



SEARCHING DATABASE
DIGITAL VIDEO
AUDIO-VISUAL SEARCH



Deliverable D 4.3

Agenda, viewgraphs and minutes of the following Workshops:

- National Initiatives on Multimedia Content Description and Retrieval, Geneva, October 10th, 2007.
- Metadata in Audio-Visual/Multimedia production and archiving, Munich, IRT, 21st – 22nd November 2007

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Abstract:

Workshop in Geneva 10/10/2007

This highly successful workshop was organised in cooperation with the European Commission. The event brought together the technical, administrative and financial representatives of the various national initiatives, which have been established recently in some European countries to support research and technical development in the area of audio-visual content processing, indexing and searching for the next generation Internet using semantic technologies, and which may lead to an internet-based knowledge infrastructure. The objective of this workshop was to provide a platform for mutual information and exchange between these initiatives, the European Commission and the participants. Top speakers were present from each of the national initiatives. There was time for discussions with the audience and amongst the European National Initiatives. The challenges, communalities, difficulties, targeted/expected impact, success criteria, etc. were tackled. This workshop addressed how these national initiatives could work together and benefit from each other.

Workshop in Munich 11/21-22/2007

Numerous EU and national research projects are working on the automatic or semi-automatic generation of descriptive and functional metadata derived from analysing audio-visual content. The owners of AV archives and production facilities are eagerly awaiting such methods which would help them to better exploit their assets. Hand in hand with the digitization of analogue archives and the archiving of digital AV material, metadata should be generated on an as high semantic level as possible, preferably fully automatically. All users of metadata rely on a certain metadata model. All AV/multimedia search engines, developed or under current development, would have to respect some compatibility or compliance with the metadata models in use. The purpose of this workshop is to draw attention to the specific problem of metadata models in the context of (semi)-automatic multimedia search.



Information Society
Technologies

Keyword List: Metadata, National Initiatives

The CHORUS Project Consortium groups the following Organizations:		
JCP-Consult	JCP	F
Institut National de Recherche en Informatique et Automatique	INRIA	F
Institut für Rundfunktechnik GmbH	IRT GmbH	D
Swedish Institute of Computer Science AB	SICS	SE
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Universiteit van Amsterdam	UVA	NL
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Thomson R&D France	THO	F
France Telecom	FT	F
Circom Regional	CR	B
Exalead S. A.	Exalead	F
Fast Search & Transfer ASA	FAST	NO
Philips Electronics Nederland B.V.	PHILIPS	N

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15:45 - 16:15

Coffee Break

16:15 - 17:45 **Open Session**

Part 1 - European National Initiatives: Challenges, communalities, difficulties, targeted/expected impact, success criteria? What could be done together?

Moderators: **Dr. Nozha Boujemaa** and **Christoph Dosch**

Part 2 - Gaps and challenges in search Engines

Moderator: **Dr. Loretta Anania**, EC DG INFSO

1.2 SET-UP

David Wood of the EBU graciously welcomed us, where after Joao Schwarz da Silva of the Commission gave some visionary long perspectives and trends to set off the discussion. Six various national projects then in turn presented both their starting points, organisational detail, and major research objectives, where after the day was concluded with an open discussion led by a panel consisting of Dr. Nozha Boujemaa, INRIA, Christoph Dosch, IRT, and Dr. Loretta Anania, EC DG INFSO.

The audience consisted of 75 persons from 15 countries (Austria, Belgium, Czech Republic, France, Germany, Greece, Italy, Luxembourg, Netherlands, Norway, Slovenia, Spain, Sweden, Switzerland and UK), representing academia, commercial activity, and government agencies. These notes constitute a brief recapitulation of the main points, intended mainly for the participants at the meeting. A full report including transcripts and recordings will be made publicly available eventually.

1.3 TRENDS AND DEVELOPMENTS TO WATCH

The discussion at the meeting centered on a set of trends and developments.

- **TREND 1: HUGE GROWTH OF ACCESSIBLE DATA BOTH AS REGARDS SIZE AND HETEROGENEITY**

This trend can be said to be well-established and uncontroversial. With the advent of multi-medial data, the topic of this workshop, the volume of data available on the web has exploded. It in itself poses a problem, since the rapid growth of material raises the threshold to enter the search market.

- **TREND 2: SEARCH ENGINES AS AN ACCESS TOOL**

Joao da Silva pointed out that general access to internet data is through search and selection as opposed to direct navigation: 85% of users use search and selection via a search engine as a navigational tool. This is a somewhat unexpected use of search functionality, and gives something of a statement on the usability and effectiveness of the navigational structure of the web. To a large extent this behaviour can be understood through the construction of the browser interfaces: the search field is as accessible as the navigational field in the browser; it also reflects on the lack of authorities and authoritative navigational structure for the general public. In fact, as has been noted in discussion, search engines are sometimes referred to as “authorities” by users.

This trend is an after-effect of the search engine market overshadowing the portal market in the late nineties and will only persist as long as there is lack of real alternatives.

If more navigational services are provided and accepted, if better designed interfaces are designed, released, and deployed beyond the research laboratories, it is likely that users will gravitate to them, search not always being the optimal or even most convenient mechanism for accessing a known item in a known location.

