Semantic Multimedia Remixing

MediaEval 2013
Search and Hyperlinking Task

Mathilde Sahuguet & Benoit Huet
MediaMixer Technology Framework

Media Assets

- Analysis tools
- Annotation tools
- Copyright tools

New Media Applications
- Re-use
- Acquire
- Search

Storage (Media + Metadata)

RDF metadata model
Media Fragment URI specification

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http://community.mediamixer.eu
MediaMixer Technology Framework

Media Asset → Analysis tools → Fragment Creation → RDF metadata model → Storage

Media Asset → Annotation tools → Fragment Description → Media Fragment URI specification

Media Asset → Copyright tools → Fragment Rights

New Media Applications

Search

Re-use

Acquire

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http://community.mediamixer.eu
Summary

- MediaEval Task presentation
- How to Search for Media Fragments
- Examples
- Results
- Conclusion
Task presentation

- Information seeking in a video dataset: retrieving video/media fragments
Task presentation

- Information seeking in a video dataset: retrieving video/media fragments

- The dataset: 2323 BBC videos of different genres
  - ~1697h of video + audio
  - Two types of ASR transcript
  - Manual subtitle
  - Metadata
  - Shot boundaries and keyframes
  - Face detection and similarity information
  - Concept detection
Task presentation

- **Search**: find a known segment in the collection given a query (text)
  
  ```xml
  <top>
    <itemld>item_18</itemld>
    <queryText>What does a ball look like when it hits the wall during Squash</queryText>
    <visualCues>ball hitting a wall in slow motion</visualCues>
  </top>
  ```

- **Hyperlinking**: find relevant segments relatively to an “anchor” segment (+- context)
  
  ```xml
  <anchor>
    <anchorId>anchor_1</anchorId>
    <startTime>13.07</startTime>
    <endTime>13.22</endTime>
    <item>
      <fileName>v20080511_203000_bbcthree_little_britain</fileName>
      <startTime>13.07</startTime>
      <endTime>14.03</endTime>
    </item>
  </anchor>
  ```
Task presentation

- **Queries are user generated** for both search and hyperlinking
  - Search: 50 queries from 29 users
  - Hyperlinking: 98 anchors initially.

- Evaluation:
  - For search, searched segments are pre-defined
  - For hyperlinking, crowd-sourcing (on 30 anchors only)
Evaluation measures

- Search
  - Mean Reciprocal Rank (MRR): assesses the rank of the relevant segment

\[ MRR = \frac{1}{|Q|} \sum_{i=1}^{|Q|} \left( \frac{1}{\text{rank}_i} \right) \]
Evaluation measures

- **Search**
  - **Mean Reciprocal Rank (MRR):** assesses the rank of the relevant segment
  - **Mean Generalized Average Precision (mGAP):** takes into account starting time of the segment
  - **Mean Average Segment Precision (MASP):** measures both ranking and segmentation of relevant segments

- **Hyperlinking**
  - **Precision at rank n:** how many relevant segment appear in the top n results
  - **Mean Average Precision (MAP)**
Our approach – 1. Pre-processing

- Extracting as much information as possible

- Processing ~ 1697h of BBC video data

<table>
<thead>
<tr>
<th>Task</th>
<th>Organization</th>
<th>Time/Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Concept detection (151)</td>
<td>CERTH</td>
<td>20 days on 100 cores</td>
</tr>
<tr>
<td>Scene segmentation</td>
<td>CERTH</td>
<td>2 days on 6 cores</td>
</tr>
<tr>
<td>OCR</td>
<td>Fraunhofer</td>
<td>1 day on 10 cores</td>
</tr>
<tr>
<td>Keywords extraction</td>
<td>Fraunhofer/UEP</td>
<td>5 hours</td>
</tr>
<tr>
<td>Named Entities extraction</td>
<td>Eurecom/UEP</td>
<td>4 days</td>
</tr>
<tr>
<td>Face detection and tracking</td>
<td>Eurecom</td>
<td>4 days on 160 cores</td>
</tr>
</tbody>
</table>
Our approach – 2. Indexing

- **Solr engine (Lucene) for indexing the data**
  - Index at different **temporal granularities** (shot, scene, sliding window segment)
  - Index different **features** at each temporal granularity (metadata, ocr, transcripts, visual concepts)

