digital archives project

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Montreux Jazz Festival

- Founded in 1967 by Claude Nobs, it has become one of the most prestigious music festivals in the world. All the greats have performed on the festival's various stages, from Miles Davis to Ray Charles
- The festival frequently features spontaneous jam sessions resulting in unique improvised performances. As a result, the Montreux Jazz Festival archives represent a one of a kind collection of very original content
- The Montreux Jazz Festival library is the largest testimony of live music recorded in one place (more than 4'000 bands played in Montreux), both in audio and video, for more than 40 years.

Archives

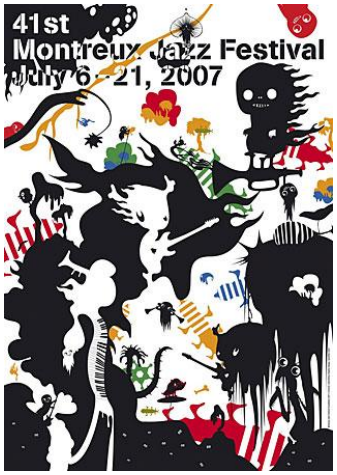
- Collection of circa 10’000 hours of audio-visual content over 40 years
- Recorded in various analog and digital formats ranging from Black and White Standard Definition to Color HDTV
- Heterogeneous collection of storage media ranging from Umatic cassettes to HD digital tapes

Video Master Formats	Hours
3/4"	1'276
2"	557
1" C	736
Betacam SP	333
3/4" B.V.U.	1
Digital Betacam	847
Digital D2	602
HDTV	248
D5 XD 1/2"	89
HDTV 60Hz	43
HDTV 50Hz	341
Total	**5’107**

Audio Master Formats	Hours
1/4' analog audio	508
3/4' digital audio	905
1/2 digital audio 24 tracks	596
2' analog audio 24 tracks	453
1' digital audio 32 tracks Ampex	35
DAT TC	1'353
3/4' analog audio	1
1/2 digital audio 48 tracks	222
DAT NO TC	13
Digital Audio DA8	58
Total	**4’156**

