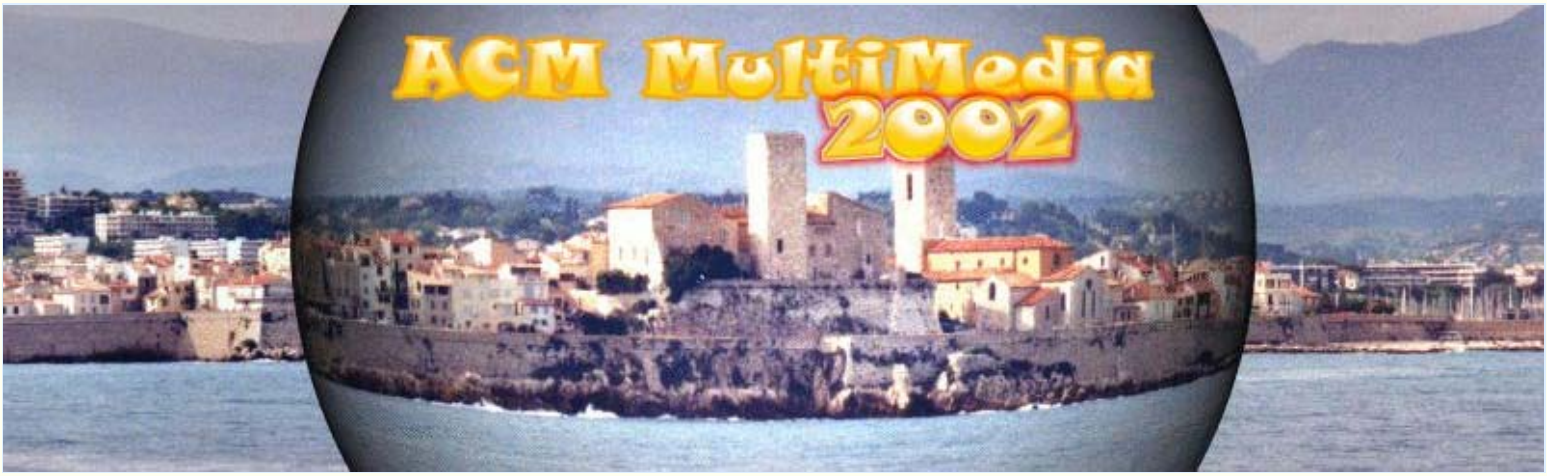


SIGMM
Special Interest Group
on Multimedia

ACM MultiMedia 2002
Juan Les Pins, France
December 1-6, 2002

(This site is mirrored in Europe and in the USA)

ACM Multimedia 2003 will be located in San Francisco, Ca, on Nov 2-7, 2003.

ACM Multimedia 2002 was held from December 1st to December 6th, 2002, in Juan-les-Pins on the French Riviera, renown for its beaches facing the azure Mediterranean, its proximity to Provence and the Alps, its sunny and mild winter climate, its sunsets, and its fine wine and dining. The Riviera is also the home of the Cannes Film Festival, an annual multimedia event. The conference location is only 8 miles away from Nice International Airport, the second largest airport in France, yet it is a quiet place along the seaside close to such spectacular spots as the Cap d'Antibes.

The conference location was chosen because of its attractiveness and its proximity with near Sophia Antipolis , a major European center for computer technology, communications and

Travel and Accomodations

Sponsors

SIGMM

Related Conferences:

- **MM 2003**
- **MM 2001**
- **MM 2000**
- **MM 1999**

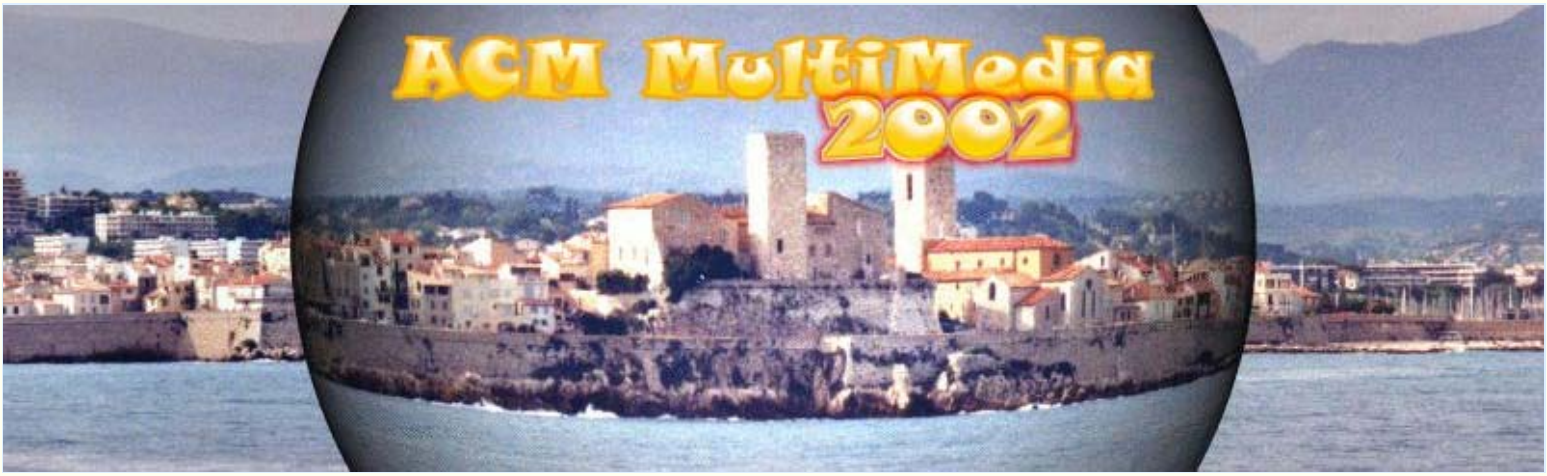
multimedia, which includes major research organizations such as INRIA, EURECOM and the W3C, as well as major industrial employers such as Amadeus, IBM, Motorola, Siemens, France Telecom, and Texas Instruments.

The conference complemented this setting by presenting and exploring technological advancements in multimedia. Technical issues, theory and practice, as well as artistic and consumer innovations will bring together researchers, developers, educators, and practitioners of multimedia.

Participate in **ACM Multimedia Conferences** and define the future of multimedia.

If you wish to receive further announcements for the ACM Multimedia conferences, you can register by sending a mail to mm02-info@eurecom.fr with SUBSCRIBE in the subject line.

This page was last updated on January 20, 2003.



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This page was last updated on January 20, 2003.

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Doctoral Symposium Chair	Thierry Turletti *INRIA* Thierry.Turletti@sophia.inria.fr
Tutorial Chairs	Wolfgang Effelsberg *Univ Mannheim* effelsberg@informatik.uni-mannheim.de Jean-Luc Dugelay *Institut EURECOM* Jean-Luc.Dugelay@eurecom.fr
Video Program Chair	Lynn Wilcox *FX Palo Alto Lab* wilcox@pal.xerox.com
Workshop Chair	Nozha Boujemaa *INRIA* Nozha.Boujemaa@inria.fr

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This page was last updated on November 7, 2001.

SUBMISSION PROCEDURES

The deadline for video submission (which is a new item this year) has been extended to **August 9th, 2002.** All other submissions to the ACM Multimedia 2002 Conference are now closed.

Papers submission

Submissions are closed. Authors will be notified regarding acceptance on or around July 7th, and will be required to return the revised camera-ready copy and complete the registration form (at least one author per paper), by August 31st, 2002.

Tutorials submission

Submissions are closed. Authors will be notified regarding acceptance on or around July 7th.

Workshops submission

Submissions are closed. Authors will be notified regarding acceptance on or around July 7th.

Panels submission

Submissions are closed. Authors will be notified regarding acceptance on or around July 7th.

Short papers and Posters submission

Submissions are closed. Authors will be notified regarding acceptance on or around August 31st. Authors of accepted demonstrations will be required to return the final form, copyright transfer form and complete the registration form (at least one author per demonstration), by September 30th, 2002.

Doctoral Symposium submission

Submissions are closed. Authors will be notified regarding acceptance on or around August 31st. Authors of accepted doctoral presentations will be required to return the final form, copyright transfer form and complete the registration form (at least one author per presentation), by September 30th, 2002.

(Authors of accepted doctoral presentations will be offered a free admission for one of the tutorials of the conference).

Video submission ** *extended to August 9th* **

Videos are invited that illustrate original multimedia tools, systems, or applications. Accepted videos will be published on CDROM and displayed during the conference, the associated paper descriptions (for video demonstrations) will be published in the Video section of the Proceedings.

There are two categories of video submissions for ACM Multimedia:

- **Video Figures** serve as an illustration for a regular or short paper submission, and should be less than 3 minutes in length. Acceptance of the video submission will be based on the quality of the video and the acceptance of the related paper submission.
- **Video Demonstrations** show a tool, system, or application in detail. It should be self-explanatory, and should be a maximum of 8 minutes in length. A 2-page paper explaining the demonstration must accompany video demonstrations and will be published in the Video section of the Proceedings.

Submission instructions:

- Prepare video for review on a CD in MPEG-1 format (preferred) or on VHS tape
- Prepare a cover sheet with title, authors, affiliations, address, and primary contact. Indicate the type of submission (video figure or demonstration). For video figures, indentify the related paper or short paper submission.
- For video demonstrations, prepare a 2-page description (using the ACM template)
- Mail video, cover sheet and eventual 2-page description to:

Lynn Wilcox
FX Palo Alto Lab
3400 Hillview Ave. Bldg. 4
Palo Alto, CA 94306
wilcox@pal.xerox.com

The new submission deadline is **August 9th, 2002**

Authors will be notified of acceptance by **August 31st, 2002**. Authors of accepted videos will be required to sign copyright to ACM. An author who embeds an object such as an art image, copyrighted by third party, is expected to obtain that party's permission to include the object with the understanding that the entire work may be distributed as a unity to ACM members and others.

Final versions of the video and electronic version of associated 2-page paper (for Video Demonstrations) will be due by **September 30th, 2002.**

This page was last modified on July 8th, 2002.

INSTRUCTIONS FOR PRESENTERS

Authors of accepted contributions to the ACM Multimedia 2002 Conference should follow the following guidelines to prepare their presentations.

Always check the notice board near the registration desk for last minute notifications.

Full Papers

Presentations will last 30 minutes for each paper, questions included. Please allow a few minutes to change speakers.

An overhead projector and a video projector will be available in each room. You have to bring your own PC. Please be present in the room 30 minutes before the beginning of the session to coordinate with the session chairman and to check the connections of your material with the projector.

Posters

The poster session is scheduled on Tuesday, December 3rd, 2002, from 18:00 to 20:00, together with the reception. It is located in the room CEZANNE (level 0 at the Hotel Ambassadeur).

The panels are 1m wide and 2m high, two posters will share three panels, so that each poster will have an available area of about 1.5mx1.5m. If your poster is not more than 1m, it will fit on a single panel. Pins and scotch band to fix the posters will be provided.

Panels will be numbered. Check the number of your poster at the entrance of the room to use the proper location.

For any question, ask the poster chair Stephane Marchand-Maillet

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Demonstrations

Demonstrations will take place in rooms MONET-RENOIR. There will be two demonstration sessions, one on Tuesday, December 3, one on Wednesday, December 4. Each session lasts from 13:00 to 18:00. Demonstrators are **invited** to be present near their demo during the time of the technical sessions, and **required** to be present during pauses and breaks.

Each demo will be provided with one table (enough to fit one PC plus some papers), two chairs, power supply and one panel (1m wide) for posting.