- **All information stored in a unified structured way**
  - flexible tool to perform the search and hyperlinking

- **Next step: design a query for each sub-task**
Solr indexing

- **Schema** = structure of document using fields of different types

- Design a schema = decide how to represent and index the data

```xml
<field name="id" type="string" indexed="true" stored="true" multiValued="false" required="true" />
<field name="begin" type="string" indexed="false" stored="true" multiValued="false" required="true" />
<field name="end" type="string" indexed="false" stored="true" multiValued="false" required="true" />
<field name="videoId" type="string" indexed="true" stored="true" multiValued="false" required="true" />
<field name="subtitle" type="text_en" indexed="true" stored="true" multiValued="false" required="true" />
<field name="Actor" type="float" indexed="true" stored="true" multiValued="false" required="true" />
<field name="Adult" type="float" indexed="true" stored="true" multiValued="false" required="true" />
<field name="Animal" type="float" indexed="true" stored="true" multiValued="false" required="true" />
<etc>
```
Solr indexing

- **Schema** = structure of document using fields of different types
- Design a schema = decide how to represent and index the data

```xml
<doc>
  <field name="id">20080401_013000_bbcfour_legends_marty_feldman_six_degrees_of#t=399,402</field>
  <field name="begin">00:06:39.644</field>
  <field name="end">00:06:42.285</field>
  <field name="videoId">20080401_013000_bbcfour_legends_marty_feldman_six_degrees_of</field>
  <field name="subtitle">'It was very, very successful.'</field>

  <field name="Actor">0.143</field>
  <field name="Adult">0.239</field>
  <field name="Animal">0.0572</field>
</doc>
**Solr indexing**

- **Analysis step:**
  - Dependent on each type
  - Automatically performed: tokenization, removing stop words, etc
  - It creates tokens that are added to the index
    - inverted index
    - query is made on tokens
Our approach – 3. Search

- Using the provided visual cues
  - Text search is straightforward
  - Visual features? Starting point = visual cues in text form

- Mapping “visual cues” to concepts
  - Based on Word-net distances
  - Outputs concepts with a confidence score

- Concepts detector confidence
  - Manual evaluation of the 100 top images for each concept
    => valid detection rate
Example: mapping

- `<visualCues>House memories Farm exploration A poem on animal and shells </visualCues>`
Example: detector confidence

- 100 top images for the concept “Animal”
- 58 out of 100 are manually evaluated as valid
2 Media Fragment Creation Strategies
- Using pre-constructed segments (scenes)
- Merging segments on the fly (clustering cl10)

Submitted runs:
- scenes-noC (-C): scenes search using textual (and visual) features
- scenes-S(-U,-I): scenes search using only textual features from transcript (S: subtitle, I and U: transcript type)
- cl10-noC (-C): Temporal shot clustering within a video using textual (and visual cues).
Our approach – 3. Search

- Pre-filtering (At Video Level)
  - Query on the video index: accurate video lies within the 40 top results (36 in the worst case)
  - Average position (50 queries) of the correct video: 4.72
  - For 23 queries, the 1st video is correct
  - For 47 queries, the correct video is within the first 20 videos

- Restricting the media fragment search to the top videos is likely to increase performances
  - Identify the optimal number of videos to search
Solr querying

- Very easy with web interface

```
$q = "What does a ball look like when it hits the wall during "
$q = "Squad";

$fq = "id";

$sort = "id";

$start = 0;

$rows = 100;