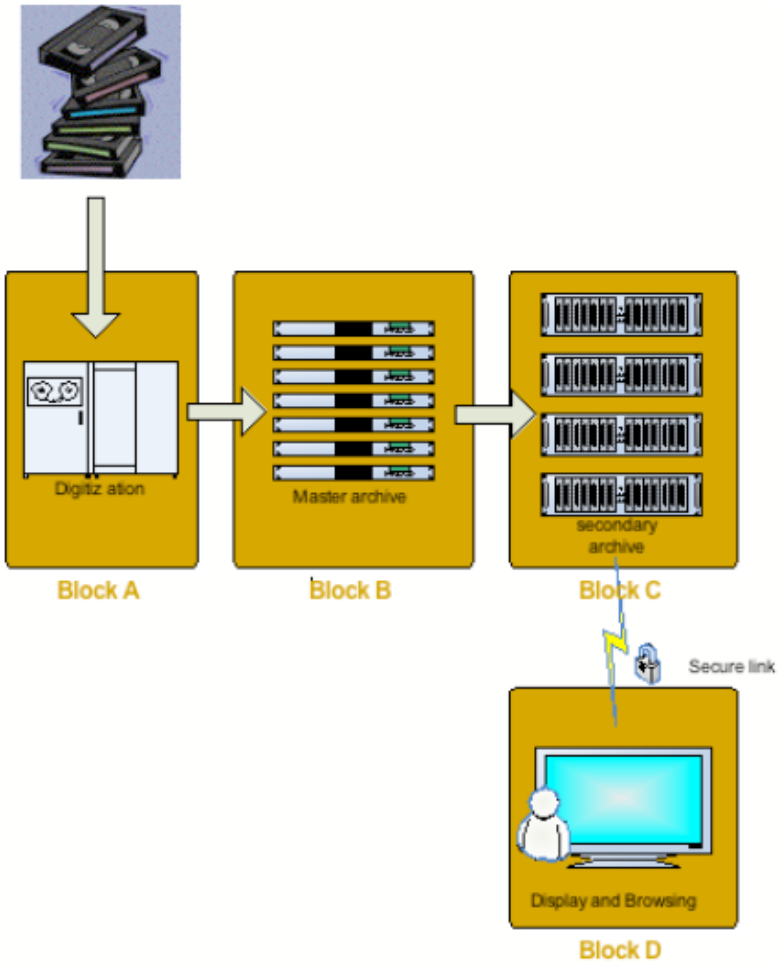
Main objectives

- Safeguard of Montreux Jazz Festival recordings
- Know-how in advanced technological solution for preservation of audiovisual archives
- Stimulating topic for further research and education
- Creation of spin-off companies specialized in the field of multimedia archival



Architecture

- Digitization of heterogeneous tapes
- Master archive of digital content
  - Robotic mass data tape storage
  - Uncompressed or lossless compression
  - Keyword metadata, database management
- Secondary archive
  - Compressed and/or enhanced
  - Hard Disk based (RAID)
  - Advanced metadata, database management
- Display and browsing
  - Secure high speed link
  - Super HD display (3D), surround sound
  - Advanced browsing/interaction capabilities
  - Test platform for research



Research and Technological Challenges

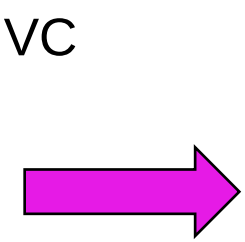
- Enhancement of audiovisual content
- Storage, compression and transmission
- Annotation, search and retrieval
- Media security and access control
- Visualization and interactivity
- Audiovisual quality metrics

Enhancement of Audiovisual Content

- Enhance legacy content to reach the highest quality possible
  - Restoration to remove artifacts from old storage media (noise, color, blooming,…)
  - Handling of legacy formats and optimal conversion
  - Up-scaling of the audio part (mono to stereo, stereo to surround)
  - Video super-resolution to achieve HDTV quality or beyond
  - 2D to 3D video conversion
  - Possible semi-automatic approaches

Storage, Compression and Transmission

- Efficient representation using standard formats
  - Lossless compression for persistent storage (e.g. JPEG 2000)
  - Lossy compression for transient representations to be used for transmission (e.g. JPEG 2000 or H.264/AVC)
  - MXF or MJ2 file formats
  - Optimal rate-distortion performance
  - Scalability to support different models of consumption
  - Transcoding between different formats (e.g. JPEG 2000 to H.264/AVC)
  - 3D video coding using H.264/MVC