If you have questions, please ask the local demo chair Jean-Luc Dugelay

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Doctoral Symposium

The Doctoral Symposium will take place on Thursday, 5 December, 2002, in the afternoon. Each selected student will have a time slot of approximately 45 minutes to explain the motivation, results, research difficulties and issues, of his/her work. The audience will participate in the discussion of those issues.

The environment available for presentation is the same as for the full papers.

This page was last modified on November 14th, 2002.

REGISTRATION

Conference Registration

Note: From now on, only onsite registration is possible. Registration forms are no longer processed.

The conference contains several events:

- the tutorial program (December 1-2, 2002),
- the technical program (December 3-5, 2002),
- the workshops (December 6, 2002).

You can register to one or more of those events. There is no quota on the number of participants.

The conference registration fee covers:

- the access to the technical program (presentation of papers, posters),
- the access to the technical demonstrations,
- the access to the reception on December 3rd, 2002,
- the access to the conference banquet on December 4th, 2002,
- a printed copy of the conference proceedings,
- a CD with the electronic proceedings.

REGISTRATION FEES IN EUROS:

Conference fees	
ACM Member	580
Non ACM Member	740
Student	310
Tutorials	
ACM Member - Full day tutorial	510
ACM Member - Half day tutorial	320
Non ACM Member - Full day tutorial	630
Non ACM Member - Half day tutorial	370
Workshops	
ACM Member	130

Non ACM Member	160
Student	110

REGISTRATION DESK SCHEDULE:

Sunday, Dec 1st	8:00 - 17:00
Monday, Dec 2nd	8:00 - 19:00
Tuesday, Dec 3rd	7:30 - 17:00
Wednesday, Dec 4th	8:00 - 17:00
Thursday, Dec 5th	8:00 - 17:00
Friday, Dec 6th	8:00 - 12:00

For any question about conference registration, please contact the ACM Multimedia registration office .

Hotel Information

The conference will take place at the Hotel Ambassadeur in Juan-les-Pins, France, and in the adjacent Palais des Congrès (Convention Center).

A block of rooms have been reserved in the hotel at a discount rate of 110 euros per room per night (single occupancy), including breakfast. To take advantage of this rate, you should fill the following reservation form (PDF) (also available in Postscript format), and fax it to the hotel:

```
Hôtel Ambassadeur
Attention: Catherine Jenoudet
50-52, chemin des Sables
B.P. 49
06161 Juan-Les-Pins Cedex
FRANCE

Fax : +33 (0)4 93 67 79 85
```

For any question about hotel reservation, please contact the hotel representative .

This page was last modified on November 26th, 2002.

ACM MULTIMEDIA 2002 PROGRAM

The schedule of the ACM Multimedia 2002 conference is the following:

Sunday, Dec 1st	Tutorials, day 1
Monday, Dec 2nd	Tutorials, day 2
Tuesday, Dec 3rd	Technical Program, day 1
Wednesday, Dec 4th	Technical Program, day 2
Thursday, Dec 5th	Technical Program, day 3 Doctoral Symposium
Friday, Dec 6th	Workshops

The conference will be held in Juan-les-Pins, France, at the Hotel Ambassadeur and Palais des Congrès.

This page was last modified on September 30th, 2002.

Tutorial Program

The tutorial program of the ACM Multimedia 2002 conference is an opportunity to get information on the latest developments of the field, exposed by leading experts.

Please refer to the appropriate tutorial ID for your subscription to an event.

Sunday, December 1st, 2002			
Morning 9:00 - 12:30	**TS1** (full day) Multimedia Technologies and Applications in the New Internet World Nicolas Georganas *(University of Ottawa, Canada)*	**TS2** Methodologies and Software Systems for e-Learning Timothy Shih *(Tamkang University, Taiwan)*	**TS3** Data Compression for Multimedia Jean-Luc Dugelay *(Institut EURECOM, France)*
Afternoon 14:00 - 17:30		**TS4** Learning Object Metadata: Supporting Share and Reuse Through Standardized Metadata Maciej Macowicz *(Ecole Polytechnique Federale de Lausanne, Switzerland)*	

Monday, December 2nd, 2002			
Morning 9:00 - 12:30	**TM1** Wireless Multimedia Borko Furht *(Florida Atlantic University, Boca Raton, USA)*		**TM3** SMIL 2.0: Interactive Multimedia on the Web Lloyd Rutledge *(CWI, Amsterdam)*
Afternoon 14:00 - 17:30	**TM4** The Evolution of Networking Protocols to Meet the Requirements of UMTS and 3G Services Ibrahim Haddad, Samer Hawwa *(Ericsson Research Canada)*	**TM5** Multimedia Content Protection in the Digital World Ahmet Eskicioglu *(City University of New York, NY, USA)*	**TM6** Content Networking - Architecture, Protocols and Practice Markus Hofmann *(Bell Labs Research / Lucent Technologies, Holmdel, NJ, USA)*

ACM Multimedia 2002 Technical Program

The Technical Program will take place from Tuesday, December 3rd, 2002 to Thursday, December 5th, 2002. A preliminary version of the schedule is available.

Sunday, Dec 1st	Tutorials, day 1
Monday, Dec 2nd	Tutorials, day 2
Tuesday, Dec 3rd	Technical Program, day 1
Wednesday, Dec 4th	Technical Program, day 2
Thursday, Dec 5th	Technical Program, day 3 Doctoral Symposium
Friday, Dec 6th	Workshops

The core of the ACM Multimedia 2002 Technical Program are the technical sessions where **technical papers** are presented by their authors. Those papers have been selected by the Conference Program Committee among the (very) large number of submissions that have been received. This drastic selection was operated after a very detailed review of the submissions, with the objective of giving to the conference attendants the most interesting information on the current status of Research and Development in Multimedia.

Beside the oral presentations, the technical program also includes:

- **short papers and posters** , which contain the latest innovations of the domain and will be presented in a poster sessions, to allow a strong interaction between the authors and the conference attendants.
- **technical demonstrations**, where researchers and companies will display some of their most significant prototypes and recent products.
- **videos of the video program** , which either illustrate the work described in some technical papers (video figures) or present complete systems (video demonstrations). A CD-ROM containing the videos will be distributed to the participants of the conference.

The following technical papers have been selected for oral presentation in the technical sessions of the conference:

1. **Rate Adaptation Transcoding for Precoded Video Streams** *"Zhijun Lei; Nicolas Georganas"*
2. **Experiences with Building Middleware for Audio and Visual Networked Home Appliances on Commodity Software** *Tatsuo Nakajima*
3. **Learning-based Linguistic Indexing of Pictures with 2-D MHMMs** *"James Wang; Jia Li"*
4. **Embedded Audio Coding (EAC) With Implicit Auditory Masking** *Jin Li*
5. **Cost-Effective Streaming Server Implementation Using Hi-Tactix** *Damien Le Moal*
6. **Temporal-Axis Personalization Techniques for Streaming Advertisement Delivery** *"Takashi Oshiba; Yuichi Koike; Masahiro Tabuchi; Tomonari Kamba"*
7. **Achieving Effective Floor Control with a Low-Bandwidth Gesture-Sensitive Videoconferencing System** *Milton Chen*
8. **PicToon: A Personalized Image-based Cartoon System** *"Hong Chen; Lin Liang; Yan Li; Yingqing Xu; Heung-Yeung Shum"*
9. **Speaker Change Detection and Tracking in Real-Time News Broadcasting Analysis** *"Lie Lu; Hong-Jiang Zhang"*
10. **Multimedia Content Screening using a Dual Watermarking and Fingerprinting System** *"Darko Kirovski; Henrique Malvar; Yacov Yacobi"*
11. **In-Home Access to Multimedia Content** *"Dario Teixeira; Yassine Faihe"*
12. **Creating Music Videos using Automatic Media Analysis** *"Jon Foote; Matt Cooper; Andreas Girgensohn"*
13. **Collages as Dynamic Summaries for News Video** *"Michael G. Christel; Alexander Hauptmann; Howard Wactlar; Tobun Ng"*
14. **Efficient Acoustic Index for Music Retrieval with various Degrees of Similarity** *Cheng Yang*
15. **Pixie: A Jukebox Architecture to Support Efficient Peer Content Exchange** *"Sami Rollins; Kevin Almeroth"*
16. **FLYSPEC: A Multi-User Video Camera System with Hybrid Human and Automatic Control** *"Qiong Liu; Don Kimber; Jon Foote; Lynn Wilcox; John Borezcky"*
17. **Digital Image Watermarking for Joint Ownership** *"Huiping Guo; Nicolas Georganas"*
18. **Detection and Removal of Lighting & Shaking Artifacts in Home Videos** *"Weiqi Yan; Mohan Kankanhalli"*
19. **Cross-Media Correlation: A Case Study of Navigated Hypermedia Documents** *"Herng-Yow Chen; Wei-Ta Chu"*
20. **Interaction with Broadcast Video** *"Mounir Tantaoui; Kien Hua; Simon Sheu"*
21. **IRW: An Incremental Representation for Image-Based Walkthroughs** *"David Gotz; Ketan Mayer-Patel; Dinesh Manocha"*
22. **A Case for a Multi-key Secure Video Proxy: Theory, Design and Implementation** *"Siu Fung Yeung; John C. S. Lui; David K. Y. Yau"*
23. **An MPEG Performance Model And Its Application To Adaptive Forward Error Correction** *"Ketan Mayer-Patel; Long Le; Georg Carle"*
24. **Content-based Organization and Visualization of Music Archives** *"Elias Pampalk; Andreas Rauber; Dieter Merkl"*
25. **A Teaching System of Japanese Sign Language Using Sign Language Recognition and Generation** *"Hirohiko Sagawa; Masaru Takeuchi"*
26. **Painting with Looks: Photographic images from video using quantimetric processing** *"Steve Mann; Corey Manders; James Fung"*
27. **Experiences in the design of the well, a group communication device for teleconviviality** *Nicolas Roussel*
28. **A Pluggable Service-to-Service Communication Mechanism for Home Multimedia Networks** *"Jin Nakazawa; Hideyuki Tokuda"*
29. **Multiple video object tracking in complex scenes** *"Andrea Cavallaro; Olivier Steiger; Touradj Ebrahimi"*
30. **An Effective Region-Based Image Retrieval Framework** *"Feng Jing; Mingjing Li; Hong-Jiang Zhang; Bo Zhang"*
31. **Multi-party Distributed Audio Service with TCP-fairness** *"Milena Radenkovic; Chris Greenhalg"*
32. **Missing data correction in still images and image sequences** *Raphael Bornard*
33. **Optimizing Hypervideo Navigation using a Markov Decision Process Approach** *"Romulus Grigoras; Vincent Charvillat; Matthijs Douze"*
34. **An Attention Model for Video Summarization** *"Yu-Fei Ma; Lie Lu; Hong-Jiang Zhang; Mingjing Li"*

35. **Retrieving actions embedded in video** *Tanveer Syeda-Mahmood*
36. **Tangible Viewpoints: A Physical Approach to Multimedia Stories** *"Ali Mazalek; Glorianna Davenport; Hiroshi Ishii"*
37. **Tile Size Transformation Algorithms for Wavelet Image Transcoding Gateway** *"Masayuki Hashimoto; Kenji Matsuo; Atsushi Koike; Yasuyuki Nakajima"*
38. **On the Choice of Similarity Measures for Image Retrieval by Example** *"Jean-Philippe Tarel; Sabri Boughorbel"*
39. **VQ-Index: An Index Structure for Similarity Searching in Multimedia Databases** *"Ertem Tuncel; Hakan Ferhatosmanoglu; Kenneth Rose"*
40. **DynDex: A Dynamic & Non-metric Space Indexer** *"Kingshy Goh; Beitao Li; Edward Chang"*
41. **Cooperative Run-time Management of Adaptive Applications and Distributed Resources** *"Christian Poellabauer; Hasan Abbasi; Karsten Schwan"*
42. **MAUI: A Multimodal Affective User Interface** *"Christine Lisetti; Fatma Nasoz"*
43. **Portable Meeting Recorder** *"Dar-Shyang Lee; Berna Erol; Jamey Graham; Jonathan Hull; Norihiko Murata"*
44. **A Utility Framework for the Automatic Generation of Audio-Visual Skims** *"Hari Sundaram; Lexing Xie; Shih-Fu Chang"*
45. **Distributed Meetings: A Meeting Capture and Broadcasting System** *Ross Cutler*
46. **A Programming Framework for Quality-Aware Ubiquitous Multimedia Applications** *"Duangdao Wichadakul; Xiaohui Gu; Klara Nahrstedt"*

This page was last modified on October 13, 2002.