$xml = "xml";
```

```
<response>

<result name="response" numFound="1" start="0" maxScore="1.4916071">

</response>
```

```xml
<?xml version="1.0" encoding="UTF-8"?>
<response>

<result name="response" numFound="1" start="0" maxScore="1.4916071">

</response>
```
Solr querying

- Very easy with web interface
- Query can be made through http request

http://localhost:8983/solr/collection_mediaEval/select?q=text:(Children out on poetry trip Exploration of poetry by school children Poem writing) Animal:[0.2 TO 1] Building:[0.2 TO 1]
Our approach – 4. Hyperlinking

- Reusing the search component
  - Designing a query from the anchor
    - aligning subtitles to anchor to extract text features
    - spotting concepts
  - Querying using both scenes and shot clustering approaches
Examples

- Text query: what to cook with everyday ingredients on a budget, denise van outen, john barrowman, ainsley harriot, seabass, asparagus, ostrich, mushrooms, sweet potato, mango, tomatoes
- Visual query: denise van outen, john barrowman, ainsley harriot, seabass, asparagus, ostrich, mushrooms, sweet potato, mango, tomatoes

Expected
20080506_153000_bbctwo_ready_steady_cook.webm#t=67,321

Scenes
20080506_153000_bbctwo_ready_steady_cook.webm#t=48,323

cl10
20080506_153000_bbctwo_ready_steady_cook.webm#t=1287,1406
Results

- Search

<table>
<thead>
<tr>
<th>Run</th>
<th>MRR</th>
<th>mGAP</th>
<th>MASP</th>
</tr>
</thead>
<tbody>
<tr>
<td>scenes-C</td>
<td>0.324931</td>
<td>0.187194</td>
<td>0.199647</td>
</tr>
<tr>
<td>scenes-noC</td>
<td>0.324603</td>
<td>0.186916</td>
<td>0.199237</td>
</tr>
<tr>
<td>scenes-S</td>
<td>0.338594</td>
<td>0.182194</td>
<td>0.210934</td>
</tr>
<tr>
<td>scenes-I</td>
<td>0.261996</td>
<td>0.144708</td>
<td>0.158552</td>
</tr>
<tr>
<td>scenes-U</td>
<td>0.268045</td>
<td>0.152094</td>
<td>0.164817</td>
</tr>
<tr>
<td>cl10-C</td>
<td>0.294770</td>
<td>0.154178</td>
<td>0.181982</td>
</tr>
<tr>
<td>cl10-noC</td>
<td>0.286806</td>
<td>0.149530</td>
<td>0.171888</td>
</tr>
</tbody>
</table>

- Scenes give the best performances
- Impact of transcript type: as expected
- Impact of visual concept: smaller than expected
mGAP results (60s window)
Results

- Hyperlinking

<table>
<thead>
<tr>
<th>Run</th>
<th>MAP</th>
<th>P-5</th>
<th>P-10</th>
<th>P-20</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA cl10</td>
<td>0.0337</td>
<td>0.3467</td>
<td>0.2533</td>
<td>0.1517</td>
</tr>
<tr>
<td>LA scenes</td>
<td>0.1196</td>
<td>0.6133</td>
<td>0.5133</td>
<td>0.3400</td>
</tr>
<tr>
<td>LC cl10</td>
<td>0.0550</td>
<td>0.4600</td>
<td>0.4000</td>
<td>0.2167</td>
</tr>
<tr>
<td>LC scenes</td>
<td>0.1654</td>
<td>0.6933</td>
<td>0.6367</td>
<td>0.4333</td>
</tr>
</tbody>
</table>

- Scenes offer the best results
- Using context increases performances
- Precision at rank n decreases with n
P-10 results (60s windows)

![Graph showing P-10 results for different runs and institutions](image)

- DCU
- HITSIRISA
- Idiap2013
- LinkedTV13
- MMLab
- TOSCA
- UPC
- UTwente
- soton-wais2013
Conclusion and Future work

- Searching and HyperLinking Media Fragment

- Scenes perform the best
  - Segmentation can still be improved
  - Actual algorithm based on visual features
  - Future work: including semantics and other features

- Visual features provide limited gain
  - Why? Further research needed
  - Visual concept detectors accuracy
  - Mapping between semantic and visual concepts
Related Publications


- Stein, D.; Öktem, A.; Apostolidis, E.; Mezaris, V.; Redondo García, J. L.; Troncy, R.; Sahuguet, M. & Huet, B., **From raw data to semantically enriched hyperlinking: Recent advances in the LinkedTV analysis workflow**, *NEM Summit 2013, Networked & Electronic Media, 28-30 October 2013, Nantes, France*


- [http://mediamixer.eu/](http://mediamixer.eu/)
- [http://www.linkedtv.eu/](http://www.linkedtv.eu/)
Semantic multimedia remixing: Deep-linking into Media Assets at the Fragment Level

Raphaël Troncy <raphael.troncy@eurecom.fr>
Drupal 8 now has Schema.org RDF mappings (but don’t pop the champagne yet)

Submitted by Lin on Sun, 2013-07-07 23:53

