

DIGITAL – Institute for Information and Communication Technologies



Efficient Essence QC for AV Archives Digitisation, Migration and Exploitation

Peter Schallauer

EBU Archives Workshop, Oct. 28th 2014

THE INNOVATION COMPANY

■ Applied R&D for industry and public bodies

■ Shareholders

■ Province of Styria (90 %)

■ TNO (10 %)



■ ~450 staff

■ Research Institutes

■ MATERIALS

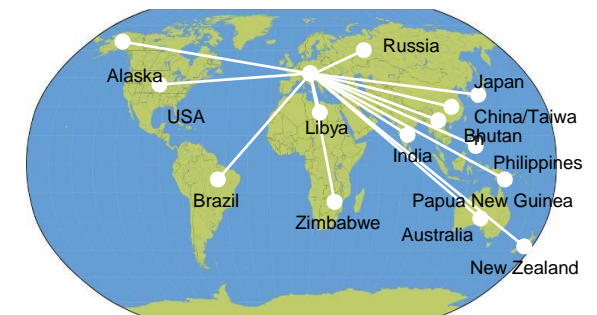
■ HEALTH

■ RESOURCES

■ POLICIES

■ ROBOTICS

■ **DIGITAL** - Institute for Information and Communication Technologies -
Research Group AudioVisual Media



Selected Products

Research Group AudioVisual Media

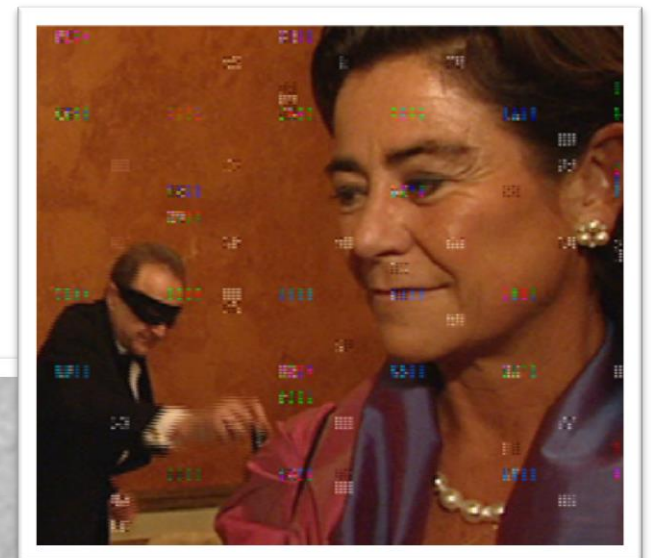
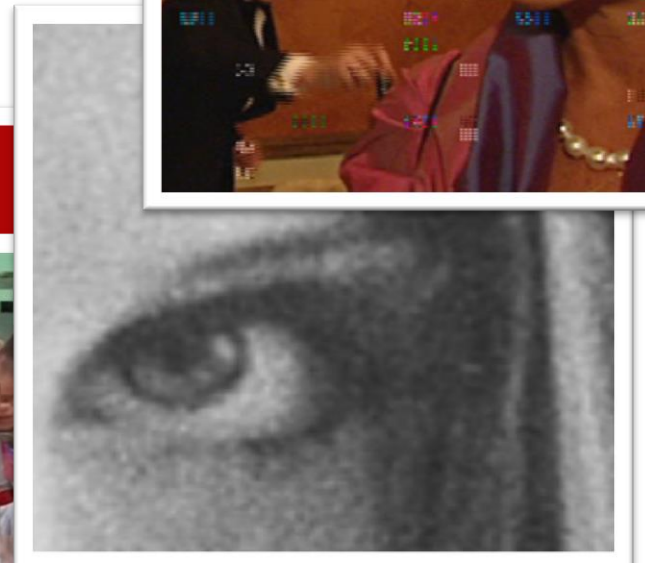
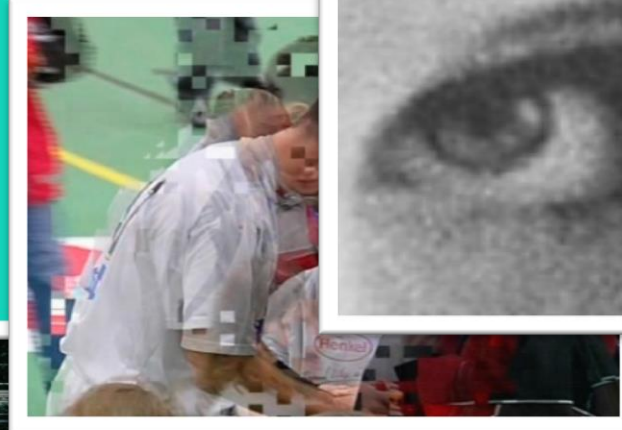
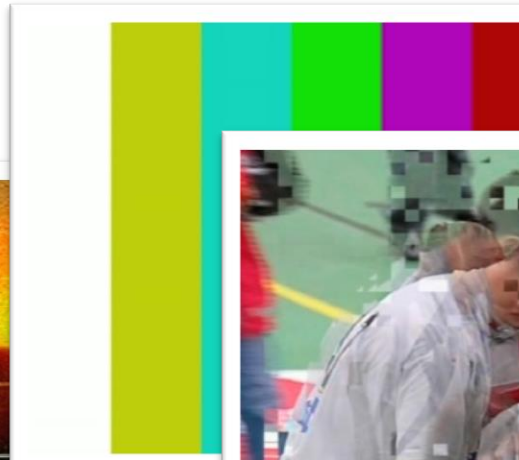
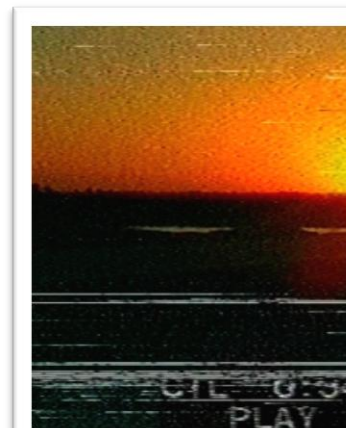
- 
- DIAMANT Film/Video Restoration
- 
- Logo Recognition
- 
- Wrong way driver detection
- 
- Efficient Video and Film Essence Quality Control