- **TREND 3: SEARCH AS A COMMODITY**

Search engines are taken as granted by every web user which was noted by several speakers and commented upon by the audience. The market value of providing accurate, effective, and satisfactory search is rapidly diminishing,

which lends some perspective to the goal of building new European search engines for the general case. The business model of search engines is based on volume or on mining the data inadvertently provided by their users.

It is unlikely there will be great market purchase for providing standard search functionality in the future, unless those search engines provide something beyond the standard; simultaneously it is necessary for most future information services we can envision that search is a crucial base component for them. This insight was clearly demonstrated by Dag Johansen of FAST who described how Fast had retreated from the search service market to providing general search systems for customers, allowing the company to focus on developing and leveraging its core competence rather than the incidentals inherent in scaling services.

There is no shortcut to providing standard search engines for multi-medial data, but the advent of less immediately analysable data such as image, video, audio etc, will make technical development necessary, and thus offer the possibility of new market entry, even in face of the large increase in data volume it engenders.

• **TREND 4: INFORMATION REFINEMENT - GOING BEYOND SEARCH**

Joao da Silva proposed the importance of refining information access beyond retrieval, specifically suggesting question answering as a future line of development. It certainly is the case that most uses of web search technology is a means to achieve something beyond finding a document - excerpting information or other further processing is a likely goal, as is that of compiling information, orienting oneself in a topical area one is unfamiliar with, or verifying something one is fairly certain of already knowing.

These various goals are not and cannot be met by general search engines.

There must be specific functionality developed to meet the use cases represented by these various refinement needs. Here, again, the advent of less obviously indexable data will motivate technical development beyond the immediate indexing done on text. The simple use case addressed by vanilla adhoc search engines such as offered by the major web services today will not wash for multi-medial data, and when it is developed further it will, as noted in the previous point, afford new entrants in the field a market position. Examples were e.g. several of the Dutch projects, which went beyond that of search engines in functionality, such as a p2p architecture for text transcription of video material.

• **TREND 5: USER PROVIDED CONTENT AND THE AUTOMATIC ANALYSIS THEREOF**

A trend noted by several participants is the presence of two-way communication between providers and consumers. With technology allowing comments and annotations from the general public, this development is yet another factor boosting data volume and risks raising noise level for the hapless user. Conversely, this is an opportunity for information refinement - the question raised in discussion was how to harness the clear interest shown by users into productive information gathering and collation, to improve a collection or information stream to the benefit of all from the voluntary activities or the incidental accrual of information from its users.

• **TREND 6 : EXPECTATION OF DISRUPTIVE TECHNOLOGIES**

Joao da Silva asked for new disruptive technologies, technologies that go beyond incremental improvement and enhancement of current technologies, technologies that change the business models of its provisioners or the everyday life of its users. It is the nature of disruptive technologies that their character and characteristics are difficult to predict, but their appearance at a steady rate is to be expected along most lines of development. Dag Johansen of FAST established that the layer between data collections and their analysis would be where the disruptive technologies would appear - neither the raw data itself nor any amount of intelligent service design will suffice without the other.

• **TREND 7: PROBLEM ORIENTATION, NOT SOLUTION PROVISION**

Dag Johansen of FAST stressed the need of basing service design and technology development on issues as experienced by users rather than on unfounded solutions to possibly non-existing problems: research problems fall out of customer requirements. This view was contested by several participants in that it risked incrementalism and settling on satisfying problems rather than finding optimal or ground-breaking solutions.

• TREND 8: NEED FOR GRAND CHALLENGES

Prof. Hervé Bourlard proposed the formulation of grand challenges to guide future research endeavours.

Formulating a grand challenge on a suitable level of abstraction, without constraining the research to follow narrow paths, yet still concrete enough to set into motion research and development from many directions simultaneously is a challenge in itself! Examples of challenges offered for the consideration of the audience were

- Search of 3D objects and search using 3D interfaces,
- How to build up viable search services to compete with the major players on the market
- The enhancement of human-human communication - both face-to-face and asynchronous or remote - using information access systems,
- Evaluation schemes, sensitive to the use cases at hand,
- The provision of useful multi-lingual access interfaces which would not only address the need of culturally sensitive systems but leverage the European reality into an asset;
- The creation of a digital time machine which would allow users to position themselves back and forth along a time axis in a document database,
- Issues regarding integrity and consumer empowerment with respect to providers.