ACM Multimedia 2002 Video Program

The ACM Multimedia 2002 Conference also includes a video program. Two types of videos have been selected:

- **Video Demonstrations** show a tool, system, or application in detail. They are self-explanatory, with a maximum of 8 minutes in length. They are described by a 2-page paper which is included in the proceedings.
- **Video Figures** serve as an illustration for a regular or short paper submission, and are typically less than 3 minutes in length.

A CD-ROM containing the Video program will be distributed to the participants of the conference. If possible, the videos will be displayed during the conference itself.

List of Video Demonstrations

VD1	**Construct 3D**	*Hannes Kaufmann*
VD2	**The Immersive Cockpit**	*Wai-Kwan Tang, Tien-Tsin Wong, Pheng-Ann Heng*
VD3	**A Hitchcock Assisted Video Edited Night at the Opera**	*John Doherty, Lynn Wilcox, Andreas Girgensohn*
VD4	**TheWSML System: Web-based Synchronization Multimedia Lecture System**	*Kuo-Yu Liu, Natalius Huang, Bo-Hung Wu, Wei-Ta Chu, Herng-Yow Chen*
VD5	**Body Brush**	*Horace Ip, Young Hay, Alex Tang*
VD6	**Interactive Guide to Valencia**	*Jose Gil, Ana Pont, Emilio Forcen*
VD7	**YIMA: Real-Time Multimedia Storage and Retrieval**	*Roger Zimmerman, Cyrus Shahabi, Kambiz Ghahremani*
VD8	**Post-hoc worknotes: A concept demo of video content management**	*Ola Andersson, Elenor Cacciatore, Jonas Lowgren, Thomas Lundin*

List of Video Figures

VF1	**Missing Data Correction in Still Images and Image Sequences**	*Raphael Bornard, Emmanuelle Lecan, Louis Laborelli, Jean-Hugues Chenot*
VF2	**Creating Music Videos using Automatic Media Analysis**	*Jonathan Foote, Matthew Cooper, Andreas Girgensohn*
VF3	**FLYSPEC: A Multi-user Video Camera System with Hybrid Human and Automatic Control**	*Qiong Liu, Don Kimber, Jonathan Foote, Lynn Wilcox, Chunyuan Liao, John Doherty*

This page was last modified on September 21th, 2002.

ACM Multimedia 2002 Doctoral Symposium

The Doctoral Symposium is an opportunity for students involved in the preparation of a PhD to interactively discuss their research issues with senior researchers. During the Doctoral Symposium, selected students will present their thesis topic, the work they have done so far and the results that they have obtained. They will also expose the difficulties, problems, questions, issues that they encounter in the continuation of their work. They will ask for the comments of the audience and the discussion of those points.

The Doctoral Symposium will take place on **Thursday afternoon, December 5th, 2002.**

The following presentations have been selected for the Doctoral Symposium:

1. Thesis Title A dynamic controller for optimal layering of video
   Student Aruna Thakur
   University Dep. of CS and EE, Lulea Univ of Tech., Sweden
   Advisor Lenka Motycokva Carr
2. Thesis Title Content adaptation of multimedia delivery and indexing using MPEG-7
   Student Mulugeta Libsie
   University Dep. of Information Tech., Univ Klagenfurt, Austria
   Advisor Prof H Kosch
3. Thesis Title Complexity management for video encoders
   Student Yafan Zhao
   University School of Eng, The Robert Gordon Univ, Aberdeen, UK
   Advisor Dr Iain G Richardson
4. Thesis Title Video telephony for the deaf: analysis & development of an optimised video compression product
   Student Laura J Muir
   University School of Eng, The Robert Gordon Univ, Aberdeen, UK
   Advisor Dr Iain G Richardson
5. Thesis Title An architecture for policy-based security management for distributed multimedia services
   Student Sandrine Duflos

University	LIP6, Paris, France
Advisor	Brigitte Kervella and Eric Horlait

This page was last modified on August 28th, 2002.

ACM Multimedia 2002 Workshops

The following workshops will be organized in conjunction with the ACM Multimedia 2002 conference.

- W1: Immersive Telepresence
- W2: Multimedia and Security
- W3: Multimedia Information Retrieval

The workshops will take place on **Friday, December 6th, 2002**. A specific registration is required for the participation to the workshops.

If you want more information on the contents of the workshops and how to actively participate, please visit the workshop websites and contact directly one of the organizers.

W1: Workshop on Immersive Telepresence

Organizers:

Gopal Pingali IBM T.J. Watson Research Center, NY, USA
Ramesh Jain Georgia Institute of Technology, USA

Refer to the Worshop web site for more detailed information.

Description: Areas of interest for this workshop include (but are not limited to):

- Design of telepresence systems
- Architecture of physical spaces to support telepresence
- Multimodal sensing (including cameras/computer vision, microphone arrays/acoustics, haptic sensors, active badges etc.)
- Multimodal presentation and display (including projection systems, flat panels, 3D graphics, 3D audio)
- Virtual and augmented reality
- Network infrastructure
- Spatio-temporal databases for telepresence
- Design of the telepresence experience
- User studies on effective telepresence
- Example systems for videoconferencing, virtual meetings, remote surveillance etc.

W2: Workshop on Multimedia and Security: Authentication, Secrecy, and Steganalysis

Organizers:

Jana Dittmann	Applied University Leipzig, Germany
Jessica Fridrich	SUNY Binghamton, NY, USA
Petra Wohlmacher	Regulatory Authority for Telecommunications and Posts, Germany

Refer to the Worshop web site for more detailed information.

Description: Based on the previous excellent experience of the last four workshops, the objectives of the workshop are

- Discussion of authentication technologies, both on the basis of fragile watermarks and combinations of perceptual fingerprints and robust watermarks for digital image, video, and audio data
- Discussion of reversible watermarking technologies, i.e. technologies where the origi-nal content can be completely restored. As a generalization, there appears to be a considerable interest in reversible watermarking methods with the additional property that embedding commutes with predefined degradation processing. This means that watermark removal after content degradation yields content with minimum degradation. The definition of parameter ranges (robust-ness, security, transparency, capacity, complexity) for different watermarking application areas;
- Steganalysis as method to detect media manipulations to embed hidden communication channels: Steganographic capacity for various embedding paradigms, identification of steganographic products, estimation of message size and its decoding, universal blind detectors for unknown steganographic methods, practical definition of steganographic security.
- Discussion of electronic signatures especially focused on ongoing processes of legislation and harmonization, but also definitions of requirements for technical equipment as well as their related security infrastructures, and interoperability aspects of electronic signature products. Particularly within the multimedia area there exist specific requirements.

W3: Workshop on Multimedia Information Retrieval

Organizers:

Prof. Sibel Adali	Rensselaer Polytechnic Institute
Prof. Yuichi Nakamura	University of Tsukuba, Japan
Dr. Uma Srinavasan	CSIRO, Sydney Australia

Refer to the Worshop web site for more detailed information.

Description:

Following the success of the three previous workshops, MISRM 1999, and MIR 2000, MIS 2001 all held in conjunction with the respective ACM Multimedia Conferences, we are organizing a fourth edition of the Inlt. Workshop on Multimedia Information Retrieval, MIR 2002, to be held jointly with ACM Multimedia 2002. Its purpose is to bring together researchers, developers and practitioners from academia and industry. The workshop will serve as a forum for discussion, presentation, and exploration of techniques, approaches and experiences in the field of multimedia information retrieval.

In order to have an application focus, this year we will have a special invited session on **Multimedia content-based retrieval for cultural heritage applications**. The special session will focus on content-based retrieval in the framework of cultural heritage applications and will be organized in cooperation with DELOS-NSF working group on "Digital Imagery for Significant Cultural and Historical Materials".

This page was last updated on August 27, 2002.

Travel Information

Conference Location

The ACM Multimedia 2002 Conference will be located in Juan-les-Pins (France), a famous resort location on the French Riviera, only 25 kilometers far from Nice.

The conference will take place at the

```
Hôtel Ambassadeur
50-52, chemin des Sables
B.P. 49 - 06161 Juan-Les-Pins Cedex
FRANCE
Tél. 33 (0)4 92 93 74 10 - Fax 33 (0)4 93 67 79 85
e-mail : manager@hotel-ambassadeur.com
```

and in the adjacent Palais des Congrès (Convention Center).

How to come to the conference

By plane

- fly to Nice Airport. This is the second largest international airport in France, with many direct connections to cities around the world.
- from the airport to the hotel, you have several possibilities:
  - take a taxi. This is the most convenient solution, although more expensive. This will take about 20-25 minutes (depending on traffic) and will cost around 50 euros.
  - take a local bus. There is no hotel shuttle, but one local bus route goes from the airport to Juan-les-Pins. The ticket will be around 7.5 euros.

- rent a car. This is specially interesting if you intend to visit the area and make some trips along the coast or in the beautiful back-country. From the airport, follow the signs to the Higway towards Cannes (there will be a toll at the exit) then follow the road instructions.

By train

There is a small railway station in Juan-les-Pins, but only local trains stop there. **Warning**: do not confuse "Juan-les-Pins" with "Antibes" or "Antibes-Juan-les-Pins". Juan-les-Pins is a neighborhood of the city of Antibes. The city itself is sometimes called Antibes-Juan-les-Pins. There is a larger railway station in Antibes, where all long distance trains stop.

So, in summary, you should:

- take a long distance train up to **Antibes** (if you arrive from the east) or **Cannes** (if you arrive from the west). You can find the complete train schedule on the SNCF (French Railways) web site .
- take a local train up to **Juan-les-Pins**.
- the hotel is about 300 meters far from the railway station. Just take a look at the map.

By road

(Those instructions were kindly provided by the Hotel Ambassadeur).

If you come by car, you should somehow get to the A8 motorway, which is the main highway along the coast. Remember that most highways in France are not free, so prepare some change for the tolls (but credit cards are accepted also).

- From the A8 motorway, take Exit N° 44 "ANTIBES - JUAN LES PINS". Then follow the signs for "ANTIBES CENTRE VILLE".
- In the town centre, follow signs for the "OFFICE DU TOURISME" which is on the Place de Gaulle square.
- As you reach the Place de Gaulle, follow signs to "JUAN LES PINS - LES PLAGES" along the Boulevard Albert 1er.
- At the end of the Boulevard Albert 1er, turn right and follow the signs to "JUAN LES PINS DIRECT" (you are on Boulevard Maréchal LECLERC).
- At the roundabout, follow the signs heading right to "PALAIS DES CONGRES" along the Boulevard du Cap and you will reach the Chemin des Sables; the Hotel AMBASSADEUR is 500 metres further along on the right.
- That's it. There is a public covered parking right next to the hotel. Here is a map to assist you.

