Linked Data in Action: Personalized Museum tours on Mobile Devices

Developers workshop@ESWC 2015
Olga Kovalenko, Yassine Mrabet, Kim Schouten, Suad Sejdovic
Navigation Support for the Visitor

• Problem
  – How to help visitor to navigate through the huge collection?

• Decision factors
  – Available time
  – Particular topic(s) of interest
  – Logistics
“Visiting” Process

1. Select starting point
2. Observing
3. Select the next one

Current location
Specific interest (if any)

What is that? Do I like it or not?

Do I want to know more about the subject? Do I want something different?
Solution: Living Museum

Mobile App – always with you!

Starting point → Observing → Suggesting the next

- 3 different objects to start
- W.r.t. current location
- Artifact description (also audio)
- Like or Dislike
- Suggestions based on ranking algorithm
  - Similarity
  - Physical distance
  - Already seen artifacts
  - History of “Like”s and “Dislike”s

This gold chariot comes from a hoard found near the Oxus river in Central Asia. It depicts a driver and probably a satrap - a governor of the Persian Empire. ...
Solution: Overview

Museum Dataset

SPARQL queries

DBPedia

Other

External Linked Open Data

BM Living Museum

Transforming Textual Description into Audio

Audio description

Textual object description

HMI

Textual and graphical description

Next 3 objects

Object Description Generation

Requesting Information about Objects

Request for object description

History of Likes and Dislikes

Recommendation Generation

Request for next objects recommendation

ARQoid Androjena

Next 3 objects
Recommendation Algorithm

- **New Location Set (NLS)**
  - Artifacts in the current visitor location and neighboring rooms
  - Ordered according to their similarity to visitor profile

- **Visitor Profile**
  - Multi-dimensional vector representing the features visited artifacts
  - Each feature in an integer incremented according to the number of “like” actions
  - Cosine similarity of visitor profile and artifact features

- **Recommendation generating**
  - Visitor profile updated and NLS re-ordered at
    - Each “like”/“dislike” action
    - Entering new room
  - Only last N artifacts are considered to build the visitor profile
Lessons Learned

• Data set irregularity or/and incompleteness
  – Missing picture of short synopsis
  – Artifact title is not always accessible with the same query pattern
  – Locations present in the dataset, but not in the actual floor plan

• A super cultural heritage ontology would be beneficial

• Querying
  – using SPARQL from the mobile application is the most efficient
  – Other protocols (e.g. Web services using JSON) lead to additional networking cost with a backend server

• API to directly query SPARQL endpoints from mobile devices
  – Neither mature nor well-supported
Discussion: Q&S

• Applications using Semantic Web and LOD on mobile devices – feasible or not?

• Server-based architecture VS running algorithms locally