

## Special Issue: Multimodal Multimedia Retrieval

# Guest Editorial

Today, the popularity of multimedia demands efficient and intelligent strategies to cope with large amount of multimedia data and the real time constraints of applications. Recent efforts in the area of Multimedia Retrieval Systems (MMRS) have led to a growing research community and a number of projects on the international, national and industrial level.

Besides concentrating on single media retrieval systems (e.g., in which only images are considered), the latest technologies target on multimodal and/or semantically rich retrieval engines. This development explicitly forms the mainstream trend as queries such as “*Show me the movie and related material for the given score available by melody and text snippets*” (maybe by humming) or “*Give me all media (text, image, video, audio) containing information about the city of Paris*” come into vogue. In order to support those challenging requests, research needs to work on a) new (ontology-based) semantic models for combining individual media models, b) new retrieval engines able to cross the media boundary during search and c) new interfaces that can deal with various media data inputs and present complex multimedia information. For instance, similarity metrics need to be developed/modified encompassing the media boundary, with the aim to discover useful relationships among multimodal multimedia documents and to find a better way through-out the vast amount of media information.

For this purpose, theories and techniques concerning multimodal information retrieval systems focusing on new approaches for indexing, representing, organizing, integrating, clustering, querying and feature extraction of multimodal data need to be investigated and evaluated.

The content of the special issue aims on providing a deeper look of current research in the area of Multimodal Multimedia Retrieval including both theory and application oriented papers and new approaches in extraction and use of semantic concepts in order to minimize the semantic gap in multimedia retrieval.

### **Using the MPEG Query Format for Cross-Modal Identification**

*Matthias Gruhne, Peter Dunker, Ruben Tous*

This article demonstrates the new multimedia query language (MPEG Query Format) in a distributed cross modal retrieval environment.

### **Bridging the Semantic Gap for Texture-based Image Retrieval and Navigation**

*Najlae Idrissi, Jos'e Martinez, Driss Aboutajdine*

The authors in this paper propose a new approach for interpreting textures in natural terms in order to bridge the semantic gap in image retrieval.

### **Semantic Restructuring of Natural Language Image Captions to Enhance Image Retrieval**

*Kraisak Kesorn, Stefan Poslad*

Image captions provide useful information and hints for image retrieval. The article introduces a framework that combines Natural Language Processing approaches with Ontologies and LSI in order to extract concepts in image captions.

### **Semantic Concept Mining Based on Hierarchical Event Detection for Soccer Video Indexing**

*Maheshkumar H. Kolekar, Kannappan Palaniappan, Somnath Sengupta, Gunasekaran Seetharaman*

The detection of semantic concepts in the sports video domain is a challenging task. This article introduces a novel hierarchical framework that supports event sequence detection, semantic concept allocation (e.g., goal scored) and summarization.

### **A Multimodal Data Mining Framework for Revealing Common Sources of Spam Images**

*Chengcui Zhang, Wei-Bang Chen, Xin Chen, Richa Tiwari, Lin Yang, Gary Warner*

Spamming is an overwhelming problem in the today's communication flow. Related to this, the proposed framework provides means for detecting and clustering spam images in order to track spam gangs.

### **Multimodal Preference Aggregation for Multimedia Information Retrieval**

*Eric Bruno, Stephane Marchand-Maillet*

The authors present a novel information representation for multimodal data in combination with a machine-learning based retrieval algorithm and highlight their improved efficiency in contrary to the SVM algorithm.

The editors want to thank all reviewers for their excellent work during the review process:

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#### Guest Editors:

**Mario Döller, Wo L. Chang, Jaime Delgado, and Lionel Brunie**



**Dr. Mario Döller** obtained his PhD from the University Klagenfurt in 2004 and became Assistant Professor at the University of Passau in 2006. Currently, Dr. Döller is substitute of the department's chair and an active member of the MPEG and JPEG consortium. In this duty, Dr. Döller has become editor of the MPEG Query Format, MPEG-7 Audio and JPSearch part 2. In addition, the standardization process of the MPEG Query Format has been administrated by Dr. Döller as Session Chair.