1.4 PROJECTS

Project	iAD – information access disruptions http://www.iad-centre.no/
Budget	Ca. €30m
Duration	8 years, start in 2007
Country	Norway
Partners	<ul style="list-style-type: none"> • Fast Search & Transfer (Host) • Accenture • Schibsted • Cornell University • AIC Dublin (DCU, UCD) • NTNU Trondheim • University of Tromsø • University of Oslo • Norwegian School of Management
Main Objectives and challenges	<ul style="list-style-type: none"> • Core research for next generation precision, analytics and scale in information access • Build international networks to identify and execute on global disruption opportunities enabled by emerging services in the information age
Research and Technologies	<p>Schema agnostic indexing services</p> <ul style="list-style-type: none"> • Schema-agnostic end2end design • Consolidation of query model <p>Processing high-speed data streams</p> <ul style="list-style-type: none"> • Capturing & extracting knowledge from data streams: • Pervasive sensor networks, RFID readers, multimedia feeds, ... <p>Scalable infrastructure for push and pull based computing</p> <ul style="list-style-type: none"> • Robust principles and services for next generation infrastructure for distributed information access <p>Extreme precision and recommendation in multimedia access</p> <ul style="list-style-type: none"> • Extreme precision solutions for access to multimedia content



	<ul style="list-style-type: none">• Social networks with recommender functions Understanding and managing the disruptive potential of iAD <ul style="list-style-type: none">• Analyze business and societal impact• Assess disruptive potential
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Project	Interactive Multimodal Information Management (IM2) http://www.im2.ch/
Budget	approximately 30 MCHF/4 years (59% Swiss NSF, 50% matching funds)
Duration	12 years, project start: January 2002
Country	Switzerland
Partners	IDIAP Research Institute, Martigny (co-ordinator) Partners: EPFL, Univ. Geneva, Univ. Fribourg, ETHZ, and Univ. Bern
Main Objectives and challenges	IM2 has the objective to develop advanced methods for indexing multimedia content and to provide advanced multimodal human computer interfaces. Therefore investigations in the area of human-human communication are carried out.
Main applications and use cases	The application scenario so far is the indexing and modelling of face-to-face meetings.
Research and Technologies	IM2 covers the following research areas: <ul style="list-style-type: none"> • Unconstrained speech recognition • Language understanding • Computer vision • Machine learning • Multimodal scene analysis • Model of individual and group dynamics • Sociology and social-psychology • Structure, index, summarize communication scenes • User interfaces
Benchmarking of project results	Each of the following technology module is evaluated in international benchmark initiatives (NIST, DARPA, ...): <ul style="list-style-type: none"> • ASR: Automatic speech recognition • KWS: keyword spotting • SEG: speaker segmentation • ID/LOC: identification and localization/tracking • FOA: focus of attention • GAA: gesture and action recognition <p>IM2 provides a huge corpus with recorded meetings for internal and external evaluation and benchmarking. IDIAP has shown the good performance of their computer vision technology in the ImageCLEF 2007 evaluation for the medical annotation task.</p>

Project	MultimediaN http://www.multimedien.nl/en/multimedien.php
Budget	€30m
Duration	Phase 1: 2002 – 2004 Phase 2: 2004 – 2009
Country	Netherlands
Partners	<ul style="list-style-type: none"> • Center for Math and Computer Science • Philips Research • Technical University Delft • Telematica Institute • TNO • University of Amsterdam • University of Twente + 39 affiliated business partners
Main Objectives and challenges	<p>MultimediaN is a public-private partnership focusing on science and technology of multimedia Interaction & search engines.</p> <p>MultimediaN contributes to the solution of four fundamental problems:</p> <ol style="list-style-type: none"> 1. The accessibility of much multimedia content is low. 2. The information is fragmented: sound can't be matched to text, text can't be matched to speech. 3. A lot of information contributes to the 'information overload' that is characteristic of today's society. 4. Multimedia information is often badly organized as a result of legacy systems, self-created standards and heterogeneity in terminologies.
Main applications and use cases	<p>MultimediaN is divided in fundamental, integration, and application projects. The fundamental projects (Learning Features, Multimodal Interaction, and Ambient Multimedia Databases) create knowledge that is new on a world level. The integration projects (Semantic Multimedia Access, Professional Dashboard, and Video At Your Fingers) develop knowledge in which existing video-, audio- and speech technology are combined. The application projects (E-Culture and Personal Information Services) are pilots, which create application knowledge in an application context.</p> <ul style="list-style-type: none"> • Learning Features • Multimodal Interaction • Ambient Multimedia Databases • Semantic Multimedia Access • Professional's Dashboard • Video At Your Fingertips • E-Culture (N9C) • Personal Information Services
Research and Technologies	<p>MultimediaN covers the following research topics:</p> <ul style="list-style-type: none"> • Image, picture, video processing and indexing • Audio and speech recognition and indexing • Textual processing • Knowledge modelling, mining • System engineering (databases, standards)
Benchmarking of project results	The modules are evaluated in several international benchmarking initiatives. For video indexing a special track of TRECVideo was established in which data from MultimediaN was used for evaluation.



