A Meta Search Engine for User Adaptive Information Retrieval Interfaces for Desktop and Mobile Devices

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Overview

- Introduction
- The Information Retrieval Framework
- User Interface Design
- Conclusions
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Introduction (1/3)

- Standard keyword based search engines
  - no user oriented information presentation.
  - user has to analyze every document and decide which are the documents that are relevant.

- System assigns additional information to the retrieved documents (annotation)
  - User gets disambiguating information
  - Annotations can be used to structure results

- Additional information retrieved from, e.g.
  - Result sets, ontologies, user profiles
Problems:
- Currently available categorization techniques
  - Still difficulties in providing appropriate categories.
- Manually and automatically derived categories
  - Only consider the word distribution in documents
  - No different meanings of a term nor information from a user profile used (given underlying query).

Possible approaches:
- Automatically annotation of result set
  - based on user and query specific information.
- Use of user specified ontologies for disambiguation
Introduction - Research Areas (3/3)

- Text classification, e.g.
  - Semantic classification
  - Categorization based on user specific information

- Ontologies
  - Creation of classes (Sense Folders)

- Adaptivity (HCI)
  - Division of content and presentation
  - Interface and system design
Overview

- Introduction
- The Information Retrieval Framework
  - Annotating Result Sets
  - Some Approaches:
    - The Intelligent Bookmark Approach
    - The Sense Folder Approach
- User Interface Design
- Conclusions
The Information Retrieval Framework

query results set processing
(the information to be presented)

the interface design
(information presentation)
Annotating the Result Sets

- IR system connected (web services) to **any search engine** (currently Google) or **local text archive**
- Semantic online classification
- Use of standardized ontologies as WordNet
- Use of user bookmarks, Web logs, etc.
- Possibility of different plug-in integration
The Intelligent Bookmarks Approach

Idea:
Exploit information about the way a user is ordering, sorting or categorizing his documents in order to categorize so far unseen documents.

Structural information stored by the bookmark hierarchy (tree structure).

Based on web pages stored in bookmark structure
- Classifier is trained, folder names as category labels

More results stored and assigned to a category
- The better the system learns something about the way a user is structuring information.

No additional user feedback required
The Sense Folders Approach (1/2)

- Semantic disambiguation of query terms (used in the retrieved documents) using an ontology.
- Categorization of documents with respect to the meaning of a search term.
- Different linguistic relations (context of the searched word) in the ontology
  - To recognize the meaning of the user query.
  - To create Sense Folders for the different meanings of the query terms.
The Sense Folders Approach (2/2)

Search Engine

Ontology

Class Prototype Creation

Document pre-processing and indexing

Indexed Result Set

"Sense Folder" Prototype

Clustering (prototype refinement)

Document Classification

Search Engine

Query User Interface

Keywords

Result Set

Class Prototype Creation

Document Classification

Ontology

annotated/classified Result Set
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  - Desktop User Interface
  - Mobile User Interface
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Desktop User Interface (1/3)

- Query area
- Result list area (Sense Folders)
- Intelligent Bookmarks
Screenshot of the search engine configuration
Screenshot of the presets configuration
Mobile User Interface - Problems (1/2)

- Limited display size
  - Screen area very small
  - Data view, navigation and manipulation difficult
- Different interaction methods/devices
  - By using mouse and/or keyboard vs. pen
- Limited performance
  - Pre-processing and pre-structuring more important than for desktop devices
Mobile User Interface (2/2)

Query area

Result list area (Sense Folders)

Intelligent Bookmarks

Screenshot of the mobile user interface
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Conclusions

- Meta search engine presented for desktop and mobile interfaces
- So far, two types of annotations implemented: *Intelligent Bookmarks* and *Sense Folders*
- Advantages of dividing
  - query results set processing (information)
  - from the interface design (information presentation)
- Web services → retrieval systems for different devices
- GUI for desktop and mobile devices presented
  - But deeper evaluation needed
- Visualization of the semantic categories:
  - *Query* and not collection *oriented*
Thank You!

Questions?