Furthermore, he is in the PC of numerous conferences and participated on the organization committee of EuroPar 2002 conference. In addition, Dr. Döller also participated within the review process of the EU FP6 program. Besides standardization efforts, Dr. Döller is leading industrial projects in the domain of video surveillance systems. His main research interests are any topic in the area of Multimedia Databases (e.g., Data Models, Query Languages, Multimedia Algebra, etc.), Content-Based and Multimodal Retrieval.



**Wo L. Chang** is currently serving as the manager of the Digital Media Group, Information Access Division of Information Technology Laboratory at the National Institute of Standards and Technology. In these duties Mr. Chang oversees several key projects including digital data archival and preservation, motion image quality, and MPEG/JPEG multimedia standards. In the past, Mr. Chang was the Deputy Chair for the US National Body for MPEG (INCITS L3.1) and chaired several key ISO/IEC SC 29 WG11 (MPEG) Ad-Hoc groups including Content-based Search Framework, Multimedia Application Formats, MPEG-7 Profiles and Levels, MPEG-4 Reference Software, and co-chaired the ISO/IEC SC 29 WG1 (JPEG) JPSearch project. Mr. Chang was one of the original members of the W3C's SMIL (Synchronization Multimedia Integration Language) Working Group for more than five years and had developed one of the SMIL reference software. Furthermore, Mr. Chang also participated with the Internet Engineering Task Force (IETF) in the protocols development of Session Initiation Protocol (SIP), Real-time

Transport Protocol (RTP), Real-Time Streaming Protocol (RSTP), Resource-Reservation Protocol (RSVP), Simple Network Management Protocol (SNMP), and Dynamic Host Configuration Protocol (DHCP). Mr. Chang's research interests include digital data preservation, content metadata description, digital file formats, multimedia synchronization, and Internet protocols.



**Prof. Jaime Delgado.** Ph. D. in Telecommunication Engineering since 1987. Telecommunication Engineer since 1983.

Since September 2006, Professor at the Computer Architecture Department of the Universitat Politècnica de Catalunya (UPC) in Barcelona (Spain). Previously, Professor of Computer Networks and Computer Architecture at the Technology Department, Universitat Pompeu Fabra (UPF), also in Barcelona, since 1999.

Head and founder of the Distributed Multimedia Applications Group (DMAG).

Project Manager of several European and national research projects in the areas of electronic commerce, Digital Rights Management, metadata, multimedia content, security and distributed applications.

Active participation, since 1989, in International standardisation, as editor of standards and chairman of groups in ISO/IEC, EWOS, ETSI, ITU-T and CEN/ISSS.

Evaluator and reviewer for the European Commission in different research programs since 1989. Advisor for the Spanish Ministry of Science.

Author of several hundreds of published papers and books, and member or chairman of many Conference International Programme Committees.



**Prof. Lionel Brunie** received his PhD in computer science in 1992 from Joseph Fourier University, Grenoble, France.

He then joined Ecole Normale Supérieure of Lyon, France (LIP lab) as assistant professor. His domain of interest were parallel programming environments, parallel databases and multimedia distributed systems.

Since October 1998, Lionel Brunie is University Professor in computer science at the National Institute of Applied Sciences (INSA) of Lyon, France where he co-founded the LIRIS laboratory in 2002 (the LIRIS lab presently hosts 300 researchers and PhD students). In 1999, Lionel Brunie created INSA e-learning service that he led until 2002. From 2002 to 2006, Lionel Brunie headed the Lyon doctoral school in computer science before being deputy director of the LIRIS lab in 2006-2007. Presently, Lionel Brunie leads a research team of 12 permanent researchers and 30+ PhD students specialized in distributed multimedia systems and multimedia information retrieval. He co-supervises with Pr Dr H. Kosch the German-French doctoral school in Multimedia Distributed and Pervasive Systems.

Lionel Brunie's main topics of interest include: collaborative multimedia information systems, multimedia databases, grid and pervasive systems, medical informatics. Lionel Brunie has led numerous national and international research projects; he is the (co-)author of over 150 research papers; he has been member of over 45 scientific conference and workshop committees.