IPTC Video Metadata Hub: Moving to Adoption

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IPTC Autumn Meeting: Video Day

IPTC Video Metadata Hub

- ‘Hub’ rather than stand-alone standard, supporting all video metadata communities
  - Acknowledges prior investments in standard creation and adoption
  - Unifies vertical ‘silos’ of support
- Represents the metadata community with the leading track record of adoption: IPTC

- Now comes the interesting part: implementation and adoption!
  - Three areas to discuss:
    - Automated metadata extraction
    - Cross-collection vocabularies
    - Open tools

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Video Metadata Communities Abound

- Differentiated by key purpose:
  - Workflow and working practice
    - (e.g. IMF, DPP, NABA)
  - Asset management
    - (e.g. pbCore, EBUcore)
  - System operations
    - (e.g. SMPTE, ISO-MPEG)
  - Search and discovery
    - (e.g. EIDR, ISAN, ContentID, Teletrax)

- Until now, vertical silos:
  - Broadcast contribution
  - Stock footage sales
  - Digital cinema
  - News contribution
  - Social media / user generated
- Might include any or all of 3 broad sets of data:
    - Semantic (IPTC: describing a/v content)
    - Rights (IPTC: rights)
    - Engineering (IPTC: technical)

Moving Image Demographics

- 200m+ unique hours of professionally-produced or professionally-accessioned moving image content around the world today
  - Many billions of instances / versions / caches / etc
  - Less than 10% originals are digitally mastered (both traditional and 'born digital')
  - Less than 5-21% rights-ready (upper figure: Screen Digest/FOCAL)
  - Annual growth? (ISAN say 6m hours annually)
- Video now dominates the Internet
  - IP traffic worldwide is 68% video and growing (excluding BitTorrent, P2P) – will reach 90% by 2020 (Cisco VNI: http://bit.ly/CiscoVisNetIndex)
    - Some interesting subsets: VR 4x growth 2015, 61x by 2020; 19.7% of digital ad spending is video
- Overall, minimal metadata coverage within any of the vertical silos
  - Plus, challenges to accuracy and sustainability - example

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Unique IDs, opportunities and issues

Unique, searchable IDs are marching forward (ISAN, EIDR, et al). Currently, much confusion and work required by rights holders (versus distributors & aggregators)

- Example: EIDR record entered and maintained by Rovi, versus ITV shot log (partial data shown)

EIDR entry:

BASE OBJECT DATA

EIDR ID	10.5240/AAAB-28B0-40DC-A85B-25EE-F
Structural Type	Abstraction
Mode	AudioVisual
Referent Type	TV
Title	Sea Otter Saga Lang: en Title Class: release
Original Language	*en* Mode: *Audio* Type: *primary*
Associated Org	itv global entertainment ID Type: EIDRPartyID Party ID: 10.5237/7A6D-D72C Role: producer
Release Date	2011
Country of Origin	GB
Status	valid
Approximate Length	PT55M
Registrant	10.5237/4C72-BE2C

EXTRA OBJECT METADATA

Episode Info	
Parent	10.5240/F6EC-FD44-1FA2-E02A-3E4C-W
Sequence Info	
Distribution Number	12 Domain: rovicorp.com
House Sequence	112 Domain: rovicorp.com

Catalogue entry for example shot:

"title_all": "Survival - Saga Of The Sea Otter -",
"title_2": "Saga Of The Sea Otter",
"main_title": "Survival",
"caption": "Sea otter floating on back among kelp fronds, flat stone on abdomen",
"qry_fld": "VAR CU sea otter floating on back among kelp fronds, flat stone on abdomen | Sea otter floating on back among kelp fronds, flat stone on abdomen | Survival | Saga Of The Sea Otter | |",
"narrative": "VAR CU sea otter floating on back among kelp fronds, flat stone on abdomen",
"media_form": "Seq", "colour_designator": "Col",
"media_resource_locator": "T00382",
"creation_date": "09 FEBRUARY 2004",
"transmission_date": "25 JANUARY 1973", "program_number": "71/10",
"filming_composing_date": "01 JANUARY 1971",
"duration": "00:00:07:00",
"tape_number": "GBS0000000495", "mrl_sum_dir": "gbs/V02/GBS0000000362",
"quality_notes": "No.2532 Ends At 57.22",
"collection_name": "SLA",
"owner": "Granada",
"country_of_origin": "UK",
"time_code_in": "00:02:52:00"
"time_code_out": "00:02:59:0
"medium": "Film",
"film_roll_number": "0688",
"film_guage": "16mm",

Total IMDB entry:

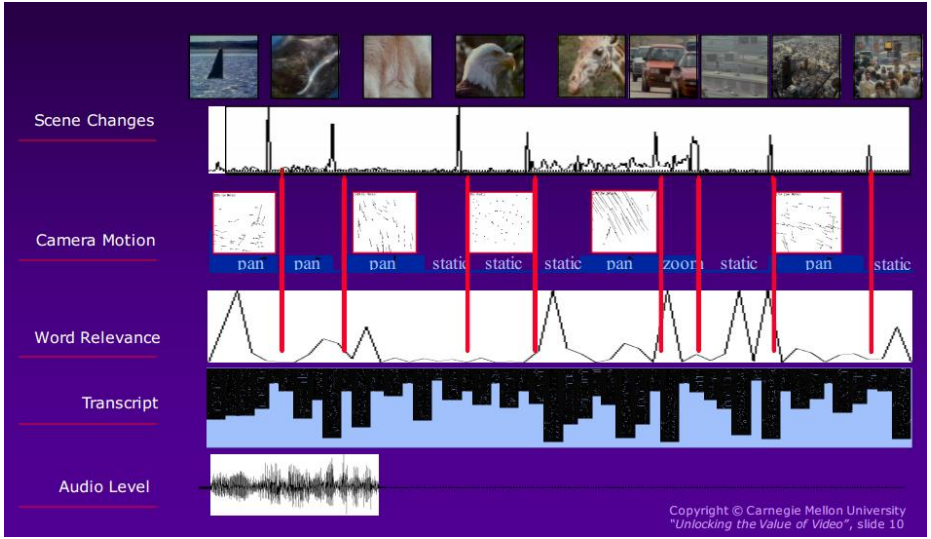
Survival

Saga of the Sea Otter (7 Feb. 1973)

TV Episode - Documentary

Automated Metadata Extraction: Historic

Automated metadata extraction has been in academic (1990) and commercial (1995) development for over 20 years

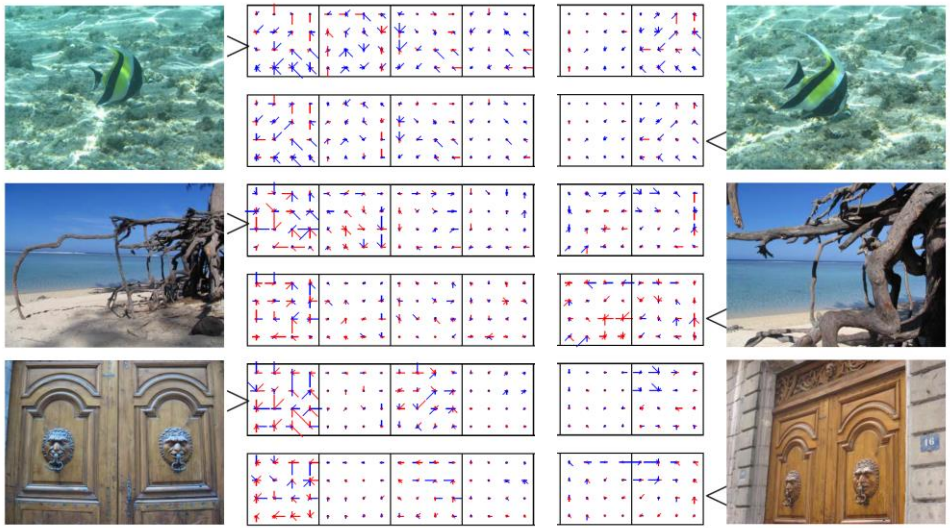


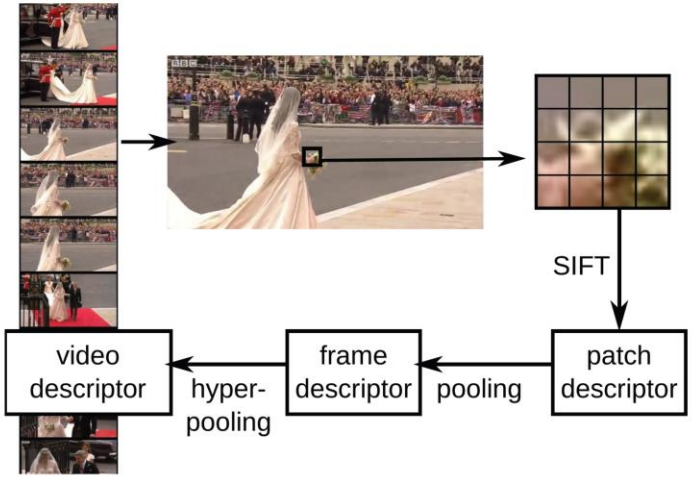
CMU / ISLIP (later Mediasite) 1998 presentation slide shown here

From sponsored PhD thesis, Sarah Porter, University of Bristol "Video Segmentation and Indexing using Motion Estimation" 1999-2002

Automated Metadata Extraction: Now

- Consolidation in new ‘deep’ learning methods (DCNN); robust new methods (VLAD, VLAC, VVLAD); performance advances (e.g. during real-time transit)
- More info: *http://resources.tmi.io/IBC2015_VideoClarity.pdf*