Project	Mundo AV -
	Information not available at this time

Project	Quaero No website at this time
Budget	<ul style="list-style-type: none"> • €100m for >5 years and more than 20 partners • Granted by French 'Agence de L'innovation Industrielle' • State aid to be authorised by DG Competition of European Commission
Duration	>5 years
Country	France with the participation of German partners
Partners	<p>Private companies : Thomson, France Telecom, Jouve, Exalead, Bertin Technologies, LTU Technologies, Vecsys, Synapse Development</p> <p>Public research labs : LIMSI-CNRS, RWTH-Aachen, Karlsruhe University, INRIA, LIG-UJF, IRCAM, ENST-GET, IRT, INIST-CNRS, MIG-INRA, LIPN</p> <p>Public institutions : INA, BNF, LNE, DGA</p> <p>Some contacts have been established with other European potential participants</p>
Main Objectives and challenges	<p>Develop demonstrators or applications corresponding to identified use cases in the domain of access and manipulation of multimedia and multilingual content</p> <ul style="list-style-type: none"> • Search, navigate, distribute, produce <p>Develop the corresponding enabling technologies for multilingual and multimodal content processing</p>
Main applications and use cases	<ol style="list-style-type: none"> 1. Consumer Multimedia Search Engine 2. Multimedia Search Services to enrich European portals 3. Personalised Video on interactive consumer networked devices Anytime and Anywhere 4. Recondition the Audiovisual Cultural Heritage 5. Professional Digital Media Asset Management for Broadcasting Industry 6. Platform for Text and Image Annotation
Research and Technologies	<ul style="list-style-type: none"> • Search and extraction infrastructure • Content processing infrastructure • Document capture and processing • Speech recognition • Translation • Musical analysis • Object recognition in images and video • Face detection and recognition • Video segmentation and structure analysis • Object tracking and event recognition in videos • Man machine interaction • Security
Benchmarking of project results	<p>Evaluation is the founding principle of Quaero's technological research and development organisation. Evaluation will be used as a tool for facilitating and structuring technology transfer between research organisations and leaders of use cases.</p> <p>Periodic evaluation campaigns shall be conducted within the program to assess global progress in each of the technology areas addressed in the program. These evaluation campaign shall be build on the most advanced procedures developed and organized by national or international bodies and programs such as NIST, CLEF, Technolanguge, Technovision...</p>



Project	Theseus <ul style="list-style-type: none"> • http://www.bmwi.de/BMWi/Navigation/Technologie-und-Innovation/Informationsgesellschaft/multimedia,did=184810.html • http://theseus-programm.de
Budget	Overall volume: €200m (Funding: €90m)
Duration	5 years
Country	Germany
Partners	<p>Industry:</p> <p>Empolis/Bertelsmann (co-ordinator), SAP, Siemens, Deutsche Thomson, Lycos, Morsophy, m2any, Intelligent Views, Ontoprise</p> <p>Research and public organisations:</p> <p>Fraunhofer Gesellschaft zur Förderung der angewandten Forschung (FhG), Institut für Rundfunktechnik (IRT), Deutsche Nationalbibliothek (DNB), Deutsches Forschungszentrum für Künstliche Intelligenz (DFKI), Forschungszentrum Informatik (FZI), VDMA-Verband, Gesellschaft für Forschung und Innovation (VFI), universities (Karlsruhe, München, Darmstadt, Dresden, Konstanz, Erlangen)</p>
Main Objectives and challenges	The main objective is to generate innovation in the area of semantic technologies to strengthen the role of the German IT industry and to establish new services in this area. The technologies are mainly for new internet based applications and services.
Main applications and use cases	<p>There are several applications foreseen. They are realized in sub projects (calls “use cases”):</p> <ul style="list-style-type: none"> • Alexandria: semantic internet platform to process and organize user generated content, semantic internet search platform • Contentus: Processing of cultural audio visual content of the German National Library • Medico: semantic image technology for Clinical Decision Support and Computer Aided Diagnosis. • ORDO: automatic semantic processing of huge text and audio visual corpora, semantic search tools • Processus: development of knowledge intensive tools to optimize generic production workflow • Texo: semantic based interconnection between service provider and service users
Research and Technologies	<ul style="list-style-type: none"> • Image and video processing • 3D analysis • Ontology • User interaction and semantic modelling • Machine learning • Digital rights management
Benchmarking of project results	In the Core Technology part of the project one work package is dealing with benchmarking of the other technology and research work. For the benchmarking the Fraunhofer IDMT is responsible



2. METADATA WORKSHOP IN MUNICH 21-22ND NOVEMBER 2007

2.1 SCHEDULE

Day 1: Wednesday, 21 November 2007 (a.m.)

09:00	Reception/Registration of Participants	IRT Lobby - Coffee
10:30	Welcome of Participants	Christoph Dosch, IRT
10:45	Session 1: Research Issues	Session Chair: Prof. Nozha Boujemaa, INRIA
	Invited Speech: State-of-the-art in automatic/semi-automatic Generation of Metadata (<i>Overview to set the scene</i>)	Prof. Nozha Boujemaa, INRIA
	MPEG-7 Interoperability and the Semantic Web	Dr. Yiannis Kompatsiaris, ITI
	Live Staging of Media Events The Metadata View	Tobias Buerger and Georg Guentner, Salzburg Research, Felix Zielke, Fraunhofer IAIS
	Interoperability of Multimedia Metadata - from Digital Cinema to Cultural Heritage Experiences from Projects IP-RACINE, K-Space & PrestoSpace -	Werner Bailer, JOANNEUM RESEARCH
	Publishing Audiovisual Content Metadata for Monitoring and Searching in Distributed Open Spaces	Michel Plu, France Télécom / Orange Labs
	Transcoding Compressed Audio into MPEG-7 Fingerprints Technical Report from the DIVAS Project	Holger Grossmann, Fraunhofer IDMT
	How to exploit spoken Audio as Source for the automatic Generation of semantic Metadata for Video	Franciska de Jong, University Twente
	The Automatic Captioning of Photographs	Mark Sanderson, University of Sheffield
12:50	Lunch	IRT Lobby



