SMARTMUSEUM:
Towards
Intelligent Cultural Heritage Knowledge Exchange Platforms on Semantic Web

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Outline of talk

- **Smartmuseum Project**
  - Project introduction
    - Aims
    - State of art
    - Beyond state of art
    - Participants
  - Content Creation and annotation architecture
    - Annotation vocabularies and tool
      - Sample annotated contents
  - Intelligence in access: adaptation and personalization
    - User modeling and profiling
      - Sample profile slices
    - Recommendation schemes
    - Architecture of recommendation generation
  - Intelligence in access: Ubiquity and Mobility
    - Mobile Devices
      - Smartmuseum Mobile Architecture
      - Interacting with Windows Mobile Device
Smartmuseum Project Introduction
SMARTMUSEUM Project: Definition and State of Art

• Overall objective
  – develop a platform for innovative services enhancing on-site personalized access to digital cultural heritage through adaptive and privacy preserving user profiling.

• General goals:
  – Lowering costs of on-site access to digital cultural heritage content,
  – Improving structured, user behavior and preference dependent on-site access to the vast repository of cultural heritage,
  – Improving the individual and shared experiences people receive from cultural and scientific resources,
  – Bringing personalized cultural experience closer to non-expert communities,
  – Making real reuse of personal experiences related to cultural heritage access for a variety of interest groups.
Smartmuseum:
Beyond State of Art

• Goals restated:
  – Lowering costs of on-site access to digital cultural heritage content
    • Approach taken: **Utilizing Widely Available Mobile User Devices**
  – Improving structured, user behavior and preference dependent on-site access to the vast repository of cultural heritage,
  – Improving the individual and shared experiences people receive from cultural and scientific resources
  – Making real reuse of personal experiences related to cultural heritage access for a variety of interest groups.
    • Approach taken: **User modelling and User profiling**
  – Bringing personalized cultural experience closer to non-expert communities,
    • Approach taken: **Adaptation and Personalization through Recommender Systems**
SMARTMUSEUM Partners
Union List of Artist Names® Online

Art & Architecture Thesaurus® Online

Smartmuseum
Content Creation and Annotation Architecture

Dublin Core® Metadata Initiative
Making it easier to find information.

Getty Thesaurus of Geographic Names
Content Creation through Annotation

CH Vocabularies

Annotation Mechanism And tool

1. ONKI Concept Search Widget in default state
   - ontology selector
   - language selector
   - open ONKI Browser

2. Autocompletion search result
   - concept collector

3. Concept collector for selected concepts
Sample Annotated Content:

Saint John the Baptist

Saint John the Baptist is depicted as a young man in spiritual communion with the divine.
Sample Annotated Content:

Thermoscope

Intelligence in access: adaptation and personalization
Personalization through User Profiling and Modeling

• User profile contains:
  – Personal information about the user (Basic)
    • Age, gender, and etc.
  – Interests and preferences (Advanced)
    • Interests and/or preferences (cognitive patterns)
      – Expressed through ranks(scores) assigned
    • Trust / Privacy
      – Confidence of experience
      – How much personal details to be disclosed outside
  – History and evidence of the experience of user to exhibits (smartmuseums).
    • Items (artifacts) visited

• Semantic profiling
  – Profiles are described using RDF triplets
Sample Profile Slices

History of Item visit

Interest towards a certain concept (process and technique)

History of Place visit

Interest Weight
Personalization through Recommendation

• SMARTMUSEUM recommendation technologies:
  – **Static** Recommendation
    • (Item-based) family of recommenders
      – In this case *Slope one Item-recommender* is considered and implemented.
  – **Semantic** Recommendation
    • (User based) RDF-triplets of user profile
      (interest/preferences/context) are processed:
      – Semantic distance between concepts on CH ontologies are used for calculating similarity between users.
  – **Trust**-Based **Collaborative Filtering**
    • Interest similarity taken as the basis of generation of trust values over semantic social network of users.
      – (i.e., if I share the same taste with you, I might trust you more).
Profile Creation:
Profile can be created manually through manual interface.

Recommendation Retrieval:
Retrieving recommendation according to user’s profile.

Rec. List:
-------------
1. A Saint in Ecstasy
2. Madonna and Child and Saint John

Madonna and Child
Style of Sandro Botticelli, date?
tempera on panel, 71.5 x 55 cm
Museum of Fine Arts, Valletta

Content Creation:
Annotation is created and indexed.
Intelligence in access: Ubiquity and mobility
Architecture of SmartMuseum mobile device

Taken from "SmartMuseum Knowledge Exchange Platform for Cross-European Cultural Content Integration and Mobile Publication", To appear in proceedings of Cultural Heritage on line, 15-16 December 2009, Florence, Italy.
Main User Interface of Windows Mobile Devices

Objective lens

Biconvex objective lens mounted in a cardboard ring. The aperture of the lens is 40 mm, the focal length 1,480 mm, the diameter of the ring 54 mm. The glass, which has a red tint, contains elliptical bubbles and some inclusions. The lens is

Read more...

Selected artifact:

- Latino Orsini
- Model of the application of the pendulum to the clock
  Eustachio Porcellotti
  Inventor: Galileo Galilei - maker: Eustachio Porcellotti
- Dividers
- Gunner’s sight and level
- Nobili’s prototype thermostile

Select an artifact

History Type N# Settings Exit

Taken from “SmartMuseum Knowledge Exchange Platform for Cross-European Cultural Content Integration and Mobile Publication”, To appear in proceedings of Cultural Heritage on line, 15-16 December 2009, Florence, Italy.
Rating of an SmartMuseum object

List of recommended objects

<table>
<thead>
<tr>
<th>URI</th>
<th>Score</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td></td>
<td>-0.01</td>
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<tr>
<td></td>
<td>-0.01</td>
</tr>
</tbody>
</table>

Manual selection of object = +0.3

Object page information

Manual selection of object additional content = +0.4

Score= +0.69

“strong dislike” button

Score= -1

“strong like” button

Score= -1

Non recommended object

<table>
<thead>
<tr>
<th>URI</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

Read of object tag = +0.3

Object page information

Manual selection of object additional content = +0.4

Score= +0.3

“strong dislike” button

Score= -1

“strong like” button

Score= -1

Score= +0.29

Score= +1

Score= +0.7

Score= +1

Score= -1

Score= -1

Score= -1
Smartmuseum.eu

• More info:
  – access to platform
  – on project
  – list of disseminations / publications
Thank you for your patience

• Time to experience the platform!

• Nima Dokoohaki, nimad@kth.se

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