You may have seen the announcement last week that Dries approved and committed a patch which changes Drupal core’s default RDF mappings. When any new Drupal 8 site is installed, the markup will include RDFa that uses terms from the Schema.org vocabulary. Of course, as with anything Schema.org, this announcement got some attention.
Once upon a time …

JISC IE Technical Foundations

Consuming and producing linked data in a content management system

Posted on September 15, 2010 by Thom Burton

At this summer’s Institutional Web Management Workshop in Sheffield (IWMW 2010), I demonstrated how it is becoming possible for a content management system both to consume and to produce linked data resources. In a plenary session, I presented an overview of the current state of play in ‘Semantic content management: consuming and producing RDF in Drupal’. In a video-recorded plenary session (specifically in a nine-minute segment of the recording, from 34 through 42 minutes), I briefly reviewed how a modern CMS can enrich local datasets with remote linked datasets – and, by engaging with the web of data, produce new insights. Here I explain the scope of what I demonstrated at this event, outline some practical implementation procedures, and evaluate initial results.
... leading to sharing Media Fragments

- Publishing status message containing a Media Fragment URI
  - Use a ‘#’!
  - Highlight a video sequence
  - Highlight a region to pay attention to

Google Goggles explained in a media fragment #teleTask
linkeddata.synote.org/synote/recordi...

http://linkeddata.synote.org/synote/recording/replay/51151#t=22,32

9:37 AM - 8 Oct 12 - Embed this Tweet

Reply to @rtroncy
W3C organized a workshop on Video on the Web in December 2007, hosted by Cisco Systems, in order to share current experiences and examine the technologies. 42 position papers were submitted for the Workshop and 37 organizations attended the event from a wide range of applications: content producers, network companies, research institutes, hardware vendors, video platforms, browser vendors, users, etc. The meeting was hosted in San Jose, California and Brussels, Belgium, with both locations linked with high definition video.
Key topics

- **Addressing**: having global identifiers for identifying spatial and temporal clips (for deep linking, bookmarking, caching and indexing)

- **Metadata**: searching and discovering video is difficult with the volume of online video

- **Video codec**: recommending a baseline (open) video codec for the World Wide Web

- **Content protection**: managing digital rights associated with the media is key: W3C should look into metadata for digital rights
Making video a "first class citizen"

Video in the Web

Mission

Following the workshop in Video on the Web, the goal of the Video in the Web activity is to make video a "first class citizen" of the Web. Video on the Web (and this includes audio, as the two are typically used together) has seen explosive growth, improving the richness of the user experience but leading to challenges in content discovery, searching, indexing and accessibility. Enabling users (from individuals to large organizations) to put video in the Web requires that we build a solid architectural foundation that enables people to create, navigate, search, link and distribute video, effectively making video part of the Web instead of an extension that doesn't take full advantage of the Web architecture.
Flickr Notes

http://www.flickr.com/photos/mhausenblas/2883727293/
YouTube Temporal Addressing (Sept 2008)

TechCrunch 50: Swype
Media Fragments Use Cases

- Bookmark / Share parts (fragments) of audio/video content
- Annotate media fragments
- Search for media fragments
- Develop Mash-ups/Collage
- Conserve bandwidth

http://www.w3.org/TR/media-frags-reqs/
What are Media Fragments?

- **Temporal media fragment**
- **Spatial media fragment**
- **Track media fragment**
- **Named media fragment**

Example VIDEO Track (Constant Frame Rate)
OTHER Tracks Types (Further tracks possible)
Example AUDIO Track (Constant Sampling Rate)