14:10	Session 2: Applications²	Session Chair: Dr. Ingo Hoentsch, IRT
	Chorus Metadata Standards in Broadcasting and EBU	Jean-Pierre Evain, EBU (Secretary of EBU Project Group P/MAG - Metadata Advisory Group)
	Metadata Models in the Audiovisual Domain	Giorgio Dimino, RAI Research Centre (Member of EU Project PrestoSpace)
	Evaluation of Automatic Information Extraction Tools for Broadcast Production	Alberto Messina, RAI Radiotelevisione Italia (Chairman of EBU Project Group P/SCAIE)
15:50	Coffee Break	IRT Lobby
16:10	Need for Structured Metadata in Television Production and Archiving	Andreas Ebner, IRT (Co-Chairman of EBU Project Group P/MAG)
	Controlled Metadata Flow for the Acquisition of AV Content – Conversion between Metadata Models (Mapping)	Reinhard Knoer, IRT (Member of the EBU Production Management Committee and Chairman of the EBU Project Group P/CP on Common Processes)
	BMF – the future Broadcast Metadata exchange Format? - BMF – the Concept and Class Models - BMF – the universal Interface for Metadata - Metadata (BMF) in MXF	Andreas Ebner, Rico Zimmermann, Dr. Ingo Hoentsch, IRT (German Chair SMPTE)
18:00	End of 2nd Session afterwards Get-together (Cocktail)	IRT Lobby



Day 2: Thursday, 22 November 2007

	Arrival of Participants	IRT Lobby
09:30	Introduction to Day 2	Christoph Dosch, IRT
09:40	Session 3: Industrial Developments	Session Chair: Stefan Schindler, Silex Media
	Ingest of Metadata in Tape-less Production A Concept for ARD and ZDF	Irene Kayser, Hessischer Rundfunk - presented by Andreas Ebner, IRT -
	Metadata in Audio-Visual/Multimedia Productions and Archiving	Steny Solitude (Co-founder, Associate and CTO of SkemA)
	Standards-Based Metadata Management for Networked Digital Media Archives	Colin Moorcraft, onTV Europe
	DR Case Study Windows on Metadata	John Foster, Silex Media
10:50	Coffee Break	IRT Lobby
	VPMS in Multilingual Playout Centre	Franziska Mauermann, S4M – Solutions for Media
	Evolution of Metadata Models in heterogenous Broadcast environments	Martin Pistor, VCS
	The Metadata Integration Journey for Digital Media	John Jordan, Siemens Global Media Consulting
13:00	Lunch	IRT Lobby
14:00	Roundtable Discussion A few Issues: <ul style="list-style-type: none"> - Search in Content vs. Search in Metadata (direct vs. indirect Search) - Rights Issues in Metadata Models - Suitable Metadata Models (in the BC Domain) – Is a "middleware-like" System such as BMF the Solution? - Workflow based on Metadata and their Models - Cross-modal Metadata modelling – the Way to semantic Data? - What can be expected from Research in the near and distant Future? - Transfer of professional Solutions to Consumer/Prosumer Applications - TVAnytime as the universal Model for the Consumer Side? 	Participants Roundtable Discussion <ul style="list-style-type: none"> - Prof. Nozha Boujemaa, INRIA - Reinhard Knoer, IRT - Henri Gouraud, Exalead S.A. - Michel Plu, France Télécom / Orange - Jean-Pierre Evain, EBU - Dr. Ingo Hoentsch, ITI - Stephan Schindler, Silex Media - Harald Brendel, ARRI Moderator: Christoph Dosch
15:30	Concluding Discussion – Q&A (How to deal with the Plethora of Metadata Models?)	all
16:00	Closure of the Workshop	



2.2 REPORT

The two-day metadata workshop started off with research issues. Prof. Nozha Boujemaa presented state of the art in automatic/semi-automatic generation of metadata, followed by Dr. Yiannis Kompatsiaris' presentation presenting the combination of MPEG-7 and the semantic web as a solution for semantic metadata interoperability problems. More specific research project presentations followed. Felix Zielke presented project LIVE's approach to producing more than one stream of content to viewers, combining manual, automatic and semi-automatic methods for meta data generation also for live content. Werner Bailer discussed metadata issues in relation to projects, IPRacine, K-Space and PrestoSpace, suggesting more semantics – ontologies to solve problems of interoperability. Project Pharos, presented by Michel Plu, exemplified the use of an AV-RSS that lets users subscribe to queries while content publishers only need to publish content descriptions once.

Holger Grossman presented project DIVAS' method of extracting metadata from compressed data files with little information loss. Project MESH was presented by Franciska de Jong who discussed how text analysis of transcribed spoken audio can help in creating and disambiguating semantic metadata for audio-visual material. Finally, Marc Sanderson presented project TRIPOD's automatic image caption creation, combining simple metadata captured by the device – in this case, a camera equipped with GPS and direction sensors – with full text descriptions extracted from web pages.