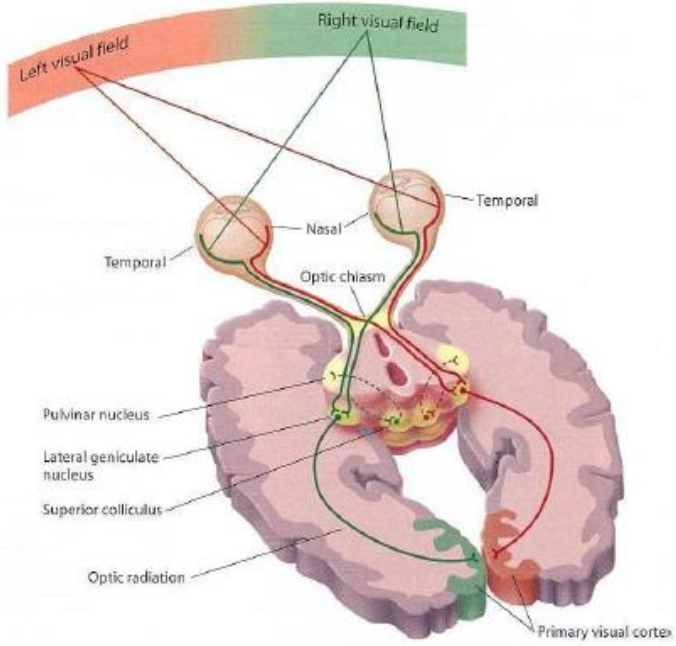


Annotation, Search and Retrieval

- Need for powerful tools to search and retrieve desired pieces of content
  - Manual and automatic annotations
  - Conversion of legacy textual annotations into widely usable metadata formats (e.g. MXF, AXF, JPSearch)
  - Metadata ontologies
  - Content-based analysis techniques
  - Exploitation of social network content tagging

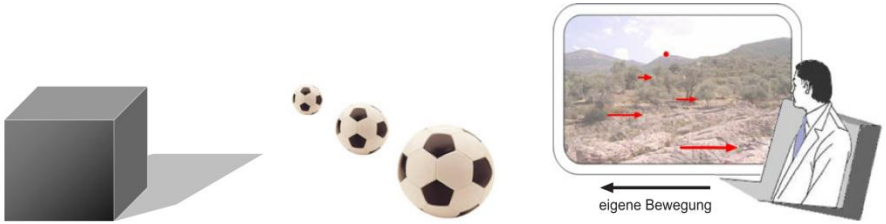
Quality of Experience

- Accurately measure the quality perceived by end-users in order to optimize experience
  - Protocols for subjective testing taking into account the combination of audio and video modalities
  - Objective metrics to automatically evaluate quality
  - Optimization of AV enhancement and compression methods
  - Complex relationship between both modalities
  - Resolutions beyond HDTV
  - 3D video



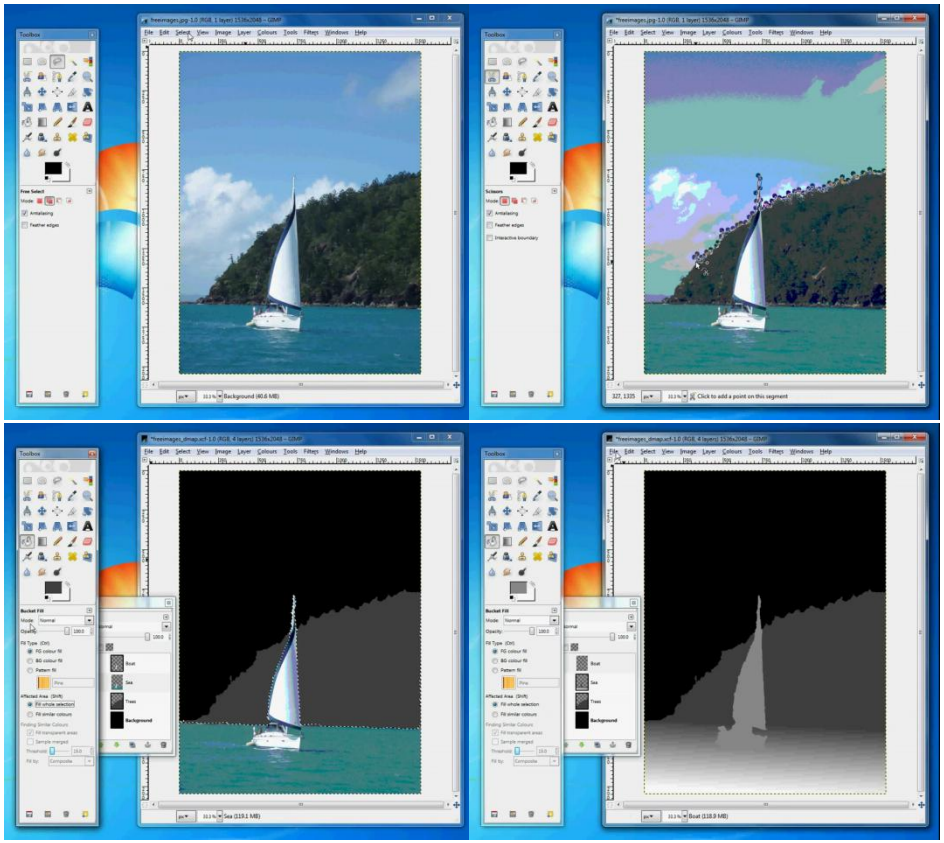
2D to 3D Video Conversion – 3D Depth Cues