Example TEXT Track (Discontinuous, Overlapping in time)
Example IMAGE Track (Discontinuous in time)
Media Fragments Dimensions

- **r01: Temporal fragments:**
  - a clipping along the time dimension from a start to an end time that are within the duration of the media resource

- **r02: Spatial fragments:**
  - a clipping of an image region, only consider rectangular regions

- **r03: Track fragments:**
  - a track as exposed by a container format of the media resource

- **r04: Named fragments:**
  - A temporal media fragment that has been given a name through some sort of annotation mechanism
Media Fragments (temporal)

Original resource length

Fragment beginning

Playback progress

Fragment end
Media Fragments (spatial)

URI Scheme

- Using URI query part:
  
  `http://www.example.org/video.ogv?t=60,100`

- Using URI fragment part:
  
  `http://www.example.org/video.ogv#t=60,100`

- Mixing both:
  
  `http://www.example.org/video.ogv?t=60,100
  #t=10,15`
### URI Fragments vs. URI Queries

<table>
<thead>
<tr>
<th>#t=20,30</th>
<th>?t=20,30</th>
</tr>
</thead>
<tbody>
<tr>
<td>secondary resource, notion of context</td>
<td>primary resource, no notion of context</td>
</tr>
<tr>
<td>extraction needs to be expressible in byte ranges</td>
<td>no adaptation restrictions</td>
</tr>
<tr>
<td>no provisions for communicating fragments to the server</td>
<td>key-value pairs are sent to the server</td>
</tr>
<tr>
<td>potentially cacheable</td>
<td>not cacheable</td>
</tr>
</tbody>
</table>

- The media fragment URI syntax can be used for URI queries
- We will focus on URI fragments
Media Fragments Resolution

- For the URI query part:
  - The media file is only processed on server side
  - The UA receives a **new** video file

- For the URI fragment part:
  - Smart UA will strip out the fragment definition and encode it into custom http headers (Range header)
  - (Media) Servers will handle the request, slice the media content and serve just the fragment (corresponding byte ranges)
  ... while old ones will serve the whole resource
Media Fragments Resolution

- 2 ways handshake

- 4 ways handshake
Influence of Media Formats

- Fragment extraction needs to be expressible in terms of byte ranges

- Requirements for the different axes
  - **temporal**: presence of intra-coded frames (i.e., random access points)
  - **spatial**: presence of independently coded spatial regions
  - **track**: need to be identifiable by a name

- **Conclusion**: temporal and track axes are realistic, spatial fragments can hardly be expressed in terms of byte ranges
Media Fragment Clients

- **Web Browsers**
  - Firefox (since version 9, now version 23)
  - Safari (since Jan 2012, [announcement](#))
  - Chrome (since Jan 2012, [announcement](#))

- **Library (or Polyfill)**
  - mediafragment.js: [https://github.com/tomayac/Media-Fragments-URI](https://github.com/tomayac/Media-Fragments-URI)
  - xywh.js: [https://github.com/tomayac/xywh.js](https://github.com/tomayac/xywh.js)

- **Custom Players:**
  - Synote: [http://smfplayer.synote.org/smfplayer/](http://smfplayer.synote.org/smfplayer/)
  - Noterik, Condat, JSI, etc.
Media Fragment Servers

- Southampton-Eurecom: node.js based implementation
- YouTube: partial support, syntax difference
- Dailymotion: partial support, syntax difference
Article annotation integrated into talk page

Annotation of article pages with annotation text recorded on the talk page. The annotation is anchored to specific text in the article.
Media Fragment Semantic Annotation

- Media Fragment **creation**: localize a region (person)
- Media Fragment **annotation** (tagging) = interpretation
  Winston Churchill, UK Prime Minister, Allied Forces, WWII
- Media Fragment **semantic annotation**
  
  ```
  dbpedia:Churchill rdfs:label "Winston Churchill";
  rdf:type foaf:Person
  dbprop:order dbpedia:Prime_Minister_(UK).
  ```

The "**Big Three**" at the Yalta Conference (Wikipedia)
A history of G8 violence (video) (© Reuters)

- Media Fragment **creation**: localize a temporal sequence
- Media Fragment **annotation** (tagging) = interpretation
