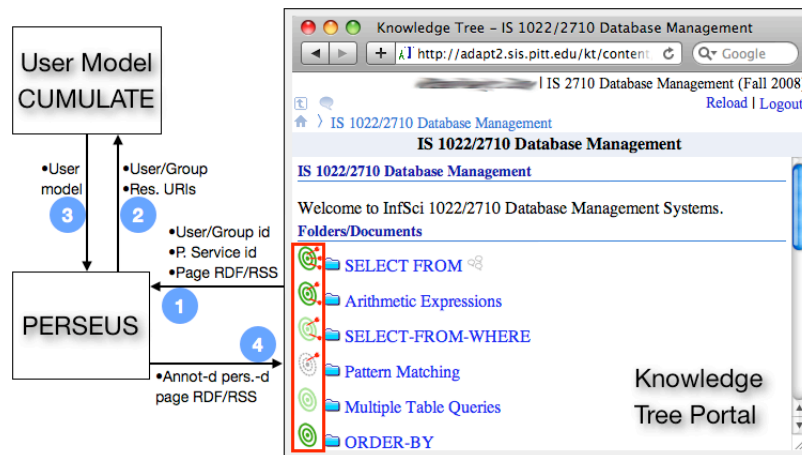
Fig. 1. Example of PERSEUS's topic-based adaptive navigation for Knowledge Tree [1] portal. Adaptive annotations (targets with darts) produced by PERSEUS are enclosed in a square. Here CUMULATE [2] is utilized as the user modeling server.

The compliance threshold for the portal to be able to use PERSEUS is minimal. Every personalization method implemented in PERSEUS is exposed as a RESTful web service. The portal has to be able to package its pages' link structures as a simple RSS1.0/RDF document and send it as one of the parameters to the selected service URL. PERSEUSE's response – modifications to the link structure, including annotations with descriptive JavaScript tooltips – should be parsed again.

3   PERSEUS Embedlets – Adaptation Made Easy

A recent extension to the PERSEUS called *embedlet* allows adaptive hypermedia authors to skip data exchange protocol in its entirety and paste snippets of adaptively annotated lists of resources as plain HTML code. An embedlet is a stationary configured call to one of the PERSEUS's adaptation techniques. It is comprised of an RSS1.0/RDF document, containing a flat link list representing a large portion of the

hyperspace and a pointer to the desired personalization service. Each embedlet is exposed as quasi personalization service.

To invoke an embedlet one should insert an object HTML tag into the web page with data attribute pointing to the embedlet's URL. To only show part of the links from the embedlet's exhaustive list one must use an additional parameter and specify an enumeration of links numbers in the bound list. User and/or group identity need to be present in the embedlet as well. However, in the case of group-based navigation (cf. Fig.2), no individual users are distinguished, and group identity could also be statically bound, which allows adaptive navigation embedlets to be successfully used in static HTML pages.

Embedlets are equivalent to regular PERSEUS services in terms of adaptation functionality offered. However, in terms of authoring they are significantly easier to aggregate into existing content.
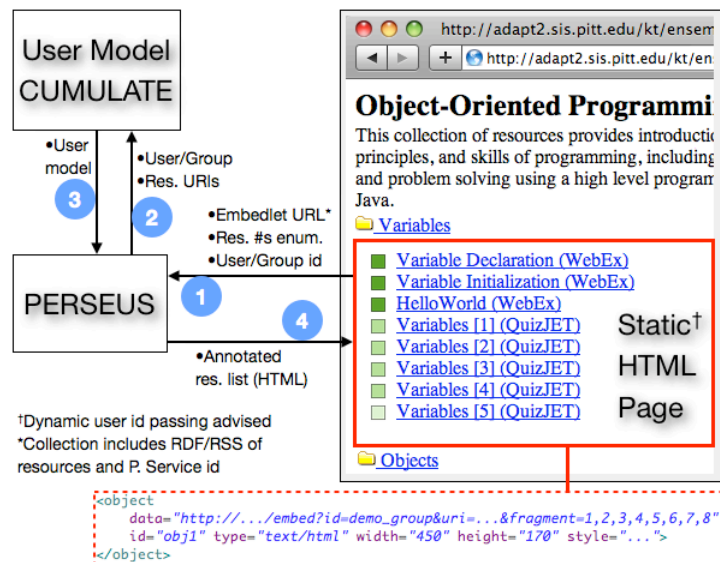

Fig. 2. PERSEUS's group-based social navigation support as an embedlet.

References

1. Brusilovsky, P., Sosnovsky, S. A., Yudelson, M., Lee, D. H., Zadorozhny, V., and Zhou, X. (2010). Learning SQL Programming with Interactive Tools: From Integration to Personalization. ACM Transactions on Computing Education, 9(4), 1-15.
2. Brusilovsky, P., Sosnovsky, S. A., and Shcherbinina, O. (2005). User Modeling in a Distributed E-Learning Architecture. In L. Ardissono, P. Brna, and A. Mitrovic (Eds.), 10th International Conference on User Modeling (UM 2005), (pp. 387-391).