Clear Focus on **Essence** QC

- File integrity
- Wrapper (MXF, MOV, AVI...) standards compliance
- Bitstream (MPEG,...) standards compliance
- **Essence (base band, content based) quality assessment**
 - Analysis of raw image data – independent of encoding
 - Video and movie degradations
 - Detects multi-generation defects
 - Analogue and digitally born
 - Resolution independent
 - No reference video required



EBU.IO/QC





Archive Use Cases for Essence Quality Checking (I)

- AV Digitisation and Digital Migration
 - monitor if the video player shows problems (due to head clogging, dirty/scratched tape)
 - Analogue Video (off-lock, line dropouts, video breakup, TBC hit)
 - Digital Video Tapes (different types of block drop-outs, e.g. DigiBETA drop-outs)
 - monitor the film scanning process
 - instability, out of focus, white/black point, ...





Archive Use Cases for Essence Quality Checking (II)

■ Archive/MAM File Ingest

- ensure consistency between file content and its MAM description
 - correct content at all, start/end timecodes consistent?
 - audio channel allocation/encoding/content consistent?
- ingest only essence fulfilling certain quality criteria
 - no up-scaled essence (e.g. upscaled SD in an HD archive)
- are metadata signaled in the file wrapper/bitstream or MAM actually present in the baseband/essence
 - scanning type (interlaced, progressive, pull-down)
 - field order



Archive Use Cases for Essence Quality Checking (II)

- Archive Content Selection/Access/Search
 - select 'best quality copy'
 - search for a video with minimum quality for a certain usage
 - Sharpness high enough for HD program or Blu-ray disc?
 - Noise reduction necessary?
- Restoration Planning
 - estimate effort/costs
 - select tools/systems



The Essence QC Challenge....

