Recommender-based enhancement of Discovery in Geoportals

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Overview

- Information Discovery
- Objectives
- Recommendations enhancing (Geo)-Web Discovery
- Integration of recommendations based on user interactions
- Implementation
- Outlook & Discussion
Information Discovery

- Geoportals are main gateways to find, evaluate and start “using” geographic information.
- Current search in Geoportals:
  - Query title, abstract, keywords etc.
  - Applying spatial and temporal filters
Information Discovery

- Geoportals are main gateways to find, evaluate and start “using” geographic information.
- Current search in Geoportals:
  - Query title, abstract, keywords etc.
  - Applying spatial and temporal filters
- Consistent efforts towards overcoming semantic heterogeneity problems
  - Thesaurus: GEMET
- User context as well as search results of other users are not incorporated
Information Discovery

- **1990s**: Catalogues
- **1998**: Search engines
- **~ 2000**: Recommender Systems

Related images:
- http://www.ukoln.ac.uk/services/papers/follett/arms/lycos.gif
Approach

- Discovery improvement in current Geoportal solutions by applying well-established discovery methods from the WWW
  - Autosuggestion lists
  - Tag clouds
  - Recommender systems
What is a recommender system?

Recommendations enhancing (Geo)-Web Discovery

Amazon
Recommendations enhancing (Geo)-Web Discovery

“It is estimated that cross-selling accounts for 35% of Amazon's revenue”*

*amazon.com 2006
Recommendations enhancing (Geo)-Web Discovery

improved „browsing“

higher customer satisfaction

more sales
Recommendations enhancing (Geo)-Web Discovery

Rankings

1. TOP 10
2. 
3. 
4. 

„together“ – Functions

Customers Who Bought This Item Also Bought

- Getting to Know ArcGIS Desktop
  - Tim Ormsby
  - Paperback
  - $49.20

- GIS Tutorial 1: Basic Workbook
  - Wilpen L. Gorr
  - Paperback
  - $48.67

- GIS Tutorial 2: Spatial Analysis Workbook
  - David W. Allen
  - Paperback
  - $47.43

Personalized recommendations
Recommendation strategies for geo-resources

- Integration of recommendations based on user interactions
  - Improvement of discovery in Geoportals by “tracking” user’s interactions with the search results & resources
  - Analogy between Geoportal interactions and recommenders:
Recommendation strategies for geo-resources

- **view**
- **rate**
- **buy**
Implementation

- Easyrec (OpenSource)
Implementation

- **Easyrec (OpenSource)**

- **Algorithm: Association Rule Miner (ARM) - Shopping cart analyzer**
    - Learning algorithm for association rules
    - “users loading their cart with item A and item B also put item C in it with a likelihood of 90%”
  - SlopeOne (Lemire & Maclachlan, 2005)
    - Item-based collaborative filtering technique
    - Assumption: behavior of certain groups can be used to conclude on particular interests of individuals
    - Predict how a user would rate an item based on the ratings of a group of users

- **Integration: JavaScript & REST-API**
  - Information provided for recommendations:
    - Username, Location, ID, title, thumbnail image
Implementation

- **Association Rule Miner (ARM):**
  - is looking for pairs of items \( <X,Y> \) that appeared significantly often together in different baskets
Implementation
Outlook & Discussion

- Recommender systems can improve the quality of search results
- Additional “links” between resources based on experiences of other users are established and presented

Further research to extend recommender-based discovery:

- Incorporation of further elements (e.g. primary search language, domain)
- Integration of contextual similarity of texts
  - Semantic text analysis