The Personal Reader: A Framework for Developing and Maintaining Web-Content Readers

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Learning Lab Lower Saxony,
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Outline

Idea: Personalization for the Semantic Web

The Personal Reader: A framework for designing, implementing and maintaining Web Content Readers

Personal Reader Instances:
- A Personal Reader for e-Learning
- A Personal Publication Reader

Summary and Current Work
Idea: Personalization for the Semantic Web
Personalization Functionality for the Semantic Web

• Provide user guidance based on semantically enriched information. Situation:
  • Machine readable semantics
  • Distributed information resources & metadata
  • Ontological knowledge

• Goal: reason over distributed information resources, ontological knowledge, user information, etc. in order to provide personalized views / guidance / search and selection support / . . .

• **Open** World, Re-usable!
  [Bringing personalization functionality to the Semantic Web means to solve the open corpus problem in Adaptive Hypermedia]

• Think of Personalization Functionality as „Services on the Web“!
Architecture: The Personal Reader
Architecture of the Personal Reader
**Data Flow**

User is clicking on a link

Visualization Service passes request to Connector

Connector searches for available (semantic) information of the link target, user model information, etc., and sends a request to all registered personalization services, including found information, the requested page, user model information, etc.

Each (registered) personalization services answers the request

Connector provides all results to Visualization Service

Visualization Service provides result to user, depending on user's device capabilities
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A Personal Reader for e-Learning
A Personal Reader for Learning Resources

- domain: Java Programming
- learning resources: The SUN Java Tutorial (freely available online tutorial)
- uses:
  - personalization service for displaying course materials
  - personal recommendation service
  - personal search service, linking course materials directly to appropriate content in the JAVA API
- semantic information used:
  - rdf description of learning resources
  - domain ontology

[rdf descriptions and ontology available at http://www.personal-reader.de/resources.xml]
Arrays

An array is a structure that holds multiple values of the same type. The length of an array is established when the array is created (at runtime). After creation, an array is a fixed-length structure.

![Array diagram]

An array element is one of the values within an array and is accessed by its position within the array.

If you want to store data of different types in a single structure, or if you need a structure whose size can change dynamically, use a Collection implementation, such as vector, instead of an array. Refer to Collections for a complete trail on the subject. This section covers these array-related topics:

- Creating and Using Arrays
- Arrays of Objects
Arrays

An array is a structure that holds a fixed-length sequence of elements.

Selected concepts:

Array

Query results:

<table>
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<tr>
<th>PReco</th>
<th>Reco</th>
<th>Title</th>
<th>Description</th>
<th>Concepts</th>
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<td></td>
</tr>
</tbody>
</table>
Administration Interface of the Personal Reader for e-Learning
A Personal Publication Reader
Personal Publication Reader

Information on REWERSE Researcher (REWERSWE Webpage)

Ontology on REWERSE Researcher (OWL)

Name- Resolver Ontology (OWL)

Publication pages (Web: HTML, PHP,..)

Extraction: Lixto (to XML)

Publication Ontology (RDF)

Personalization Rules: determine information relevant for a user: for the publication(s), and in REWERSE (Triple)

Display of Results in Personal Reader
Excerpt of the REWERSE Researcher Ontology

Klassenhierarchie

- owl:Thing
- ResearcherOntology
  - Organization
    - Department
    - Institute
    - University
    - WorkingGroup
  - Person
    - Employee
      - AcademicStaff
        - FacultyMember
          - AssistantProfessor
          - AssociateProfessor
          - FullProfessor
        - Lecturer
      - AdministrativeStaff
      - Manager
      - TechnicalStaff
    - Student
      - Graduate
      - PhDStudent
      - Undergraduate
  - Project
  - Anonymous-1

Properties

- website, name, additionalInformation
- hasMember (→ Person, Organization) (inverse to involvedIn), involvedIn (→ Organization, Project) (inverse to hasMember), shortName, country, hasRepresentative (→ Person) (inverse to isRepresentativeOf)
- hasStaffMember (→ Person) (inverse to employedAt)
- hasCooperator (→ Person) (inverse to cooperatorOf)
- picture, eMail, phoneNumber, faxNumber, currentProfessionalInterest, formerProfessionalInterest, currentEmployments, formerEmployments, involvedIn (→ Organization, Project) (inverse to hasMember), cooperatorOf (→ WorkingGroup, Project) (inverse to hasCooperator), isRepresentative (→ Organization, Project) (inverse to hasRepresentative), employedAt (→ Department, Institute, University) (inverse to hasStaffMember)
- hasMember … + alle Subproperties
Excerpt of the REWERSE Publication Ontology

  <rewerse:origin>University of Heraklion</rewerse:origin>
  <rewerse:title>Describing Knowledge Representation Schemes: A Formal Account</rewerse:title>
  <rewerse:author>
    <rdf:Seq>
      <rdf:li rdf:resource="#Giorgos Flouris"/>
      <rdf:li rdf:resource="#Dimitris Plexousakis"/>
      <rdf:li rdf:resource="#Grigoris Antoniou"/>
    </rdf:Seq>
  </rewerse:author>
  <rewerse:year>2003</rewerse:year>
</rdf:Description>
Further Services under development:

- Activity-Based Search
- Assessment and Interactive Exercises

Reasoning Techniques for Personalization

Services under investigation:

- Wlog
- ECA-Rules, Flora2, ...

See REWERSE (rewerse.net) for further information
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Summary

• Approach for applying personalization functionality on the Semantic Web:
  • rule-based personalization functionality
  • encapsulated in Web Services
  • towards re-usable Personalization Services

• Architecture of the Personal Reader:
  • designing, implementing and maintaining Web content readers

• Examples:
  • A Personal Reader for e-Learning
  • A Personal Publication Reader
Future Steps

• More complex user interactions, user feedback
• User annotations and management of learning resources
• Implementing a user control center for accessing personalization functionality
• More Personalization Services, more Readers!
Thank you very much for your attention!

You can test the Personal Reader for e-Learning and download course descriptions and ontologies at

www.personal-reader.de