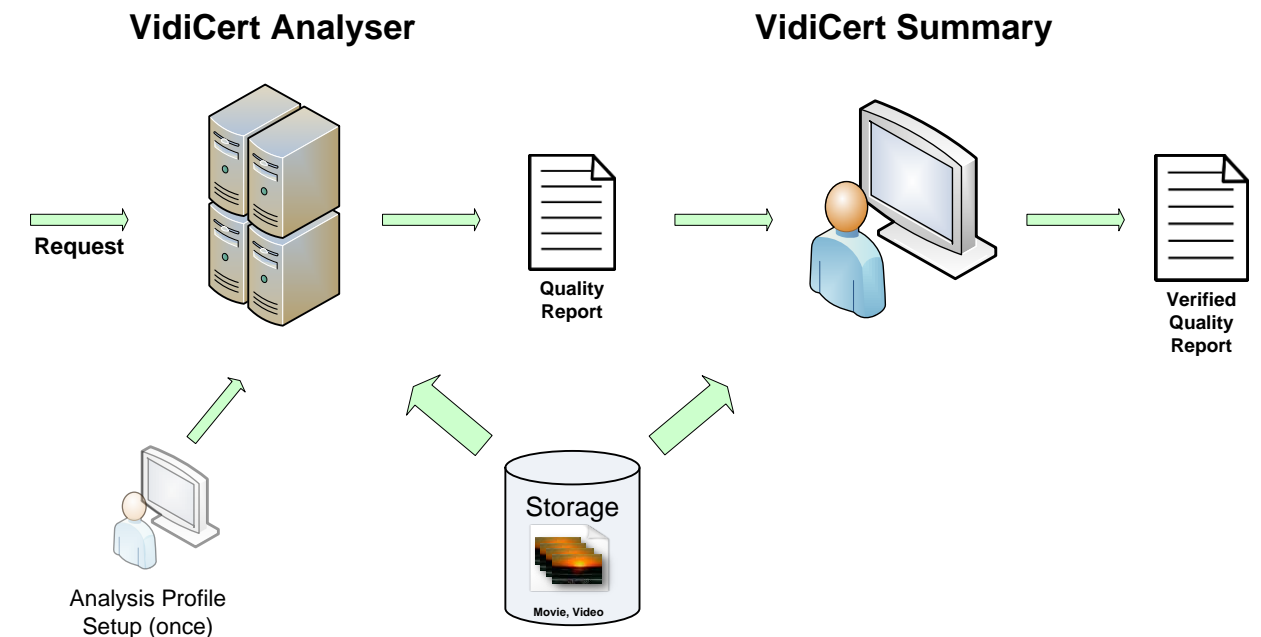
■ ... is operator job time





Automation of Essence Checking

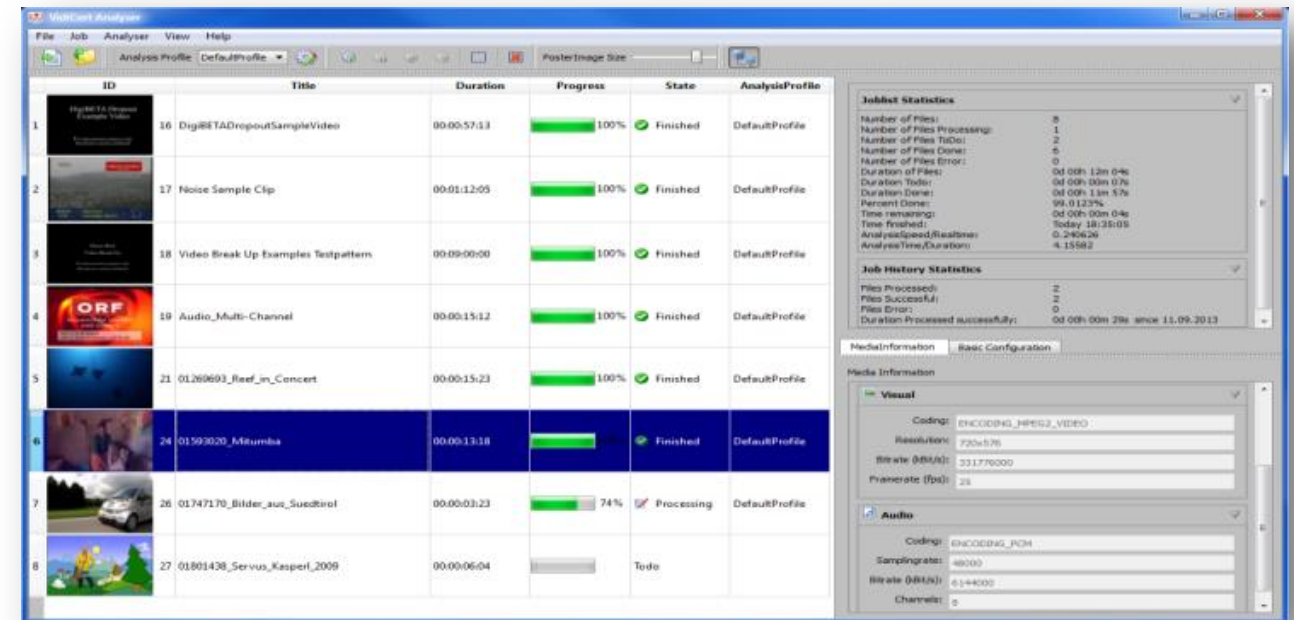
- Fully manual
 - Highest quality, extremely expensive
- Fully automatic
 - Limited functionality, very cheap
- Automatic analysis + Human verified
 - Cost efficient and high quality





Automatic Quality Analysis

- VidiCert Analyser
 - Detectors
 - Video Breakup (major analogue video disruptions)
 - Noise/Grain (electronic & film grain)
 - Digital Tape Dropouts (e.g. Digital BETACAM™)
 - Blurriness
 - Monochrome Frames
 - Test Pattern
 - Silence
 - Dolby®E™
 - Field Order Errors
 - Scanning Type Errors (Progressive/Interlaced/3:2 Pull Down)
 - **Customised solutions**, e.g. Line Dropout Detection
 - Metadata fully compliant to MPEG-7/AVDP (XML) standard
 - Customizable analysis profiles
 - Highly optimised GPU accelerated algorithms
 - Workflow integration via web service & drop folder