Hotel Accomodations

The area is very touristic, and there are many hotels around. Although this is the low season are some facilities might be closed, specially the smaller ones, you will have no difficulty in finding a place to satisfy your needs.

We recommend to use the Conference Hotel, for which we have negociated a discount rate of 110 euros per room per night (single occupancy), including breakfast. A block of rooms have been reserved until October 31st, 2002. To take advantage of this rate, you should fill the following reservation form (PDF) (also available in Postscript format), and fax it to the hotel:

```
Hôtel Ambassadeur
Attention: Catherine Jenoudet
50-52, chemin des Sables
```

```
B.P. 49
06161 Juan-Les-Pins Cedex
FRANCE

Fax : +33 (0)4 93 67 79 85
```

For any question about hotel reservation, please contact the hotel representative .

Tourist Information

The whole area is very touristic. Following are some web sites which might assist you if you intend to wander in the area.

- Tourist Office of Antibes-Juan-les-Pins.
- Tourist Office of Cannes.
- Tourist Office of Nice.
- Tourist Guide for the French Riviera.

This page was last modified on August 27th, 2002.

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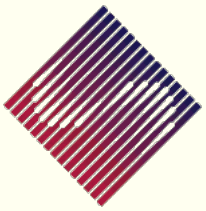

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If you would like to sponsor the conference, please contact us.

ACM MULTIMEDIA 2002
1-6 December, 2002
Juan-les-Pins – FRANCE

Hotel Reservation Form

The ACM Multimedia 2002 Conference will take place at the Hotel Ambassadeur, in Juan-les-Pins, France. A block of guestrooms has been secured at the Hotel Ambassadeur from November 30 up to and including Friday December 6, 2001, at a discount rate of 110 € (euros)* per room per night (single occupancy), including breakfast. These rates can be extended (subject to availability) from November 28 to December 8. This rate is only valid for registered conference attendees until October 31, 2002.

Last Name	First Name	
Title/Department	Company/Organization	
Address		
City	Country	Postal/ZIP Code
Phone	Fax	Email

Date of arrival: _____
Date of departure: _____

Send the completed registration form to:

Hôtel Ambassadeur
Attention: Catherine Jenoudet
50-52, chemin des Sables
B.P. 49 - 06161 Juan-Les-Pins Cedex, FRANCE
Tel. 33 (0)4 92 93 74 10 - Fax 33 (0)4 93 67 79 85
Email : cjenoudet@hotel-ambassadeur.com

Reservations have to be secured with a credit card :

☐ VISA Credit Card # Expiry Date:

☐ Mastercard Card Holder Name:

☐ American Express Signature:

Cancellation policy (*notification should be done by fax or email*):

- If cancelled more than 48 hours in advance: no fee
- If cancelled between 48 hours and arrival: one night fee
- In case of no-show: two nights fee

* This rate does not include the Local City Tax (1,07 € per person per day), room upgrades or extra individual expenses.

Tutorial TS1
Multimedia Technologies and Applications in the new Internet World

Full day, Level Introductory

Lecturer

Nicolas D. Georganas, FRSC , FIEEE
Canada Research Chair in Information Technology
Distinguished University Professor
Multimedia Communications Research Laboratory (MCRLab)
School of Information Technology and Engineering (SITE)
University of Ottawa
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Tel: +1 -613-562-5800 Ext 6225 (Secretary - 6132)
Fax:+1-613-562 5175
e-mail: georganas@mcrlab.uottawa.ca
http://www.mcrlab.uottawa.ca/

Abstract

This tutorial is for beginners in multimedia and its objective is to present the state-of-the-art in multimedia enabling technologies and services, with emphasis on the Internet wireline and wireless world. It will also demonstrate new multimedia applications in e-commerce, tele-collaboration, tele-training and tele-medicine using Collaborative Virtual Reality. It will cover the fundamental multimedia topics, enhanced with video clips of international project developments:

- Introduction, Applications
- Networking Technologies (LAN, MAN, WLAN, HAN, WAN, ATM, IP)
- Multimedia to the home (DSL, cable,wireless,...)
- Image, Video and Audio Compression
- Multimedia Synchronization
- Multimedia and the Internet: IP and other protocols, QoS provision, Mobile IP, WAP, applications
- Multimedia conferencing and collaboration tools
- e-commerce and Security issues
- Digital Watermarking for Multimedia

Virtual Reality and Collaborative Virtual Environments & applications

Detailed Outline Part I:

Introduction
Recent history of multimedia technologies
Business and home multimedia applications
Multimedia networking Market
Networking Technology for Multimedia
Local Area Networks (LAN):
"legacy" LANs (Ethernet, Token Ring)
FDDI, FDDI-II
Switched Ethernet
Isochronous Ethernet (IEEE 802.9)
Fast Ethernet (100 Mbps)
100 VG-AnyLAN
Gigabit Ethernet (IEEE 802.3z)
Wireless LANs and Wireless Personal Area Networks
IEEE 802.11
Bluetooth
IEEE 802.15
HomeRF
Wide Area Networking (WAN)
Key WAN Services for Multimedia
Bridges and Routers
X.25 and Frame Relay
ATM Networking
Brief review of N-ISDN, B-ISDN , ATM.
Adaptation layer (AAL) for different ATM classes of service
ATM comparisons with other technologies
Multimedia to the Home
Access Technologies: Telephone, DSL, Cable, Wireless cable
Fiber-in-the-loop, Fiber-to-the-home, Hybrid Fiber-coax

Digital Image and Video Compression in Multimedia Communications
Compression needs in Multimedia
Video services, bandwidth and storage needs
Image and video coding standards: JPEG, MPEG-1, MPEG-2, MPEG-4, MPEG-7, H.261, H.263
Software Compression/Decompression

Multimedia Synchronisation
Basic synchronization concepts and methods
Synchronization Quality of Service (QoS) Parameters
Synchronized Multimedia Integration Language (SMIL)

Detailed Outline Part II:

Multimedia and the Internet
OSI reference model
Internet Protocols: TCP, UDP, IP, IPv6
Mobile IP
Unicast, Broadcast, Multicast
Protocol requirements for multimedia
RSVP
Real Time Transport protocol (RTP, RTCP)
QoS provisioning over IP networks: IntServ, DiffServ
Internet telephony, Internet Fax
WWW, HTML, XML, Java
Real Time Streaming Protocol (RTSP)
Government concerns on Web usage

Wiresess Internet and Wireless application Protocol (WAP)

Multimedia conferencing and collaboration tools
Conferencing standards
Conferencing market evolution
Conferencing systems
Tele-collaboration tools

e-Commerce and e-Security
Cryptography
Public key Encryption
Secure Sockets Layer, SHTTP, IPSec,SMIME
Secure Electronic Transactions (SET)
Attacks on e-security

Digital Watermarking for Multimedia
Classification of watermarks
Image, video, audio and text watermarking techniques

Virtual Reality as a new Medium
Virtual Reality Modeling Language (VRML)
Java3D
Distributed Virtual Environments
High-Level Architecture (HLA) : A new OMG standard for distributed simulations
Applications in industrial training, e-commerce, tele-collaboration

Lecturer's biography

Nicolas D. Georganas is Canada Research Chair in Information Technology and Distinguished University Professor, Multimedia Communications Research Laboratory (MCRLab),School of Information Technology and Engineering, University of Ottawa, Canada. He has been leading multimedia application development

projects since 1984. He was General Chair of the ACM Multimedia 2001 (Ottawa), IEEE Multimedia Systems'97 Conference (ICMCS97)(June 1997, Ottawa)and Technical Program Chair of the IEEE COMSOC MULTIMEDIA'89 (Montebello, Canada) and of the ICCC Multimedia Communications'93 Conference (Banff, Canada). He has served as Guest Editor of the IEEE Journal on Selected Areas in Communications, issues on"Multimedia Communications" (1990) and on "Synchronization Isssues in Multimedia Communications" (1996). He is on the editorial boards of the journals Multimedia Tools and Applications, ACM/Springer Multimedia Systems, ACM Computing Surveys, Performance Evaluation, Computer Networks, Computer Communications, and was an editor of the IEEE Multimedia Magazine. He is Fellow of IEEE, Fellow of the Canadian Academy of Engineering, Fellow of the Enginering Institute of Canada and Fellow of the Royal Society of Canada. In 1998, he was honored as the University of Ottawa Researcher of the Year and also received the University 150th Anniversary Gold Medal for Research. In 1999, he received the T.W.Eadie Medal of the Royal Society of Canada, funded by Bell Canada, for contributions to Canadian and International Telecommunications. In 2000, he received the J.C.Smith Medal of the Engineering Institute of Canada, the A.G.L.McNaughton Medal of IEEE Canada, the OCRI Presidents's Award, the Bell-Canada-Forum Award of the Corporate-Higher Education Forum, the TeleLearning Researcher Achievement Award and a Canada Research Chair. In 2001, he received the Order of Ontario and in 2002, the Killam Prize for Engineering, Canada's highest prize.

He has given Multimedia short course/tutorials at:

-Pont.Univ. Catolica de Chile, Santiago, Chile [April 1995][sponsored by NORTEL][55 persons]]
-Newbridge Netw. Co., Ottawa, [Febr. 1996] [17 persons]
-SIMTEL'96, Univ. Tech. F. Santa Maria, Santiago, Chile [May 1996][sponsored by NORTEL] [50 persons]
-IEEE Intern. Conf. on Multimedia Comp. and Sys. (ICMCS'96), Hiroshima, Japan [June 1996] [30 persons]
-ACM Multimedia'96, Boston, [Nov. 1996] [20 persons](excellent evaluations)
-ACM Multimedia'97, Seattle [Nov. 1997][25 persons](excellent evaluations)
-ICCC'97, Cannes, France [Nov. 1997] [20 persons]
-CRC, Ottawa [Dec. 1997][50 persons]
-Intern. Conf. on Telecomunications (ICT'98), Chalkidiki, Greece, June 1998 [10 persons]
-IEEE Intern. Communications Conference (ICC'99), Vancouver, Canada, June 1999 [20 persons]
-ACM Multimedia'99, Orlando [Nov. 1999] [20 persons](excellent evaluations)
-ACM Multimedia'2000, Los Angeles [Oct.2000] [22 persons]
-ACM Multimedia'2001, Ottawa [Oct.2001]

Tutorial TS2
Methodologies and Software Systems for e-Learning

Half day, Level Intermediate

Lecturer

Timothy K. Shih
Tamkang University, Taiwan
Email: tshih@cs.tku.edu.tw

http://www.mine.tku.edu.tw/chinese/teacher/tshih.htm

Abstract

This tutorial is intended for software engineers, educators, researchers, students and people interested in gaining an overall understanding of distance learning/virtual university software systems, as well as practitioners, system developers, multimedia course designers, programmers and people interested in distance learning applications.

Distance Learning technologies are important research and application issues of multimedia computing and networking. The tutorial starts from the discussion of current distance learning approaches, with a highlight of some potential research problems. Methodological and sociological issues of distance education will be presented. A survey of distance education technologies and projects toward possible solutions is given. The tutorial covers important topics, such as communication system for virtual university operation, instruction authoring and assessment, educational technology, and standards for distance learning. Demonstrations of distance learning projects follow the presentation. The conclusion of this tutorial points out suggestions and directions to the potential future university operations. Audiences may benefit from the tutorial by understanding the new research issues of distance learning. For a sample tutorial, please visit the following tutorial Web site: http://www.mine.tku.edu.tw/chinese/teacher/tshih/icme2001-tutorial.htm
which was presented in IEEE ICME'2001, IEEE PCM'2001, and several other international conferences. However, the content of this tutorial will be revised and updated according to the general interests of the ACM Multimedia'2002 audience.

