

Preface to the Special Issue on Content-based Multimedia Indexing

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Content-Based Multimedia Indexing (CBMI) is the multi-disciplinary field broadly aiming at extracting knowledge from multimedia information and providing fluent access to it. CBMI research proposes to develop methods to model, abstract and organise multimedia data in view of fast, effective and accurate access. CBMI covers all the chain from the data to the user. It encompasses a large variety of challenges from multimedia information capture and representation via content understanding and information fusion to effective information indexing and retrieval. Since the early days, CBMI research has therefore produced a wide range of fundamental and application-oriented contributions and has provided methodological guidelines for progressing in the field. Due to its multi-disciplinary nature, CBMI research has also strongly been impacted by progress in adjunct domains such as machine learning, large-scale information storage and processing, and new modes of user interaction.

The International Workshop on Content-based Multimedia Indexing has been established as one of the most important forums for the presentation of the newest ideas and original research results in the field. Following the eight successful previous events of CBMI (Toulouse 1999, Brescia 2001, Rennes 2003, Riga 2005, Bordeaux 2007, London 2008, Chania 2009, Grenoble 2010 and Madrid 2011), CBMI 2012, the 10th edition of the workshop was organised by the LISTIC lab of the University of Savoie, in Annecy, France from June 27th to 29th, 2012. CBMI 2012 brought together the various communities involved studying in the different aspects of the content-based multimedia indexing, retrieval, browsing and presentation issues. The scientific program of CBMI 2012 included invited keynote talks and regular and special sessions with contributed research papers. CBMI 2012 received 54 submissions from over 17 countries (49 papers and 5 demo proposals) from which the program committee selected 24 for oral presentations, 14 for poster presentations and 5 for demo presentations.

This special issue of the MTAP journal was created to publish both new extended versions of CBMI 2012 submitted papers and also completely new contributions. In response to the open call, 19 papers were submitted and after rigorous reviewing according to the journal rules, 6 of them were finally accepted for publication.

The special issue is structured to successively visit all aspects of CBMI. The first two papers study multimedia content representation. “Video Fingerprinting Based on Graph Model” by Xiushan Nie *et al.* propose a model where two graph models are constructed for keyframe selection and foreground extraction, respectively. From a graph-based representation of the video, keyframes are selected and used to identify the foreground in frames of the corresponding shots. “Retina Enhanced SURF Descriptors for Spatio-Temporal Concept Detection” by Sabin Tiberius Strat *et al.* propose to apply a human retina model to preprocess video sequences before constructing the State-Of-The-Art Bag-of-Word analysis.

An advanced formal study of multimedia content understanding is proposed in “Boosted Kernel for Image Categorization” by Alexis Lechervy *et al.* Authors propose a framework to learn an effective kernel function using the Boosting paradigm to linearly combine weak kernels and then use a SVM with such kernels to categorize image databases.

Indexing is addressed by the next two papers. “Efficient Binary Code Indexing with Pivot based Locality Sensitive Clustering” by Wei Zhang *et al.* presents the Pivot Based Locality Sensitive Clustering (PLSC) along with Density Adaptive Binary coding (DAB) in PLSC clusters. This contribution aims at designing an efficient indexing based on binary code clustering and where only codes in estimated relevant clusters are scanned. “Distributed Media indexing based on MPI and MapReduce” by Hisham Mohamed *et al.* proposes an adapted structure of the MapReduce programming model using MPI for multimedia indexing. The aim is to provide a fundamental distributed indexing framework suited to adapt to the large volumes of data inherent to CBMI applications.

Finally “Retrieval of High-Dimensional Visual Data: current state, trends and challenges ahead” by Antonio

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Foncubierta-Rodrguez *et al.* systematically reviews current techniques in various fields of 3D and 4D visual information retrieval and analyses the currently dominating application areas. This paper provides a clear insight on future challenges in the field.

We warmly thank all those who have helped to accomplish the task of successfully organizing this special issue of MTAP and CBMI 2012. We want to thank specially the technical chairs of the conference (Shin'ichi Satoh and Stéphane Marchand-Maillet) and the reviewers of both the conference and this special issue. Their contribution was the basis for selecting the high quality of the works presented here. We also thank all the authors of the papers submitted to the workshop and to this special issue; they constitute the true force behind the success of the workshop and are the first accountable for the quality and the interest of this issue.