Although addressing very different problems within the area of audio-visual/multimedia production and archiving, all project presentations strongly argued for the importance of using metadata. Other commonalities were a) interoperability issues, where MPEG-7 was put forward as an important component in the achievement of interoperability; and b) the importance of combining manually and automatically generated metadata, not least to aid in the disambiguation process.

Interoperability continued to be a common theme in subsequent sessions on applications and industrial developments (see agenda below). Jean-Pierre Evain discussed metadata standards for broadcasters, both B2B and B2C, arguing that there is currently a shift from exchange of content to search and retrieval. He concluded that metadata is key in allowing users on all levels to find the content that they need: "as a provider, if you cannot be found, you do not exist." Grigorio Dimino argued for the need of data models i.e. to achieve interoperability with standards and to separate editorial content from the content itself. Alberto Messina dealt with the problem of knowledge transfer from research to practice, arriving at the conclusion that user requirements and text guidelines are needed along with application oriented reference material as well as concrete dissemination and education activities. Andreas Ebner discussed the evolution of metadata from yesterday's record cards to today, where essence is stored away from its metadata; metadata often comes into existence prior to the content that it describes. Dr. Ebner strongly argued for metadata, not least as a means to integrate the editorial and production processes. Richard Knör enforced the importance of analyzing the production process in relation to metadata creation and informed about EBU work on standards for metadata in the acquisition phase, leading to requirements on camcorders, for automatic as well as manual metadata creation. Dr. Ebner, Rico Zimmerman and Ingo Höntsch described BNF, a broadcast metadata format building on the MXF standard.

In the session on industrial developments, Steny Solitude from SKEMA saw two new challenges: the evolution of new AV platforms and the evolution of new formats for TV programs. To meet this evolution, he claimed that interoperable system will need "semantic" metadata (in the same sense as for the "semantic" web). Skema's solution to this is to provide content with an intelligent media wrapper that increases the mobility of and access to content throughout its life cycle. Colin Moorcraft from onTV Europe took an end-user perspective and argued for building on the TV anytime model, while it handles storage in a way that makes sense to the end-user. He discussed onTV's "Babel fish" role of converting between formats and integrating manually and automatically derived metadata from many sources, and stressed the importance of handling IPR in the IPTV scenario. John Foster, Silex Media, described work at the Danish Radio (DR) where the on-line archive has been integrated with work-in-progress since 2003. Examples were shown of the working system that also supports metadata annotations as a natural part of the production work. Franziska Mauermann from Solutions for Media (S4M) described their video publishing management system used in the context of a multilingual playout center. Using a well defined metadata model, the system integrates different "production islands" and allows content to be shared without copying. Martin Pistor from VCS also advocated a middleware solution to enable all kinds of stakeholders to participate and contribute to the production process. Universal metadata models give us a common intellectual basis but should not be

regarded as absolute system requirements. Finally, John Jordan from Siemens described Siemens work with arriving at a common corporate standard.

To summarize the two sessions on applications and on industrial developments, the production process was given much attention, focusing on the exchange of audiovisual material between “production islands” within one organization as well as between different organizations taking part in the production process. Presenters were pointing at this plethora of models and standards already available, drawing the pragmatic conclusion that inventing a new one is not a creative solution. Neither is it practically feasible to impose the use of a particular model on all actors. The general solution advocated was instead to create a middle layer. Any actor will then only have to adapt to the middle layer, not to every other actor, greatly facilitating the information exchange. Many examples were shown, for example the BMF model proposed by the IRT and the TV anytime initiative presented by the EBU.

The workshop ended with a panel. Among others, the question of search in content vs. search in metadata was discussed. General agreement was reached that metadata should be made available as freely as possible, while keeping the content itself – the essence – appropriately protected. In conclusion, the host Christoph Dosch, IRT, announced that a follow workshop focusing on the usage of metadata is planned for mid-2008, and invited the audience to participate in this future event.

2.3 PRESENTATIONS

- State-of-the-art in automatic/semi-automatic Generation of Metadata
Prof. Nozha Boujemaa, INRIA
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Boujemaa.pdf
- MPEG-7 Interoperability and the Semantic Web
Dr. Yiannis Kompatsiaris, ITI
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Kompatsiaris.pdf
- Live Staging of Media Events The Metadata View
Tobias Buerger and Georg Guentner, Salzburg Research, Felix Zielke, Fraunhofer IAIS
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Buerger_Guentner_Zielke.pdf
- Interoperability of Multimedia Metadata
Werner Bailer, JOANNEUM RESEARCH
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Bailer.pdf
- Publishing Audiovisual Content Metadata for Monitoring and Searching in Distributed Open Spaces
Michel Plu, France Télécom / Orange Labs
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Plu.pdf