Detailed Outline

- Preliminary concepts and history of distance learning
  - History of media technology
  - What we can learn and improve using Internet and Web technologies
- A survey of current distance learning programs
  - Distance learning programs in traditional universities
  - Virtual universities
  - E-Learning portals
- Methodological and sociological issues of distance education
  - Policy, people, and technology of distance education
  - Questions and answers in distance learning panel discussions

- State-of-the-art research issues in distance learning
  - Research projects and systems around the world
  - Operation criteria of virtual university
  - Middleware system for virtual university operation
  - Potential research issues
- SCORM: Sharable Courseware Object Reference Model (if time is available)
  - XML course structure format
  - Run-time environment
  - Metadata
- Technologies for the implementation of distance education systems
  - Web authoring and engineering
  - Educational technology
  - Multimedia synchronization technology
  - Mobile agent technology
  - Broadband communication technology
  - Wireless communication technology
- Demonstrations of several distance learning research projects
  - A Persistent look-and-feel agent
  - A courseware development and student assessment system
  - An on-line annotation tool with feedback and control
  - A synchronized multimedia presentation and editing tool
- Summary and References
  - Distance education in the near future
  - Distance education journals
  - Distance education books
  - Distance education Web sites

Lecturer's Biography

Dr. Shih (http://www.mine.tku.edu.tw/chinese/teacher/tshih.htm) is a Professor and the Chairman of Department of Computer Science and Information Engineering at Tamkang University, Taiwan, R.O.C. He is a senior member of IEEE and a member of ACM. His research interests include Multimedia Computing and Networking, Distance Learning, E-Commerce, and Content-Based Multimedia Information Retrieval. He was a faculty of the Computer Engineering Department at Tamkang University in 1986. In 1993 and 1994, he was a part time faculty of the Computer Engineering Department at Santa Clara University. He was also a visiting professor at the University of Aizu, Japan in summer 1999, and a visiting researcher at the Academia Sinica, Taiwan in summer 2001. Dr. Shih received his BS and MS degrees in Computer Engineering from Tamkang University and California State University, Chico, in 1983 and 1985, respectively. He also received his Ph.D. in Computer Engineering from Santa Clara University in 1993. Dr. Shih has edited many books and published over 250 papers and book chapters, as well as participated in many international academic activities, including the organization of many international conferences and special issues of international journals. He is **the founder and co-editor-in-chief of International Journal of Distance Education Technologies** (http://www.mine.tku.edu.tw/JDET/), published by Idea Group Publishing, USA. Dr. Shih has received many research awards, including Tamkang University research awards, NSC research awards (National Science Council of Taiwan), and IIAS research award of Germany. He also received many funded research grants from both domestic and international agencies. Dr. Shih has been invited frequently to give keynote/plenary speeches, tutorials, panels, and talks at international conferences and overseas research organizations.

Tutorial TS3
Data Compression for Multimedia

Half day, Level Intermediate

Lecturer

(Note: this tutorial was initially planned with Prof. Amer as a lecturer. Unfortunately, for personal reasons, Prof. Amer had to cancel his participation)

Professor Jean-Luc Dugelay
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Institut EURECOM
BP 193
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Fax: +33 (0)4 93 00 26 41
Email: dugelay@eurecom.fr
Web site: http://www.eurecom.fr/~image/

Abstract

This tutorial is targeted at the practically oriented researcher or developer who is interested in details about the foundation concepts and mechanisms used in multimedia data compression.

An exponentially growing amount of data, image, video, music, voice, virtual reality, etc., is being transmitted around the world. No matter how much we increase telecommunication bandwidth and disk storage capacity, a vital practical need remains to compress data so that multimedia can be transmitted faster and stored more efficiently. Data compression reduces the size of multimedia by reducing an object's redundancy.

Lossless techniques preserve an original file bit for bit after compression and decompression. Lossy techniques obtain significantly greater compression than lossless, but at a penalty of changing or distorting the original file. Lossy compression investigates the tradeoff of compression vs. error distortion.

At the University of Delaware, Professor Amer teaches a graduate level computer science course on data compression. This half-day tutorial summarizes the highlights of the course thereby giving each student a thorough introduction to today's important approaches to data and multimedia compression. This tutorial culminates with an explanation of JPEG2000 and MPEG, both of which encompass multiple compression methods: lossless and lossy.

Detailed outline

1. Introduction
    - History of data compression
    - Methods vs. software vs. standards
    - General Characteristics
        - Symmetric vs. asymmetric

        - Uniform vs. nonuniform
        - Types of redundancy
        - Lossless vs. lossy
2. Lossless compression
    - Metrics - how to evaluate lossless compression
    - Statistical coding - Huffman
    - Dictionary coding - Lempel-Ziv-Welch
    - Run-length coding - facsimile
    - Arithmetic coding
3. Lossy compression
    - Metrics (SNR, PSNR) - how to evaluate lossy compression
    - Scalar quantization
    - Vector quantization
    - Differential methods (e.g., for speech/audio)
        - Examples: DPCM, ADPCM
    - Subband/transform methods (e.g., for images/video)
        - Example: discrete cosine transform
        - Example: wavelet
4. Image/Video Standards
    - GIF, JPEG, JPEG2000
    - MPEG1, MPEG2, MPEG4, MPEG7

Lecturer's Biography

Jean-luc DUGELAY was born in Rouen, France, in 1965.

From 1989 to 1992, he worked for France Telecom Research (formerly CNET - CCETT) He received the Ph.D. degree in Computer Science in 1992 from Rennes University.

He is currently with the Institut EURECOM, Multimedia Communications dept., Sophia Antipolis, France, as a Professor; and with the University of California, Santa Barbara, ECE dept., SCL Lab., as a Visiting Researcher.

His research interests currently include Image Processing and Coding, Watermarking and Indexing, Video Communications, Virtual Reality and 3D Imaging.

More information on his professional activities is available

Tutorial TS4
Learning Object Metadata: a new Standard for Metadata

Half day, Level Intermediate

Lecturer

Maciej Macowicz
LEAO Laboratoire d'enseignement assisté par ordinateur
Ecole polytechnique fédérale de Lausanne
1015 Lausanne, Switzerland
Email: maciej.macowicz@epfl.ch

Note: for personal reasons, Prof. Erik Duval had to cancel his lecture. He appointed Maciej Macowicz for his replacement.

Abstract

This tutorial is intended towards:

- Designers of repositories of multimedia assets, specifically (though not only) repositories of educational assets;
- Users of repositories of learning objects, contributors and re-users alike;
- Researchers interested in the idea of "share & reuse", and specifically in the role of digital libraries to support this idea;
- Etc.

Attendees will learn about the scope and purpose of the "Learning Object Metadata" (LOM) standard, being finalized by the IEEE Learning Technology Standards Committee <http://ltsc.ieee.org/>. The underlying hierarchical data model will be presented. All of the data elements will be covered in some detail. We will explain how LOM deals with value spaces, data types, vocabularies, classifications, and extensions. Binding and conformance related issues will be discussed. Guidelines for the actual use of LOM in practice will be presented. Tool sets and infrastructures, as well as experiences based on actual use, will illustrate LOM applications.

Detailed Outline

In this tutorial, participants will be guided through the Learning Object Metadata (LOM) structure, which includes metadata on general, technical, educational and other characteristics. A toolset from the ARIADNE Foundation <http://www.ariadne-eu.org/> will be used to describe sample resources. Searches across a distributed Knowledge Pool System of learning objects with detailed metadata will be compared with more conventional web searches.

The intent of the workshop is that participants will acquire a basic understanding of the scope and status of the Learning Object Metadata standard. They will be able to judge how relevant LOM is for their context. They will also have some practical experience with the application of LOM through one toolset based on that standard.

The basic structure of the tutorial will be as follows

1. Introduction
    a. Metadata: what and why
        i. Subjective versus objective
        ii. Multiple metadata instances per learning object
    b. Standards and Interoperability
    c. LOM: scope and purpose
2. The LOM Data Model
    a. Data elements, categories
    b. Value Spaces
    c. Datatypes
        i. LangString
        ii. DateTime
        iii. Duration
        iv. Vocabulary
    d. List values
    e. Vocabularies
3. The LOM Base Schema
    a. General
    b. Life cycle
    c. Meta-metadata
    d. Technical
    e. Educational
    f. Rights
    g. Relation
    h. Annotation
    i. Classification
4. Binding Issues
    a. XML DTD
    b. XML Schema
    c. RDF (Schema)
5. Conformance
6. An example Infrastructure: ARIADNE
    a. Indexation tool
    b. Knowledge Pool System
    c. Demo
    d. Lessons from Actual Use
7. Wider Context
    a. Internationalization and Localization
    b. Standards Organizations:
        i. Learning Technologies:
            1. IEEE LTSC, CEN/CENELEC ISSS LTWS, ISO/IEC JTC1 SC36
            2. ARIADNE, IMS, ADL, OKI, etc.
        ii. Metadata: Dublin Core, MPEG-7
8. Putting LOM to use
    a. Describing resources
    b. Finding resources
    c. Re-using resources
9. Research Directions
10. Conclusion

Lecturer's Biography

Erik Duval is a professor at the research unit on hypermedia and databases, in the computer science department of the Katholieke Universiteit Leuven, Belgium.

His current research interests include: hypermedia data models, the design and implementation of distributed hypermedia systems, metadata, and the application of information and communication technology in education and training.

He coordinates the development of the Knowledge Pool System (a distributed database of reusable pedagogical documents) for the ARIADNE Foundation, is the technical editor for the standard on Learning Object Metadata, and chairs the CEN/ISSS Learning Technologies Workshop. Erik teaches courses on Human-Computer Interaction and Multimedia, both at the university and in corporate training settings.

Relevant publications include:

- Erik Duval, Wayne Hodgins, Stuart Sutton, and Stuart L. Weibel. Metadata Principles and Practicalities. D-Lib Magazine, Vol.8, No.4, April 2002.
- E. Duval, E. Forte, K. Cardinaels, B. Verhoeven, R. Van Durm, K. Hendrikx, M. Wentland-Forte, N. Ebel, M. Macowicz, K. Warkentyne, and F. Haenni, *The ARIADNE Knowledge Pool System*, Communications of the ACM 44 (2001), no. 5, 73-78.

The tutorial proposed here will be presented as a hands-on workshop at EdMedia 2002 <http://www.aace.org/>.

Tutorial TM1
Wireless Multimedia

Half day, Level Intermediate

Lecturer

Dr. Borko Furht
Professor and of Computer Science and Engineering
Director of NSF Multimedia Laboratory
Florida Atlantic University
Boca Raton, Florida 33431
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Fax: (561) 297-2800
Email: borko@cse.fau.edu
Web: http://www.cse.fau.edu/~borko

Abstract

This tutorial is intended for academicians, scientists, system designers, and engineers who are involved in wireless Internet and multimedia systems. It is also intended to anyone interested in receiving an overview and future trends in wireless multimedia technologies and applications. The tutorial assumes some familiarity with multimedia and Internet.

OVERVIEW:

This tutorial is designed to excite curiosity of the audience in the field of wireless multimedia technologies and applications. Participants will get the fundamental knowledge of wireless network architectures, including 3G wireless system, wireless Internet, and various wireless devices. Furthermore, participants will get familiar with major issues and challenges in designing and applying wireless multimedia systems. A spectrum of potential wireless multimedia applications and future trends in wireless multimedia systems will be discussed as well.