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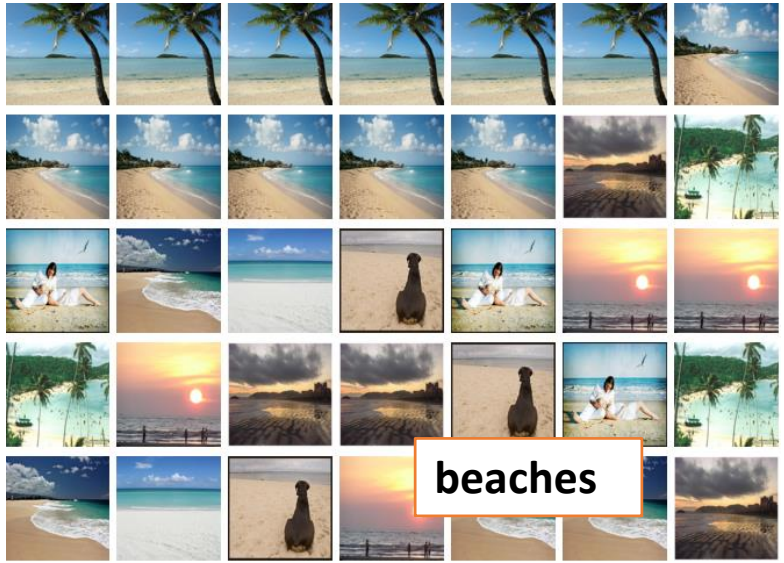
Why do we need this (1)?

- Discover semantic meaning; e.g. ImageNet (valuable 'ground truth'):
  - Major human tagging initiative, 14m images, organized by WordNet nouns
  - See Professor Li Fei Fei's excellent TEDx talk here: http://bit.ly/FFL-IM



Why do we need this (2)?

- Anti-piracy
- De-duplication of file systems
- With visual quality analysis – compare and characterize all instances of a work
- Displaces earlier fingerprinting technology

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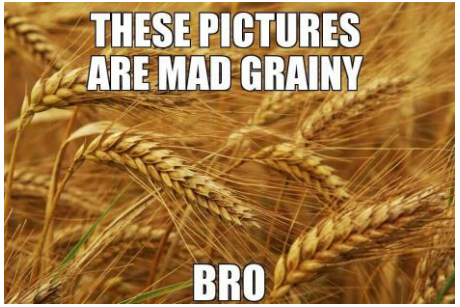
Why do we need this (3)?

- Because visual quality matters!
  - Just when you think it can't get worse…



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Cross-collection Vocabularies

- Significant work to be done
  - Aim: simplicity and adoptability!
- Coding format example:
  - How many? (pbCore: 243; Netflix IMF: 2)
- Significant growth in complexity must be represented:
  - color space (Rec.2020, ACES, HDR)
  - Object-based media, integrative media (W3C MSE, EME, Timed Text 2)
  - Production formats and profiles as SMPTE standards (GoPro Cineform VC-5, Apple ProRes VC-6)
  - Visual quality metrics, human perception

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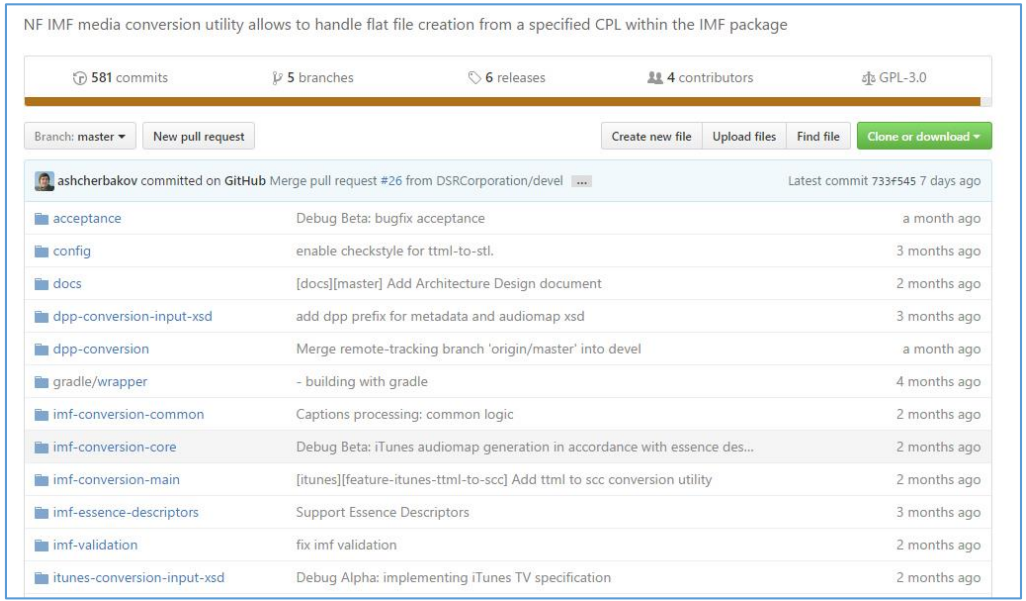
Open Tools

- Open toolsets are needed to accelerate adoption
  - Example: IMF-DPP mapping, re-formatting tool wipes out format conflict in broadcast contribution (Netflix, others)



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No substitute for action:

- Moving to the next stage:
  - Open toolsets
  - Vocabulary effort
  - Genuine experiments

- Thank you!
  - Pam Fisher (p.fisher@cs.ucl.ac.uk)

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