- Transcoding Compressed Audio into MPEG-7 Fingerprints
Holger Grossmann, Fraunhofer IDMT
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Grossmann.pdf
- How to exploit spoken Audio as Source for the automatic Generation of semantic Metadata for Video
Franciska de Jong, University Twente
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_deJong.pdf
- The Automatic Captioning of Photographs
Mark Sanderson
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Sanderson.pdf
- Mark Sanderson, University of Sheffield Chorus Metadata Standards in Broadcasting and EBU
Jean-Pierre Evain, EBU
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Evain.pdf
- Metadata Models in the Audiovisual Domain
Giorgio Dimino, RAI Research Centre
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Dimino.pdf
- Evaluation of Automatic Information Extraction Tools for Broadcast Production
Alberto Messina, RAI
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Messina.pdf
- Need for Structured Metadata in Television Production and Archiving
Andreas Ebner, IRT
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Ebner.pdf
- Controlled Metadata Flow for the Acquisition of AV Content
Reinhard Knoer, IRT
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Knoer.pdf
- BMF - the future Broadcast Metadata exchange Format?
Andreas Ebner, Rico Zimmermann, Dr. Ingo Hoentsch, IRT
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Ebner_Zimmermann_Hoentsch.pdf

- Ingest of Metadata in Tape-less Production
Irene Kayser, Hessischer Rundfunk
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Kayser_presented_by_Ebner.pdf
- Metadata in Audio-Visual/Multimedia Productions and Archiving
Steny Solitude (Co-founder, Associate and CTO of Skema)
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Solitude.pdf
- Standards-Based Metadata Management for Networked Digital Media Archives
Colin Moorcraft, onTV Europe
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Moorcraft.pdf
- DR Case Study Windows on Metadata
John Foster, Silex Media
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Foster.pdf
- VPMS in Multilingual Playout Centre
Franziska Mauermann, S4M - Solutions for Media
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Mauermann.pdf
- Evolution of Metadata Models in heterogenous Broadcast environments
Martin Pistor, VCS
http://www.ist-chorus.org/_events_RTF/documents/WSChorus_Pistor.pdf
- The Metadata Integration Journey for Digital Media
John Jordan, Siemens Global Media Consulting

ANNEX 1 : PARTICIPANTS LIST IN MULTIMEDIA CONTENT DESCRIPTION AND RETRIEVAL, GENEVA, OCTOBER 10TH, 2007

NAME & First Name	Company	Country
1 ALFARO Antonio	Rose Vision	Spain
2 ANANIA Loretta	European Commission	Belgium
3 AUDOUARD Benoît	Canal+	France
4 BERHMANN Malte	EGDF	Germany
5 BLUME Horst	German Aerospace Center, Project Management Agency	Germany
6 BOUJEMAA Nozha	INRIA	France
7 BOURLARD Hervé	IM2	Switzerland
8 BRERETON Sian	The Technology Strategy Board	UK
9 CAMPOS Fernando	Mundo AV	Spain
10 CENCIONI Roberto	European Commission	Luxembourg
11 CORDARA Giovanni	Telecom Italia	Italy
12 DARAS Petros	CERTH	Greece
13 DJELALIAN Jean-Charles	European Commission DG Competition	Belgium
14 DOSCH Christoph	IRT	Germany
15 DOUMENIS Gregory	ICCS/NTUA	Greece
16 DUFAUX Frédéric	EPFL	Switzerland
17 EDWARDES Alistair	University of Zurich	Switzerland
18 ESTRADA Francisco. J	EPFL	Switzerland
19 EVAÏN Jean-Pierre	EBU	Switzerland
20 FAVRE Philippe	SERIAL SA	Switzerland
21 FINAT CODES Javier Dr.	University of Valladolid	Spain
22 FRANCINI Gianluca	Telecom Italia	Italy
23 GARCIA Gonzalo	Geovirtual S.L.	Spain
24 GARCIA MORATE Diego	University of Valladolid	Spain
25 GATICA-PEREZ Daniel	IDIAP	Switzerland
26 GAUCHERON Jean-Francois	Agence France Presse	France
27 GERNERT Regine	Federal Ministry of Economics and Technology	Germany
28 GEURTS Joost	INRIA	France
29 GOURAUD Henri	Exalead	France
30 GROS Patrick	INRIA	France
31 GROSSMAN Holger	Fraunhofer IDMT	Germany
32 GUIGNARD Jean Pierre	ESA	Italy
33 GUSMEROLI Sergio	TXT e-Solutions SpA	Italy
34 HAAS Werner	Joanneum Research	Austria
35 HAGEGE Caroline	XEROX Research Centre Europe	France
36 HO-HUNE Patricia	ERCIM GEIE	France
37 JIN Shan	Technical University of Berlin	Germany
38 JOHANSEN Dag	University of Tromsø	Norway
39 KARLGREN Jussi	SICS	Sweden
40 KAVLIE Dag	The Research Council of Norway	Norway
41 KERSTEN Martin	Multimedien	Netherlands