DESCRIPTION:

The multimedia and Internet technologies including World Wide Web, have already created many benefits, but we can still only guess at many benefits these liberating new technologies will create in the future. Today, nations and corporations are making enormous efforts to establish a wireless infrastructure, including declaring a new wireless spectrum, building new towers, and inventing new handesets, high-speed chips, and protocols.

The goal of this tutorial is to link present "wireless realities" to the future of technology. It should bring to participants 21st century thinking today. In the first part of the tutorial we will present fundamental technologies and architectures of wireless Internet, including network technologies, generations of wireless systems (from 1G to 3G), and wireless devices.

The second part of the tutorial will focus on 3G systems that will provide data transmission speeds of several Mbps, which are needed for multimedia. We will present wireless multimedia architectures, wireless multimedia protocols, and related standards. We will also discuss wireless multimedia challenges including (a) error resilience when

delivering rich digital media over wireless networks at low and varying transmission speeds, (b) adaptive decoding that will optimize digital media for mobile devices with limited processing power, (c) network access, and other. The synergy between the 3G wireless Internet and multimedia promises to bring a tremendous explosion in application possibilities. The tutorial will end with a brief discussion on future trends in Wireless Internet and multimedia.

TUTORIAL MATERIAL:

Class notes including copies of all slides.

Outline

1. From Wired to Wireless Internet
2. Wireless Internet Network and Access Technologies
3. Wireless Devices
4. Wireless Multimedia Architecture
5. Wireless Multimedia Protocols and Standards
6. Wireless Multimedia Challenges
7. Wireless Multimedia Applications
8. Future of Wireless Internet

Lecturer's Biography

Borko Furht is a professor of computer science and engineering at Florida Atlantic University (FAU) in Boca Raton, Florida. He is the founder and director of the Multimedia Laboratory at FAU, funded by National Science Foundation. Before joining FAU, he was a vice president of research and a senior director of development at Modcomp, a computer company of Daimler Benz, Germany, and a professor at University of Miami in Coral Gables, Florida.

His current research is in multimedia systems and Internet, video coding and compression, video databases, and wireless multimedia. He has published over 160 papers, 17 books, and holds 2 patents. Dr. Furht received research grants from national agencies such as NSF and NASA, and from industrial corporations such as IBM, General Electric, Xerox, Datacom, and Modcomp.

Dr. Furht is a founder and editor-in-chief of the *Journal of Multimedia Tools and Applications* (Kluwer Academic Publishers). He recently completed three handbooks, to be published by the CRC Press, "*Handbook of Internet Computing*" (2000) "*Handbook of Multimedia Computing*", (1999) and "*Handbook of Internet and Multimedia Systems and Applications"* (1999). He was the Program Chairman for America for the IEEE Conference on Multimedia Systems and Computing ’99 in Florence, Italy and area chairman for the IEEE Conference on Multimedia and Expo, Tokyo 2001. He is also consulting editor for the Book Series on *Multimedia Systems and Applications (Kluwer)* and *Internet and Communications* (CRC Press).

Dr. Furht has initiated the graduate program on multimedia and Internet at FAU, and has presented tutorials, seminars, invited lectures, and keynote addresses at various IEEE and ACM conferences. He has received several technical and publishing awards, and has consulted for IBM, Hewlett-Packard, Xerox, General Electric, JPL, NASA, Honeywell, and RCA.

Tutorial TM3
SMIL 2.0: Interactive Multimedia on the Web

Half day, Level Introductory to Intermediate

Lecturer

Lloyd Rutledge
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Abstract

The tutorial is intended for content developers who have created HTML documents or have used tools such as Macromedia Director or Authorware. Multimedia designers, web-page creators, creators of interface prototypes such as user interface designers, human factors practitioners and industrial designers will also benefit from this course.

This tutorial can be followed usefully by participants unfamiliar with existing multimedia tools and environments. The level is introductory and expects knowledge of the Web at a user's level, not necessarily that of an HTML author. Familiarity with basic HTML constructs is desirable, though not necessary.

SMIL 2.0 specifies interactive multimedia on the Web. It has been a W3C recommendation since August 2001. It already enjoys substantial support, implemented in such Web browsers as RealNetworks' RealOne and Internet Explorer 6.0. This version of SMIL extends SMIL 1.0, a W3C recommendation since June 1998. SMIL 2.0 is 15 times as large as SMIL 1.0, and defines a family of languages rather than just one language. This tutorial presents SMIL 2.0, tools for it, how to create presentations in it, and how it has currently been adopted by the community at large.

This tutorial covers SMIL 2.0 as a specification, the sub-languages it defines, the available tools for it, and its current use on the Web. The primary constructs are described in full. All areas of SMIL 2.0 are overviewed. All languages defined with SMIL constructs, including SMIL 1.0, SMIL 2.0 Language Profile, SMIL 2.0 Basic Language Profile (SMIL Basic), XHTML+SMIL and SVG, are discussed. Available tools for playing and editing these languages are presented and demonstrated. Examples of SMIL 2.0 presentation in current use are demonstrated.

The goal of the tutorial is to explain the concepts that form the basis of the SMIL language and to provide sufficient detail on the language itself so that participants can create their own simple presentations. Participants will also understand the underlying issues of temporal and spatial layout and the complexity of creating links within multimedia. They will also be able to use available tools to play and create SMIL presentations.

SMIL 1.0 is a W3C recommendation, approved in June 1998, which provides a vendor-independent, declarative language for hypermedia presentations on the Web. With at least three players currently available, and with more and more presentations being posted on the Web, SMIL promises to do for interactive multimedia what HTML did for hypertext: bring it into every living room with an easy-to-author, readily implementable format and easily accessible players for it. Through its support in all RealNetworks media players since SMIL 1.0's release, at least 200 million SMIL players have been distributed. A large collection of SMIL documents is played frequently on RealPlayer, since SMIL defines the multimedia synchronization it uses.

SMIL 2.0 was released by the W3C in the summer of 2001. The specification document is 15 times the size of SMIL 1.0, offering many new, rich features and constructs. SMIL 2.0 also has the backing of major industrial players and has been implemented in RealNetworks' RealOne and Internet Explorer 6.0. SMIL 1.0's legacy of wide, though behind-the-scenes, distribution and use is expect to expand further with the anticipated adoption of these tools.

Before describing the details of the SMIL 2.0 language, the tutorial first presents an overview of the components required in a hypermedia document description language. The SMIL language includes features for specifying the media items included in a document, referred to with URL's, how these are temporally and spatially related to one another, and how links can be specified within the multimedia environment. Alternates for different data formats for the heterogeneous web environment are also provided.

The goal of the tutorial is to explain the concepts that form the basis of the SMIL language and to provide sufficient detail on the language itself so that participants can create their own simple presentations. Participants will also understand the underlying issues of temporal and spatial layout and the complexity of creating links within multimedia. The tutorial also describe the use of the major SMIL implementations.

Detailed Outline

Part One. Introduction

1. Overview of SMIL
   - What SMIL Does
   - Design Goals; SMIL and Other Specifications
   - Using SMIL 2.0: Examples
   - Crossing the Bridge; Happy Birthday!; The Evening News; Flags
   - SMIL Modules and Profiles
   - Application of SMIL 2.0: Formats and Tools
   - SMIL 1.0; SMIL Profile; SMIL Basic; Media-based SMIL; SMIL GUI Editors
   - SMIL Editing Accessories
2. Introduction to SMIL Code
   - XML Code
   - Elements; Attributes; References; Document Classes
   - Primary SMIL Constructs
   - Media Content; Layout; Timing; Linking; Adaptivity
   - SMIL Structure
   - SMIL Document Classes; The <smil> element; Core Attributes
   - The <head> Element; The <body> element
3. Streaming Media

Part Two. Basic Constructs

4. Basic Media Integration
   - Media Object Elements
   - The <ref> Element; The src Attribute; Media-specific Media Object Elements
   - Media Creation
   - Images; Video; Audio; Graphics and Animations; Text
   - Media Typing
   - The mimetype Construct; Filename suffixes; The type Attribute
   - Communicating mimetypes through HTTP
   - Brush Media
   - The <brush> element; The color Attribute
5. Layout
   - SMIL Layout Overview
   - SMIL's Approach to Layout; SMIL Layout Modules
   - Presentation Windows

Lecturer's Biography

Lloyd Rutledge is a researcher at CWI, the Dutch national center for computer science and mathematics research. His research involves adaptable hypermedia, generated hypermedia and hypermedia standards such as SMIL. He received his Sc.D. from the University of Massachusetts Lowell, where he worked with the Distributed Multimedia Systems Laboratory (DMSL) on developing the HyOctane HyTime-based hypermedia environment. Dr. Rutledge is a member of the W3C working group that developed SMIL. He is also co-author of "SMIL: Interactive Multimedia on the Web", to be published in May by Pearson Education.

Relevant references

W3C SMIL Webpage: http://www.w3.org/AudioVideo/
SMIL 2.0 specification: http://www.w3.org/TR/smil20/
XHTML+SMIL Profile specification: http://www.w3.org/TR/XHTMLplusSMIL/
SVG specification: http://www.w3.org/TR/SVG/
This tutorial series Website: http://www.cwi.nl/~media/SMIL/Tutorial/

Tutorial TM4
"The evolution of networking protocols to meet the requirements for UMTS and 3G Services"

Half day, Level Intermediate

Lecturers

Ibrahim Haddad, Samer Hawwa
Open Systems Lab
Ericsson Research Canada
8400 Decarie Blvd, Town of Mont Royal
Québec H4P 2N2, Canada
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Fax: 1.514.345.6105
Email: Ibrahim.Haddad@Ericsson.com , Samer.Hawwa@Ericsson.com

Abstract

The tutorial is intended for researchers, scientists, and engineers interested on learning on Internet Protocol version 6 (IPv6) and Session Initiation Protocol (SIP). The aim of the tutorial is to provide the participants with an understanding of the overall picture of Third Generation (3G) networks and to provide complete tutorials on the IPv6 and SIP protocols.

The tutorial will present introductory material (25%) necessary for people not familiar with 3G, SIP and IPv6 to get them to speed, then intermediate material (50%) which covers tutorials on IPv6 and SIP, then advanced material (25%) where we discuss advanced research, issues and challenges.

Internet protocols have been constantly evolving to keep up with the advancement and evolution of technologies and applications to meet the requirements of the telecommunication industry. IPv6 and SIP are two examples of protocols that either evolved or were created in response to needs demonstrated in the telecom industry.

- Introductory material

  (Joint presentation by Ibrahim Haddad and Samer Hawwa)

  1. The Open Systems Lab: Introduction and Ongoing research
  2. Brief introduction on the advances in Telecommunication and Networking
  3. A general overview of 3G Wireless Networks
  4. Requirements for 3G services and Wireless Networks platforms from protocols point of view
  5. Networking protocols falling behind the advances in platform and services

- IPv6: Internet Protocol version 6

  (Covered by Ibrahim Haddad) IPv6 is the next generation protocol designed by the IETF to replace the current version of the Internet Protocol, IP Version 4 (IPv4). Most of today's Internet uses IPv4, which is now nearly twenty years old. IPv4 has been remarkably resilient in spite of its age, but it is beginning to have problems.

Most importantly, there is a growing shortage of IPv4 addresses, which are needed by all new machines and devices connecting to the Internet.

