

EU Audio-Visual Search

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The Networked World

- Content
 - Explosion in amount of available data in the form of text, images, video, audio and meta-data
 - Content evolves rapidly, and often the most frequently changing content is the most valuable.
- Users can access content
 - at work, at home and on the road
 - anytime
 - using various devices such as PC, cell phone, PDA
- Need means to get
 - The correct data
 - In the correct context
 - To the correct device

Enabling Requirements

- Open standards
- Scale out architecture and tiered approach
- Semantic understanding and context awareness
- Multi-modal and ubiquity
- Cross lingual, cross cultural

Open Standards

- Open communication protocols for both IP and cellular channels
- Open API, standard transport (e.g. Web services)
- Open platform for text analytics (e.g. IBM's UIMA)
- Standard formats for content subscription (e.g. RSS)
- Open source search code (e.g. Apache Lucene/Nutch)

Scale-Out Architecture

- Requirements mainly in terms of:
 - Content volume for analysis and indexing
 - Content freshness, immediate updates
 - Query load
 - Cellular and IP wireless coverage and bandwidth
- Distributed architectures
 - Grid technology
 - Web Services for distributed content gathering and management.
 - Distributed storage solutions
- Tiered approach
 - Content: caching at EU level, country level, city level, device level
 - Search: central search through embedded search on device
 - Content Sharing: group level, content provider level, locality level

Semantic Understanding and Context Awareness

- Beyond keyword search
 - Text analytics for extraction of semantic data from content, and the ability to leverage at search time
 - Fact extraction for question-answering
 - Requires framework and of course analytic components
- Structured, semi-structured and non-structured content
 - Bridge most of the functionality gap between databases and search engines (XML retrieval and metadata just the first step)
- Contextual search
 - Location aware, for home and mobile users
 - Activity aware (search session based)
 - User aware (personal preferences based on profile extraction)

Multi-Modal and Ubiquity

- Available everywhere
 - At home from PC
 - In car and public transportation, on the street from PDA and cellular devices
 - In public information kiosks
- Multi-modal
 - Speech driven search and browse while driving, walking or constraint by form factors
 - Spoken search results
 - Query by combination of image and location (e.g. cell phone with camera)
 - Includes OCR technology for free form and structured form extraction
 - Query by implicit actions such as passing by historical buildings or artifacts
- Using all modalities and contexts from both the virtual (Web) and the physical (location / users' surroundings) worlds.

Cross Lingual and Multi-Cultural

- Text analytics in multiple languages
- Cross-language retrieval
- Cross-cultural retrieval and ranking, based on some learned preferences of the community of origin
- Basic machine translation capabilities
 - E.g. translation of essential data for tourists – timetables, directions, menus at restaurants
- Speech to text, text to speech in multiple languages

Sample Application and Supported Scenarios #1

- Implicitly receiving tourism information nuggets based on personal interests, cultural origin, physical position, and activity history
- Automatic generation of recommended tourist paths based on past information.



Sample Application and Supported Scenarios #2

- Enhancing city experience through ubiquitous search:
 - allowing constant flow of leisure information
 - enablement of e-Government activities based on local-context and current activity (e.g. transferring the ownership of a car, paying parking tickets, getting the opening hours of a nearby post office, the bus schedule that stops in my street, etc.)
 - Facilitate movement of people from one city/country to another
 - searching, ranking and rating of institutions like bars and restaurants based on user opinions / comments / use patterns



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