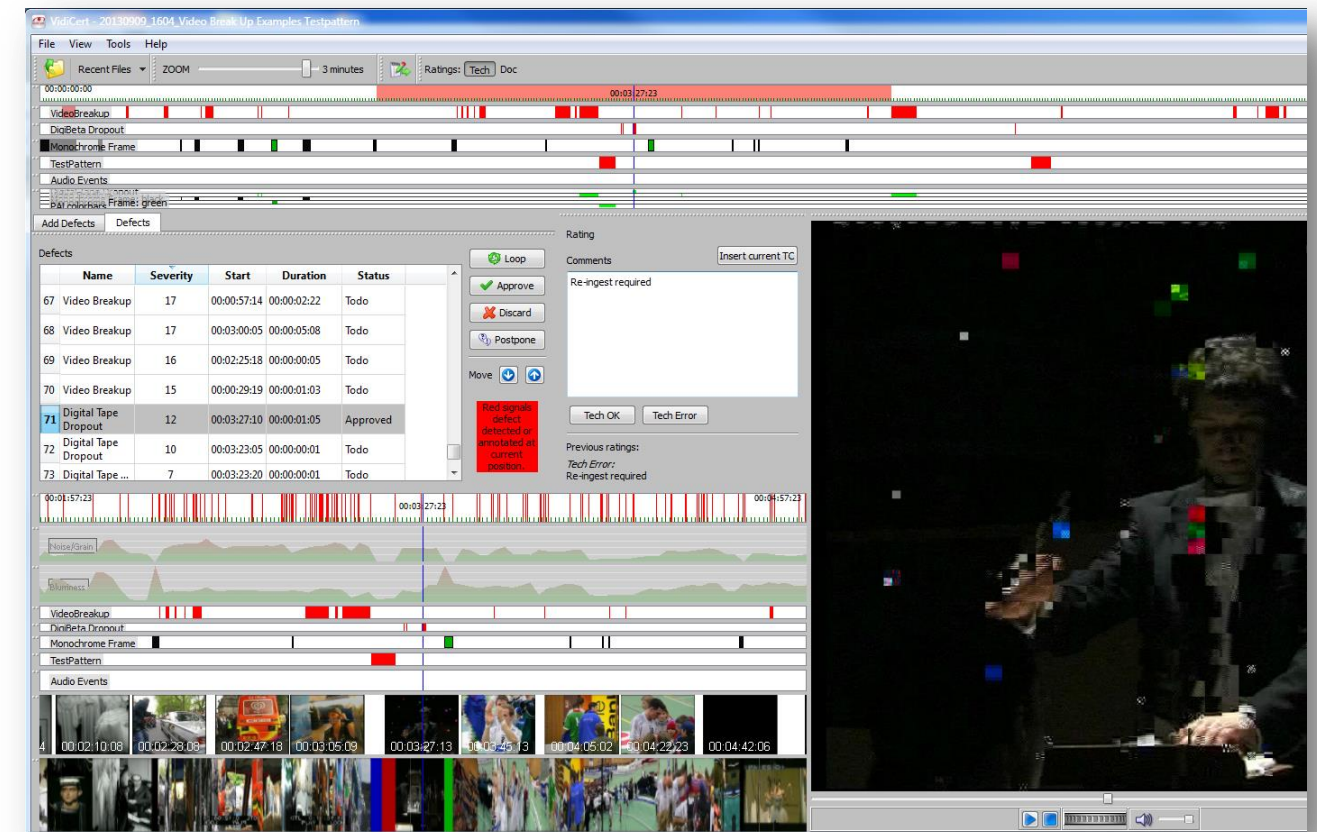




VidiCert Efficient Interactive Essence Quality Verification

VidiCert Summary

- Advanced summarisation and navigation by various timeline based metadata views
- Fully customizable user interface (including full screen video player support on second monitor)
- Job-time optimisation capability – trade-off human effort against verification accuracy
- Efficient time based annotation
- Rating support, including multi-stage QC





14

Restoration Digital BETACAM Dropout





15

Restoration Digital BETACAM Dropout





Summary on Essence QC for AV Archive Digitisation and Exploitation

- Digitisation, digital migration and archive ingest and access can benefit from essence QC tools
- Automation of QC is essential to reduce costs
- Reliable detection algorithms are required
 - Video Breakup, Noise/Grain Level, Blurriness, DigiBETA Dropouts, Scanning Type
- Efficient human verification tools available
 - Timeline based summarisation and navigation
 - Job time optimisation by severity based verification



The DAVID Project (david-preservation.eu)

■ Goals

- What types of damage are common in digital video archive content and workflows and what are its consequences on the re-usability of that content?
- Which solutions are there to detect and repair MXF errors?
- Which solutions are there to detect and repair video essence damage and to improving the picture quality beyond its original state?
- How to apply risk management to prevent from digital damage in the future?



The DAVID Results

■ Outcomes

- MXF D10 File Repair (operational ORF workflow)
- Detection of DigiBETA Dropout, Field Order and Interlaced/Progressive/Pull-Down Errors integrated in the VidiCert Essence QC System
- Noise and DigiBETA Dropout Repair integrated into DIAMANT-Film Restoration System
- Advanced Field Processor
- De-blurring and Super-Resolution of Archive Content
- Risk Modelling & Management tools for digital damage prevention within archives

■ DAVID User Test-Workshop, 28.-29. April 2015, Vienna

- Evaluate the tools and discuss your needs about
- Registration info at david-preservation.eu/news



www.vidicert.com

Contact



Peter Schallauer

peter.schallauer@joanneum.at

<http://www.joanneum.at/digital>



DIGITAL AV MEDIA DAMAGE
PREVENTION AND REPAIR