42 KOEHLER Joachim	Fraunhofer IAIS	Germany
43 KOHNERT Werner	Deutsches Zentrum fur luft - und Raumfahrt	Germany

NAME & First Name	Company	Country
44 KOMPATSIARIS Yiannis	CERTH	Greece
45 KONING Ilse	Ministry of Education, Culture and Science	Netherlands
46 KONSTANTAS Dimitri	University of Geneva	Switzerland
47 KRIEGLER Hans Pieter	Institute for Informatics, University of Munich	Germany
48 LE MOINE Jean Yves	JCP-Consult	France
49 LEMONIER Michel	Agence de L'Innovation Industrielle	Switzerland
50 LIEBHERR Charles	Schweiter Radio DRS	France
51 LOYER Michel	INRIA	Switzerland
52 MARINI Simone	IMATI-CNR	Italy
53 MARTINI Giovanni	Telecom Italia	Switzerland
54 MIJIC Ljiljana	LM Information Technology	Slovenia
55 MISLEJ Sebastjan	Jozef Stefan Institute	Germany
56 MODARESSI TEHRANI Darius		France
57 NIESSEN Thomas	empolis GmbH	Germany
58 ORTGIES Robert	IRT	Germany
59 PANAREDA Marçal	Mundo AV	Spain
60 POINT Jean-Charles	JCP-Consult	France
61 PORTER Gary	Pace Micro Technology plc	UK
62 RAJMAN Martin	EPFL	Switzerland
63 RECOURCÉ Gaëlle	Sinequa	France
64 RIESTRA Ruben	Inmark	Spain
65 RODRIGUEZ-ROSELLO Luis	European Commission	Belgium
66 RONCHAUD Remi	VITALIS	France
67 SCHWARZ DE SILVA Joao	European Commission	Belgium
68 SCHAEFER Ralf	HHI	Germany
69 SPYROPOULOS Constantine	NCSR "DEMOKRITOS"	Greece
70 STEWART Craig	Queen Mary, University of London	UK
71 TRAPHOENER Ralph	empolis GmbH	Germany
72 TZOVARAS Dimitrios	Informatics and Telematics Institute	Greece
73 VAN DER LINDEN Pieter	Thomson	France
74 VLASTISLAV Dohnal	Faculty of Informatics, Masaryk Univesrity	Czech Republic
75 VOS Johan	Multimedien	Netherlands



ANNEX 2: PARTICIPANTS LIST IN THE METADATA WORKSHOP IN MUNICH 21-22ND NOVEMBER 2007



Participants	Nikos	Achilleopoulos	Archetypon S.A.
	Peter	Altendorf	IRT
Dr.	Loretta	Anania	European Commission - INFSO D2
	Francis	Bodson	BeTV
	Sebastian	Brings	Silex Media
	Jürgen	Bühler	Thomson
	Sebastien	Campion	INRIA
	Volker	Carstensen	NDR
Dr.	Ramón	Compañó	JRC-IPTS European Commission
	Vincenzo	Croce	Engineering I.I. S.p.a.
	Alexander	Engelhardt	ProSiebenSat.1
	Dieter	Franz	DME Die Medien Experten
	Leonhard	Geiger	S4M - Solutions for Media
Dr.	Katharina	Giesen	BR
	Axel	Götzke	Thomson
	Henri	Gouraud	Exalead S.A.
	Harald	Greiner	Siemens
	André	Guthannß	MDR
	Klaus	Hellmich	D.A.V.I.D.
	Christian	Hentschel	HHI - Fraunhofer
	Siegbert	Herla	IRT
Dr.	Benoit	Huet	Institut Eurecom
Dr.	Andreas	Hutter	Siemens
	Bouke	Huurnink	University Amsterdam
	Christoph	Jung	Fraunhofer IGD
	Paul	King	Informatics Telematics Institute, CERTH
	Mary-Ellen	Kitchens	BR
	Thomas	Kitchens	
	Dominic	Hoffmann	SWR
	Hans	Lange	SWR
	Jean Yves	Le Moine	JCP-Consult
	Rainer	Lienhart	University Augsburg
	Hao	Liu	University Eindhoven
	Gorka	Marcos	VICOMTech
	Roland	Mies	IRT
Dr.	Karsten	Müller	Fraunhofer HHI
Dr.	Jan	Nesvadba	Philips
	Ralf	Neudel	IRT
	Holger	Noske	S4M - Solutions for Media
	Robert	Ortgies	IRT
	Céline	Poudat	Sinequa
	Bernd	Rieger	HansNet
	Roger	Roberts	RTBF
	Jan	Röder	TU Ilmenau
	Boris	Rotenberg	European Commission - DG JRC - IPTS
Dr.	Asa	Rudström	SICS
	Philipp	Sandhaus	OFFIS - Institute for Information Technology
Prof.	Dietrich	Sauter	IRT
Dr.	Rainer	Schäfer	IRT
	Johannes	Scheuerer	IRT
	Birgit	Schröter	IRT
	Mary Anne	Scott	
	Manfred	Seidenthal	IRT
	Gerhard	Stanz	ORF
	Mardiros	Tavit	ProSiebenSat.1

Mary Anne	Scott	
Manfred	Seidenthal	IRT
Gerhard	Stanz	ORF
Mardiros	Tavit	ProSiebenSat.1

Dr.	Christian	Timmerer	University Klagenfurt
	Gregor	van den Boogaart	University Augsburg
	Bernd	Weltrowski	S4M - Solutions for Media
	Michael	Wenleder	IRT
	Frank	Wieland	Plazamedia
Dr.	Henning	Wilkens	erstwhile IRT

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