IPv6 comes along to fix a number of problems in IPv4 and to add many improvements to cater for the future Internet. The improvements come in areas such as routing and network auto-configuration, security, and mobility. IPv6 represents a big package of capabilities, of which addressing is the most visible component. The addressing issue gets a lot of attention, but one of many important issues that IPv6 designers have tackled. Other capabilities have also been developed in direct response to critical business requirements for scalable network architectures, improved security and data integrity, integrated quality-of-service, automatic configuration, mobile computing, data multicasting, and more efficient network route aggregation at the global backbone level.

This part of the tutorial will cover the following topics:

1. IPv6: The new Internet protocol
2. The problems with IPv4 that triggered IETF to design IPv6 as the next generation IP protocol.
3. IPv6 features: how they solve the problems with IPv4 and provide new functionalities.
4. IPv6 and 3G/UMTS.
5. Challenges ahead: We cover the challenges in different areas such as IPv6 implementations, co-existence issues with IPv4, deployment and performance issues.
6. IPv6 ongoing research at the Open Systems Lab (Ericsson Research) and operation deployment experience of IPv6 on our telecom-grade Linux clusters.

- SIP: Session Initiation Protocol

  (Covered by Samer Hawwa) Internet conferencing, telephony, presence, event notification, and instant messaging have increasingly attracted industrial interest. This new service paradigm, together with the use of IP technology, open up tremendous opportunities for service providers and network operators to create new and diverse services. However, a key issue in realizing this vision is how to engineer services for next generation networks. The standard service architecture (SIP CGI, CPL) that comes with the signaling protocol (SIP) is rather weak. Several alternatives are emerging. Some of them are object oriented based API (PARLAY, JAIN, Servlets).

  More recent technologies, such as Web Services, are based on web technologies. This tutorial will provide an in-depth overview for the SIP protocol and how to engineer SIP services.

  The following topics will be covered:

  1. SIP: The new protocol
  2. SIP Overview
  3. SIP in IETF and 3GPP
  4. Programming SIP services (Enablers and tools)

- Advanced Material

  (Joint presentation by Ibrahim Haddad and Samer Hawwa)

  1. Challenges
  2. Ongoing research
  3. Final notes

Lecturers' Biographies

Ibrahim Haddad is a Researcher at the Ericsson Corporate Unit of Research in Montreal, Canada, involved with the

system architecture of third generation wireless IP networks. Ibrahim represents Ericsson on the Technical Board and Sub-Groups of the Open Source Development Lab. He is involved in several Open Source projects and a Contributing Editor for the Linux Journal. Ibrahim has delivered several talks at universities, IEEE and ACM conferences, and Open Source forums. He received his Bachelor and Master degrees in Computer Science from the Lebanese American University, charted by the University of the State of New York. He is currently a Dr.Sc. Candidate at Concordia University in Montreal where he received both the J. W. McConnell Memorial Graduate Fellowships and the Concordia University 25th Anniversary Fellowship.

Samer Hawwa is a System Designer at Ericsson Corporate Unit of Research in Montreal, Canada. He is involved in the technical investigations, prototyping, and standardization of Service Engineering for the 3G Networks. Samer holds a B.Sc. degree in Computer Science from Lebanese American University, charted by the University of the State of New York. He is currently pursing a M.Sc. degree in Computer Science at Concordia University in Montreal, Canada.

Tutorial TM5
Multimedia Content Protection in the Digital World

Half Day, Level Introductory to Intermediate

Lecturer

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Abstract

A digital home network is a cluster of digital audio/visual (A/V) devices including set-top boxes, TVs, VCRs, DVD players, and general-purpose computing devices such as personal computers. Copyrighted digital multimedia content may be delivered to the consumers from a number of sources including the Internet, and satellite, terrestrial or cable television systems. It may also be made available as prepackaged media (e.g., a digital tape or a digital video disc) at retail stores.

Before releasing their content for distribution, the content owners may require protection by specifying certain access conditions and digital rights. Although legal institutions exist for protecting intellectual property, complimentary technical measures are needed to sustain financial returns and to ensure incentives for new creations. Recently, two fundamental groups of technologies, encryption and watermarking, have been identified for protecting copyrighted multimedia content in digital distribution networks. Encryption-based technologies transform content into unintelligible form. This transformation, being reversible in nature, allows perfect recovery of content before consumption. Technologies based on watermarking embed data directly into content, resulting in imperceptible degradation in visual quality.

Three major industries have a vital interest in this problem: The motion picture industry, the consumer electronics (CE) industry, and the information technology (IT) industry. This tutorial is an overview of the work done for protecting the content owners' investment in intellectual property. It highlights the important developments within several international forums including the Copy Protection Technical Working Group (CPTWG), Secure Digital Music Initiative (SDMI), Advanced Television Systems Committee (ATSC), Digital Video Broadcasting (DVB), Open Cable, Motion Pictures Expert Group (MPEG) and Internet Engineering Task Force (IETF).

Detailed Outline

    - CONFIDENTIALITY
    - DATA INTEGRITY
    - AUTHENTICATION
    - NON-REPUDIATION
- ENCRYPTION AND DATA HIDING (WATERMARKING)
    - BASIC TERMINOLOGY IN SECRET WRITING
    - SYMMETRIC AND ASYMMETRIC CIPHERS
    - DIGITAL SIGNATURES
    - PUBLIC KEY INFRASTRUCTURES
    - TYPICAL USES OF WATERMARKS
    - WATERMARK EMBEDDING AND DETECTION
- TYPES OF CONTENT PIRACY
- CONDITIONAL ACCESS (CA) SYSTEMS FOR SATELLITE, CABLE AND TERRESTRIAL TELEVISION NETWORKS
- DIGITAL RIGHTS MANAGEMENT (DRM) SYSTEMS FOR THE INTERNET
- COPY PROTECTION (CP) SYSTEMS FOR DIGITAL HOME NETWORKS
    - DVD PROTECTION
    - DIGITAL INTERFACE PROTECTION
    - COPY PROTECTION GROUPS/ORGANIZATIONS
    - ATTRIBUTES FOR A COPY PROTECTION SYSTEM
    - GLOBAL ARCHITECTURES FOR COPY PROTECTION
- WORLD INTELLECTUAL PROPERTY ORGANIZATION (WIPO)
- DIGITAL MILLENIUM COPYRIGHT ACT (DMCA)
- IP MULTICAST SECURITY
    - SECURE MULTICAST APPLICATIONS
    - CORE PROBLEM AREA IN MULTICAST SECURITY
    - EVALUATION CRITERIA
    - CLASSIFICATION OF KEY MANAGEMENT SCHEMES
    - PERIODIC BATCH REKEYING
- WIRELESS NETWORKS AND MOBILE MEMBERS
    - TWO-TIER SERVER ARCHITECTURE
    - DESIGN CRITERIA
    - MOBILE MEMBER JOIN AND LEAVE
    - MOBILE MEMBER TRANSFER
        - BASELINE REKEYING
        - IMMEDIATE REKEYING
        - DELAYED REKEYING
- SECURITY OF WIRELESS LANS
    - WIRELESS EQUIVALENT PRIVACY (WEP)
    - WHAT'S WRONG WITH WEP?
    - ATTACKS ON WEP
    - NEW IMPROVEMENTS

Lecturer's Biography

Ahmet M. Eskicioglu received the B.S. degree from the Middle East Technical University (METU), Ankara, Turkey, and the M.S. and Ph.D. degrees from the University of Manchester Institute of Science and Technology (UMIST), England. He was with the Computer Engineering Department, METU from 1983 to 1992, the Department of Computer Sciences, University of North Texas from 1992 to 1995, and Thomson Multimedia Corporate Research, Indianapolis from 1996 to 2001.

Dr. Eskicioglu is with the Department of Computer and Information Science, Brooklyn College of the City University

of New York. He has actively participated in the development of several national and international standards for conditional access and copy protection in the US and Europe. These include the Advanced Television Systems Committee (ATSC) conditional access system, the Electronics Industries Alliance (EIA) National Renewable Security Standard (NRSS), the Digital Video Broadcasting (DVB) Content Protection and Copy Management (CPCM) System, and the Content Scramble System (CSS) for DVD players.

Dr. Eskicioglu is on the program committee of several conferences on networks and security, and has been a reviewer for numerous conferences and journals including the IS&T/ SPIE's Electronic Imaging 2003 Conference, Santa Clara, CA, January 20-24, 2003; IASTED International Conference on Communications, Internet and Information Technology, St. Thomas, Virgin Islands, USA, November 18-20, 2002; IEEE International Conference on Acoustics, Speech, and Signal Processing, Istanbul, Turkey, June 5-9, 2000; IEEE Network Special Issue on Multicasting: An Enabling Technology, January/February 2003; IEEE Transactions on Signal Processing; IEEE Transactions on Consumer Electronics and the Journal of Interconnection Networks. His interests include image compression, system simulation, data security, conditional access, and digital rights management.

Recent Publications

1. ESKICIOGLU, A. M., "Multimedia Security in Group Communications: Recent Progress in Wired and Wireless Networks," IASTED International Conference on Communications and Computer Networks, Cambridge, Ma, November 4-6, 2002.
2. ESKICIOGLU, A. M. and ESKICIOGLU, M. R., "Multicast Security Using Key Graphs and Secret Sharing," Proceedings of the Joint International Conference on Wireless LANs and Home Networks, Atlanta, GA, August 26-29, 2002.
3. ESKICIOGLU, A. M. and DELP, E. J., "An Integrated Approach to Encrypting Scalable Video," International Conference on Multimedia and Expo 2002, Lausanne, Switzerland, August 26-29, 2002.
4. ESKICIOGLU, A. M. and DELP, E. J., "Overview of Multimedia Content Protection in Consumer Electronics Devices," Signal Processing: Image Communication, Vol. 16, No. 5, April 2001.
5. ESKICIOGLU, A. M. and LITWIN, L., "Cryptography: The Science and Art of Secure Communications," IEEE Potentials, February/March 2001.
6. ESKICIOGLU, A. M., TOWN, J. and DELP, E. J., "Security of Digital Entertainment Content from Creation to Consumption," (Invited paper) Proceedings of SPIE Applications of Digital Image Processing XXIV, Vol. 4472, San Diego, CA, July 31-August 3, 2001. To be published in a special issue of Signal Processing in 2003.
7. ESKICIOGLU, A. M., "A Prepositioned Secret Sharing Scheme for Message Authentication in Broadcast Networks," Communications and Multimedia Security Issues of the New Century, IFIP TC6/TC11 Fifth Joint Working Conference on Communications and Multimedia Security (CMS'01), Darmstadt, Germany, May 21-22, 2001.
8. ESKICIOGLU, A. M., "A Key Transport Protocol for Conditional Access Systems," Proceedings of SPIE Security and Watermarking of Multimedia Content III, Vol. 4314, San Jose, CA, January 22-25, 2001.
9. ESKICIOGLU, A. M. and DELP, E. J., "Overview of Multimedia Content Protection in Consumer Electronics Devices," Proceedings of SPIE Security and Watermarking of Multimedia Content II, Vol. 3971, San Jose, CA, January 24-26, 2000.
10. ESKICIOGLU, A. M., "Quality Measurement for Monochrome Compressed Images in the Past 25 Years," IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Vol. 4, Istanbul, Turkey, June 5-9, 2000.

