ATLAS:
A web-based software architecture for multimedia e-learning environments in virtual communities

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Agenda

• Research Framework
• (Virtual) Communities of Practice
• Community learning
• ATLAS
• Online video triage system MECCA
• Conclusions & Outlook
Research Framework

• Collaborative research center on „Media and Cultural Communication“

• Interdisciplinary setting bringing together:
  - Philologists
  - Psychologists
  - Music scientists
  - Cinematic scientist
  - Historians
  - Computer Scientists

• Project: Networked multimedia information systems in cultural science communities
(Virtual) Community of Practice

- Distributed setting
  - Spread among different universities in Germany
  - Networked via the world wide web

- Diverse educational background
  - Researchers: Cinematic sciences, art historians, ...
  - Cinematic science students

- Shared history
  - Project background
  - University experience
Community learning

- Joint Enterprise
  - Semantics of facial expression in movies
  - Classification of and commenting on movie scenes

- Learning by taking triages to
  - analyze,
  - classify,
  - categorize, and
  - comment on

Multimedia Artifacts
Community needs vs. Data Management needs

**Community needs:**
- Media versatility
- (even contradictory) Metadata
- „generic“ allocation
- Versatile Description tools
- Semantic Information

⇒ **Multimedia Concepts**
  - [Dublin Core 02], [Fendt 99],
  - [Manjunath, Salembier, Sikora 02]

**Data Management needs:**
- Abstraction
- Categorization
- Classification
- Contextualization
- Domain modeling

⇒ **Ontologies**
  - [Ontoweb 02], [Welty 02]

⇒ Goal: Concatenation of both worlds
  - Semantic Web [Berners-Lee 00], [RDF 02], Talk CAiSE [Jarke 02]
ATLAS: Architecture for Transcription, Localization, and Addressing Systems

XML Metadata Repository
- XML Schema
- Ontology Management
- MPEG-7 Compatibility

Community Content Creation

Assessing Community Needs

Measuring

ATLAS

Architecture for Transcription, Localization, and Addressing Systems

Community Software

Multimedia Management

Simulation

Community Usability Repository
- Multimedia Artifacts
- Community Management
- Statistics

Semantic Zapping

Transcript Engine
- Personalization
- Searching
- Browsing

Digital Community Media

Media commenting on Media
Multimedia Metadata Management

- Versatile Multimedia Artifacts
  - Movies
  - Sound files
  - Text
  - Pictures
- Additional content information
  - Stage Director
  - Actors
  - Production data
  - etc.
- Annotation features to share semantics
- Exchangeability & Reusability

⇒ MPEG-7

[IEEE 02]
Ontology Management

- Expressing domain knowledge
- Storing domain ontology as MPEG-7/XML graph
- Tracing & analyzing the ongoing ontology discourse
- Comparing shared and individual semantics
  - Detecting disturbances between individuals and community
  - Making disturbances productive
Concept Matching (CoMa)

- Mapping of MPEG-7 descriptors
- Matching in consideration of
  - Synonyms
  - Poly-/Monosems
  - Hypero-/Hyponyms
  - Holo-/Meronyms
  based on WordNet
- Computing the structural similarity
  - Tree comparisons heuristic
  - Pruning at level two
- Server-side computation
- Manual adaptations possible

Community ontology

Individual ontology
MECCA
Online video triage system

- Based on the constructivist learning environment „Berliner sehen“ [Fend01]
- Ontology as the intermediate result of the ongoing discourse
- Three transcription modes
  - Ontology guided movie triages (Semantic Zapping)
  - Media commenting on media (Hypermedia)
  - (Re-) combining and annotating media (Shared collections)
Conclusions & Outlook

• MPEG-7 helps to overcome gap between Multimedia Concepts and Ontologies

• Combining loose characterization and generic classification with domain modeling and strict categorization

• Personalization by mapping shared and individual semantics

• Current research on
  - collaborative & distributed ontology creation
  - measuring and simulation of virtual community activities
  - MPEG-21

• Others projects at i5:
  - SOCRATES: Chat/Talk-tool for aphasics self help groups
  - MARS: Electronic music analysis tool
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