  G8 Summit, EU Summit, Heiligendamm, 2007, Gothenburg, 2001
- Media Fragment **semantic annotation**
  :Seq1 foaf:depicts dbpedia:33rd_G8_Summit.
  :Seq4 foaf:depicts dbpedia:EU_Summit.
  dbpedia:33rd_G8_Summit
  rdfs:label "33rd G8 summit"@en ;
  grs:point "54.143055555555556 11.841666666666667".
Media Fragment Semantic Annotation

- Things, not strings!
  http://googleblog.blogspot.fr/2012/05/introducing-knowledge-graph-things-not.html

- Use knowledge bases (LOD)

- Use common vocabularies (LOV)

- Follow the 4 Linked Data principles

- Refine the 4 Linked Media principles
Open Annotation Data Model

- Specification developed in the W3C Open Annotation Community Group
  [http://www.openannotation.org/spec/core/](http://www.openannotation.org/spec/core/)

- Core model
  - OWL vocabulary for representing and sharing annotation of digital resources (and their fragment) … in RDF
  - A **body** is related to a **target**
  - Nature of the annotation changes according to intention (motivation)

- How to annotate this image?
Semantic Annotation of an Image

http://www.w3.org/community/openannotation/wiki/SE_Semantically_Tagging_an_Image
Maphub: http://maphub.github.io/
Open Video Annotation Project

Media-rich Video Annotation for the Web

http://openvideoannotation.org/

To support teaching, learning and research with web video.
YouTube Annotations

- Annotations are clickable text overlays on YouTube videos
- Annotations are used to boost engagement, give more information, and aid in navigation
YouTube Annotations: How To

How to create YouTube video annotations:

- Speech Bubble
- Note
- Title

Add a speech bubble, you can add a note, a title, a spotlight, or just even pause the video.
LinkedTV: automatic annotations ...
... and enrichment for hypervideos

CONCEPT IN PLAYER

Cubism  Expressionism  Fauvism

FACETS / PROPERTIES OF CONCEPT

CONTENT ENRICHMENT
Media Fragments and Annotations

- **nerd:Location**
  - Casablanca
  - Cafe Rick

- **nerd:Person**
  - H. Bogart
  - I. Bergman

http://data.linkedtv.eu/media/e2899e7f#t=840,900

- **Media Fragment URI 1.0**
  - Chapters
  - Scenes
  - Shots
  - etc…
person

entity

thing
NER Tools and Web APIs

- Standalone software
  - GATE
  - Stanford CoreNLP
  - Temis

- Web APIs
  - AlchemyAPI
  - DBpedia Spotlight
  - evri
  - EXTRACTIV
  - [SemiTags](#)
  - CALAIS
  - saplo
  - Yahoo!
  - ontotext
  - Wikimeta
  - Zemanta
  - TextRazor

http://nerd.eurecom.fr/
NERD: Named Entity Recognition and Disambiguation

- Compare performances of NER and NEL tools
  - Understand strengths and weaknesses of different Web APIs
  - Adapt NER processing to different context

- (Learn how to) Combine NER (/ NEL) tools

What is NERD?

ontology\(^1\)    REST API\(^2\)

UI\(^3\)

1 [http://nerd.eurecom.fr/ontology](http://nerd.eurecom.fr/ontology)
2 [http://nerd.eurecom.fr/api/application.wadl](http://nerd.eurecom.fr/api/application.wadl)
3 [http://nerd.eurecom.fr](http://nerd.eurecom.fr)
NERD User Interface

Analysis

Insert a URI or plain text

URI article

Analyze web resource

Plain text

Analyze plain text

action

- analyze
- export
- evaluate
- compare
- search
Media Fragment + Open Annotation + NERD

Locator

MediaResource

MediaFragment

Annotation

Entity

URL (hyperlink)
Media Fragment Enricher: http://mfe.synote.org/mfe/

Video Preview

*URL
http://www.youtube.com/watch?v=FBUIFgu2M2gM

Please enter the URL of a YouTube or DailyMotion Video e.g. http://www.dailymotion.com/video/36300382 or http://www.dailymotion.com/video/28764136

How simple ideas lead to scientific discoveries - Adam Savage

Tags
No tags for this video

Duration
00:07:32

Statistics
1104526 Views
1236 Comments
0 Favorites
12312 Ratings

Category
Education

Language

Creation Date
2012-03-13T18:18:58.000Z

Publication Date
2012-03-13T18:18:58.000Z

Subtitles Available

Description

Adam Savage walks through two spectacular examples of profound scientific discoveries that
Linking pieces of knowledge

How simple ideas lead to scientific discoveries - Adam Savage

Subtitle

to the phenomenon of the ball, going to the back of the wagon.
