

Challenges in Multimedia Digital Libraries

Stavros Christodoulakis
Technical University of Crete

Changes in the Environment

- European archives contain several tenths of millions of hours of film and video recordings
- Digital video will be produced in very large volumes by thousands of digital video broadcasters
- 3D data production accelerates dramatically through automatic 3D capturing devices, CAD tools, etc.

Changes in the Environment

- Content delivery will be done via diverse means (broadcast, internet, mobile)
- Delivery in diverse devices (PC, TV, mobile)
- Support of important multimedia digital library applications (like e-learning, e-science, edutainment)

Knowledge Extraction and Representation

- Currently mostly low level visual or audio features are extracted
- Recent approaches started looking at higher level concept extraction (like events) supported by the MPEG-7 standard
- Models integrating domain ontologies with the content description standards to represent video content should be investigated

Knowledge Extraction and Representation

- Additional knowledge representation structures should be investigated to capture more knowledge on the video content (activities, states, facts, opinions, etc)
- Models that also represent the context at the time of capture related to the video objects should facilitate retrieval and data mining in the long run
- The video knowledge extraction process should investigate methods to organize systematically the software to exploit domain knowledge, multimodal extraction clues, and previous knowledge on the type of video

3D Data Semantics

- 3D data are generated in increasingly high rates and viewed by visualization packages
- Very important applications in e-science, e-medicine, e-learning, biotechnology, CAD, archeology, etc.
- Typically no semantics are associated with the parts of the 3D objects
- Methodologies and standards are needed to fully integrate semantics with 3D objects in order to exploit automatic construction, retrieval, personalization, etc.

Retrieval, Delivery and Presentation

- Personalization models should utilize multimedia content and context standards, as well as domain ontologies
- Presentation models that take into account the user context to structure the results and present them with appropriate personalized visualization metaphores should be investigated
- Natural language and speech interfaces that exploit context and ontologies should be investigated
- Methodologies for building semantic user profiles based on his interactions with the multimedia data on different device types should be investigated
- Methodologies for semantic compression and delivery are needed

Application Support

- Architectures for supporting important applications on top of digital libraries should be investigated
- Applications typically have their own standards. Interoperability between the digital library and the applications as well as across applications is important
- Models and architectures that integrate user societies with functions and workflows that generate knowledge (like with distributed annotations) is important