Previous Presentations on the Same Subject

1. "Multicast Security with secret sharing," 55th IETF Meeting, Atlanta, Ga, November 17-21, 2002.
2. "Wireless LAN Security," IEEE Joint International Conference on Wireless LANs and Home Networks, Atlanta, GA, August 26, 2002.
3. "Multimedia Security in Group Communications: Recent Developments in Wired and Wireless Networks," Department of Computer and Information Sciences, Fordham University, New York, NY, April 19, 2002.
4. "Technologies and Architectures for Digital Rights Management," MediaSec Technologies, Providence, RI,

April 5, 2002.
5. "Multicast Security: Issues in Group Key Management," Thomson multimedia, Inc., Princeton, NJ, March 7, 2002.
6. "An Overview of Multimedia Communications Security in Digital Domains," Department of Computer and Information Sciences, Fordham University, New York, NY, March 5, 2002.
7. "Multimedia Content Protection in the Digital World," Department of Computer and Information Science, Brooklyn College of the City University of New York, New York, NY, February 25, 2002.
8. "Multimedia Content Protection and Digital Rights Management," Telecommunications Research Labs, Winnipeg, MB, Canada, January 4, 2002.
9. "Multimedia Content Protection and Digital Rights Management,"University of Manitoba, Department of Computer Science, Winnipeg, MB Canada, January 3, 2002.
10. "Protection of Multimedia Content in Digital Home Networks," International Symposium on Telecommunications, Tehran, Iran, August 30, 2001.
11. "Cryptography: The Science and Art of Secure Communications," Department of Electrical and Computer Engineering, Drexel University, Philadelphia, PA, October 27, 2000.
12. "How to Protect Electronic Books with Cryptography?" The Electronic Book Exchange (EBX) Working Group Meeting, New York, NY, September 21, 2000.
13. "An Overview of Multimedia Content Protection in Home Networks," Department of Electrical and Computer Engineering, Purdue University, West Lafayette, IN, April 13, 2000.
14. "Protection of Multimedia Content in Consumer Electronics Devices," Department of Electrical Engineering, Swiss Federal Institute of Technology, Lausanne, Switzerland, February 2000.
15. "Protection of Copyrighted Digital Content," International Conference on Consumer Electronics, Los Angeles, CA, June 1999.

Author's Participation in Content Protection Related Forums

- **Digital Video Broadcasting (DVB) Consortium,** European Union, 2000-2001.
  Member, Technical Module. Participated in determining the commercial requirements for a new DVB Content Protection and Copy Management (CPCM) System to provide a common framework for the protection and management of content beyond the traditional boundaries of DVB compliant conditional access systems.
- **Consumer Electronics Association (CEA),** USA, 1998-2001.
  Co-Chair, R4.8 Working Group on Copy Protection. Investigated the impact of copy protection systems on the digital interfaces including the IEEE 1394 and RF Remodulation interfaces. Wrote an extensive report summarizing the proposed systems.
- **Advanced Television Systems Committee (ATSC),** USA, 1997-1999.
  Member, T3/S8 Conditional Access Ad Hoc Working Group. Participated in determining the ATSC needs for a conditional access system for digital TV. Reviewed the proposals concerning the essential components such as scrambling algorithms, EMM and ECM generation and distribution, host conditional access software, and copy protection.
- **Copy Protection Technical Working Group (CPTWG),** USA, 1997-1999.
  Member, Data Hiding Subgroup. Participated in determining the requirements of a system for watermarking digital video content. Reviewed the submitted proposals.
- **Electronics Industries Association (EIA) - National Cable Television Association (NCTA) Joint Engineering Committee,** USA, 1996-2001.
  Member, National Renewable Security Standard (NRSS) Subcommittee. Revised and edited both Part A and Part B of the NRSS. Designed and proposed a system for the protection of the common interface between the host device and the renewable security module.
- **International Digital Video Disk Forum,** USA, 1996-2000.
  Member, Copy Protection Technical Working Group. Evaluated proposals for protecting DVD Video and DVD Audio, and participated in the development of copy protection systems for DVD players, DVD recorders and DVD-ROM drives.
- **Copy Protection Technical Working Group (CPTWG),** USA, 1996-1998.
  Member, Digital Transmission Discussion Group. Participated in determining the requirements of a system for

the protection of digital audio/video data transmitted on the IEEE 1394 serial bus. Reviewed the submitted proposals.

- **Society of Cable Telecommunications Engineers (SCTE),** USA, 1996-1998.
  Member, Digital Video Subcommittee. Contributed to the architectural design of a conditional access system for the cable TV industry.

Author's Patents On Multimedia Content Protection

1. "Conditional Access System for Digital Receivers," EP 1 040 661, October 31, 2001 ; Australian Patent 745625, March 23, 2002. Inventors: A. M. Eskicioglu, M. K. Ozkan and B. W. Beyers.
2. "Method for Protecting the Audio/Visual Data Across the NRSS Interface," US Patent 6,409,089, June 25, 2002; EP 1 059 001, July 24, 2002. Inventor: A. M. Eskicioglu.
3. "Conditional Access System for Set-Top Boxes," EP 986 910, August 14, 2002; Australian Patent 732576, August 9, 2002. Inventors: A. M. Eskicioglu, K. R. Wehmeyer and D. E. Virag.
4. "A Copy Protection System for Home Networks," EP 1 110 393, May 29, 2002. Inventors: A. M. Eskicioglu and B. W. Beyers.
5. "Global Conditional Access System for Broadcast Services," Australian Patent 740825, February 28, 2002. Inventor: A. M. Eskicioglu.

Author's Patents Pending

1. "Threshold Cryptography Scheme for Message Authentication Systems." Inventor: A. M. Eskicioglu.
2. "Threshold Cryptography Scheme for Conditional Access Systems." Inventor: A. M. Eskicioglu.
3. "Method and System for Adding a Conditional Access System." Inventors: D. J. Duffield, J.-L. Diascorn and A. M. Eskicioglu.
4. "Method and System for Handling Two Conditional Access Systems in the Same Receiver." A. M. Eskicioglu, M. S. Deiss, J.-L. Diascorn and D. J. Duffield.
5. "A Global Copy Protection System for Digital Home Networks." Inventors: A. M. Eskicioglu, D. E. Virag, D. J. Duffield, M. S. Deiss and B. W. Beyers.
6. "CA System for Broadcast DTV Using Multiple Keys for Different Service Providers and Service Areas." Inventors: A. M. Eskicioglu, B. W. Beyers, E. A. Heredia and I. H. Izzat.
7. "A Conditional Access System for Broadcast Digital Television." Inventors: A. M. Eskicioglu, B. W. Beyers, E. A. Heredia, I. H. Izzat and Y. W. Nijim.

Tutorial TM6
Content Networking - Architecture, Protocols, and Practice

Half day, Level Intermediate to Advanced

Lecturer

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Abstract

The tutorial is intended for professionals as well as for students and researchers coming from academia. The tutorial concentrates mainly on underlying principles, concepts and mechanisms and tries to explain and evaluate them. It uses many examples and case studies for illustration. Specific protocols are selected as examples of how the concepts and mechanisms can be incorporated in real-life networks, but the tutorial i s not intended to provide a reference guide to web-related protocols. It rather aims to provide a systematic and architectural view of the content networking and content services field. It helps the participant in understanding the overall picture and how all the components fit together.

As more and more people start using the Internet as an integral part of their lives, scalability and reliability of multimedia Internet services become more and more crucial. It is important to help people understand the reasons for current problems in the Internet and to explain the challenges of and possible solutions for building a more reliable and scalable Internet better supporting advanced multimedia applications. The author has been working in content networking and related fields for more than seven years and has gained valuable practical experience, which he would like to pass on the participants of this tutorial.

The Internet, and in particular the World Wide Web (WWW), have become an integral part of people's life. With the increase in popularity, however, users have to face more and more problems when using the Internet - high access delays, poor quality of service and unreliable services. This tutorial helps participants in understanding the reasons for these problems. It explains the challenges in making content available on the WWW, describes basic concepts and principles for improving the current situation and outlines possibilities for tapping into the huge potential of custom-tailored provisioning of multimedia services over the Internet.

The tutorial starts with a discussion of fundamental techniques and protocols for moving content on the Internet, followed by an introduction to fundamental web caching techniques. From there, the tutorial outlines the evolution from web caching towards a flexible and open architecture to support a variety of content-oriented services. Evolutionary steps include support for streaming media, systems for global request routing, and the design of APIs and protocols enabling value-added services, such as compression, filtering, or transformation. The tutorial also explains how the different components interact with each other and how they can be used to build complex content networks.

The participant will learn how the technology evolved from traditional web caching towards more sophisticated content services. The participant will get a better understanding of the key components in modern content networks and of the protocols that make the components interact with each other. Various examples will help the participant to better

understand how this technology can be deployed and how it could help their business. All parts of the tutorial will have a mix of research and industry flavor, addressing seminal research concepts and looking at the technology from an industry angle.

Detailed outline

1. Introduction
    - The early days of content delivery over the Internet
        - From FTP, Archie, and WAIS towards the Web
    - The World Wide Web - where it came from, what it is
        - A brief history of the World Wide Web
        - Basic concepts of the World Wide Web
        - Applications on the World Wide Web
    - The evolution of content networking
        - The traditional Web model comes to age
        - Evolutionary steps in overcoming the Web slowdown
        - Content networking defined
2. Content Transport
    - Protocol architecture and design paradigms of the Internet
    - HTTP - How content is transported on the Web
3. Caching Techniques for Web Content
    - Motivation and goals of Web caching
    - Techniques for caching web content
        - Cacheability rules
        - Content freshness
        - Content Consistency
        - Cache replacement
        - Caching of dynamic objects
    - Application examples for caching systems
        - Forward proxy
        - Reverse proxy
        - Surrogate proxy
    - The evolution of caching systems
4. Caching Techniques for Streaming Media
    - Multimedia streaming explained
    - Problems with the current Internet streaming technology
    - Techniques for caching streaming media
        - Fast prefix transfer
        - Object segmentation and cache replacement
        - Dynamic caching
5. Switching and Routing in Content Networks
    - General problem statement and motivation
    - Techniques for request switching
        - Layer 4 switching
        - Layer 7 switching
        - Load balancing
    - Techniques for request routing
        - DNS-based request routing
        - HTML Rewriting
        - Others
6. Beyond Web Surfing - Content Services
    - Motivation and problem statement

Lecturer's Biography

Markus Hofmann is currently Head of the Networked Services Research Department at Bell Labs/Lucent Technologies, where he is leading Research and Development efforts on next-generation communication services and on network convergence, bringing the Internet/Web and the telephony world together. In prior projects at Bell Labs, Markus was the principal researcher and lead architect on Lucent's content networking solution named "imminet". He is well regarded in the technical and research community for his contributions to the field of multicasting and group communication. Markus is active in the IETF and has been a long time contributor to the IRTF. Currently, he is co-chair of the OPES Working Group in the IETF and co-author of a multitude of recent Internet Drafts in the content networking area. Markus is also on the Editorial Board of the Computer Communications Journal and has served as co-chair of various conferences and workshops. Markus has published numerous papers in the areas of multicasting, multimedia communication and content networking, and he has filed more than ten patents. He has spoken at a variety of international conferences and workshops in the area of data networking and distributed systems. Over the last few years, he gave several graduate lectures on content networking at different universities.

Prior to joining Bell Labs, Markus was a research assistant at University of Karlsruhe, Germany, where he was leading major projects with German Telekom and other partners. In this position, he also taught several graduate courses on data networking and advised about 25 master students. He received his Ph.D. degree from University of Karlsruhe in 1998. His Ph.D. thesis won the 1998 GI/KuVS Doctoral Dissertation Award for the best Ph.D. thesis in Germany in the area of Distributed Systems and Telecommunications and the 1998 FZI Doctoral Dissertation Award for best Ph.D. thesis in Computer Science at University of Karlsruhe. For more information, see http://www.mhof.com/.