But in truth, nobody really knows."

Feynman went on to earn degrees at MIT, Princeton. He solved the Challenger disaster.
He ended up winning the Nobel Prize in Physics for his Feynman diagrams describing the movement of subatomic particles.
And that credits that conversation with his father.

NERD

<table>
<thead>
<tr>
<th>Thing (123 entities)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
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Challenger disaster

label
Space Shuttle Challenger disaster
abstract
The Space Shuttle Challenger disaster occurred on January 28, 1986, when Space Shuttle Challenger broke apart 73 seconds into its launch.

description
Linking pieces of knowledge

How simple ideas lead to scientific discoveries - Adam Savage

Subtitle

00:00:09 to 00:01:01
Feynman went on to earn degrees
00:01:01 to 00:01:04
at MIT. Princeton. He solved the Challenger disaster.
00:01:04 to 00:01:07
He ended up winning the Nobel Prize in Physics
00:01:07 to 00:01:10
for his Feynman diagrams, describing the movement of subatomic particles.
00:01:10 to 00:01:14
And he credits that conversation with his father.
00:01:14 to 00:01:16
as giving him a sense
00:01:16 to 00:01:20
that the simplest questions could carry you out to the edge of human knowledge.
00:01:20 to 00:01:22
and that's where he wanted to play.
Towards a Linked Media Layer

- **Enriching media with media from a closed collection (e.g. BBC archive)**
  - The MediaEval scenario (~ 1697 hours of archived BBC video)

- **Enriching media with content from the open web**
  - LinkedTV scenarios: white listed web sites for each program
  - Media Collector for Social Media
Media Collector

- Composition of media item extractors (12 SNs)
  - Rely on search APIs (+ a fix 30s timeout window to provide results)
  - Fallback on screen scraping when necessary (Twitter ecosystem)

- Implemented as a NodeJS server

- Serialize results in a common schema (JSON)
Deep link

Permalink

Clean text for NLP processing

Aggregate view of ALL social interactions

12 Social Networks
Media Collector + White List web sites

Q:\http://ir.lmcloud.vse.cz:8080/irapi/media-server?q=img_title:*Merkel*
Seed video enriched with web content

nerd:Location Brandenburg

Winter School on Multimedia Processing and Applications (WMPA) @ MMM 2014
Enrichments are Annotations too

http://data.linkedtv.eu/annotation/68983388...

http://data.linkedtv.eu/media/e2899e7f-67c1-4a08-9146-5a205f6de457

"location"
"semiTags"
http://en.dbpedia.org/resource/Neuhardenberg

"Neuhardenberg"

http://distilleryimage3.ak.instagram.com/1603921c844811e29e0522000a1af0c5.jpg

Instagram

http://instagram.com/p/WaQFXbclon/

http://d3j5womefs46c.cloudfront.net/photos/large/776981799.jpg?1370045559

http://d3j5womefs46c.cloudfront.net/photos/large/776981799.jpg?1370045559

"Monterey Bay Aquarium"

"President2 join African leaders @ Tokyo ..."

Provenance Ontology
Nisuna Ontology
LinkedTV Ontology
Ontology for Media Resources
Nerd Ontology
Open Annotation Ontology
String Ontology

2012-07-19T9:00:00+01:00

2012-07-19T9:00:00+01:00

2012-07-19T9:00:00+01:00
http://linkedtv.project.cwi.nl/news/
TV + Kinect + Web experience

http://www.youtube.com/watch?v=4mSC685AG7k
Take Away Summary

- **Video is a first class citizen on the Web**
  - Annotations: [Ontology](#) and [API](#) for Media Resources, [Open Annotation Data Model](#)
  - Access: [Media Fragments URI](#)
  - [NERD platform](#) for extracting key information from textual resources including video subtitles and microposts

- **Embrace the Linked Media vision**
  - Publish, re-use, re-purpose and remix media descriptions
  - Develop links between (part of) media items via their descriptions
Credits

- Giuseppe Rizzo, Vuk Milicic, José Luis Redondo Garcia (EURECOM)
- Thomas Steiner (Google Inc.), Yunjia Li (University of Southampton)
- Marieke van Erp (Free University of Amsterdam)
- Erik Mannens, Davy ven Deursen (iMinds, Uni. Ghent)
- Paolo Ciccarese, Robert Sanderson, Herbert Van de Sompel and all the members of the W3C Open Annotation Community Group
- … and many other students