- Single image (monocular)
  - Defocus
  - Perspective
  - Shading
  - Occlusion
- Two images (binocular)
  - Disparity
  - Motion
  - Focus
  - Silhouette



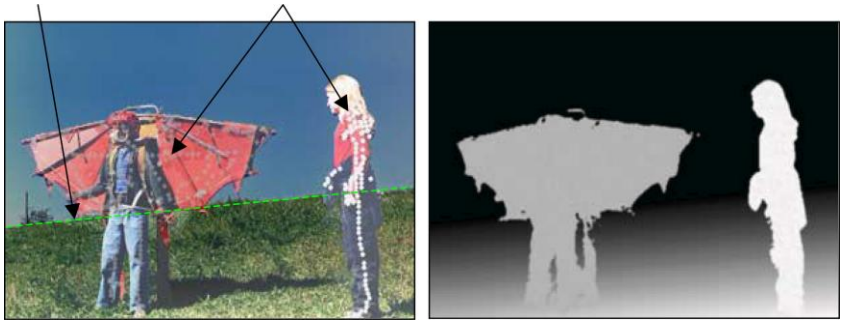
2D to 3D Video Conversion –Depth Map

- Manual depth map creation
  - Usually done by 3D artists
  - Object segmentation and depth ordering
  - Very time consuming for videos

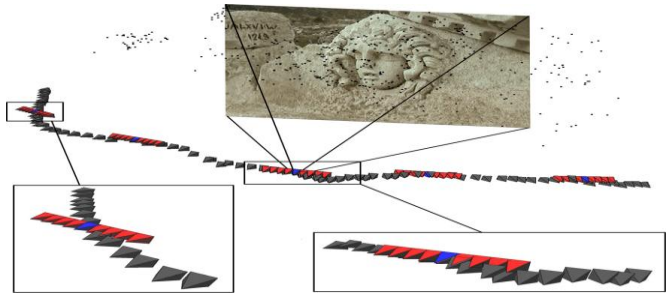


2D to 3D Video Conversion –Depth Map

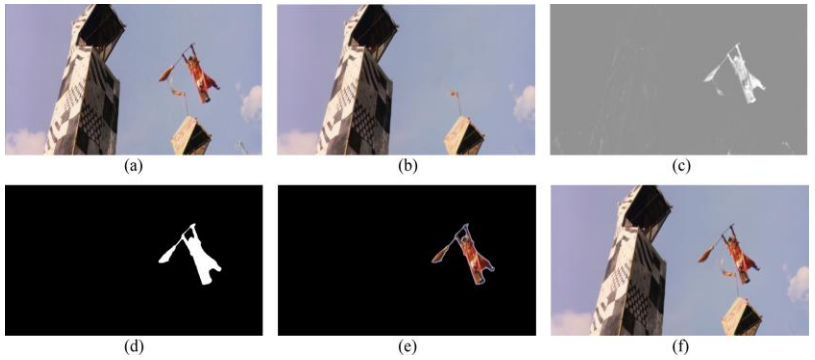
- Depth through local model



- Structure from motion



- Semiautomatic background/foreground conversion



Thank you for your attention !!

Any questions ?

OAIS

- Open Archival Information System (OAIS)
- ISO standard (ISO 14721:2002)
- Conceptual model
  - definitions, frameworks and concepts describing the responsibilities and the organization of a system for the long term preservation of (digital) data
  - does not provide any technical recommendations