Lecture Notes in Computer Science 4918

Commenced Publication in 1973
Founding and Former Series Editors:
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison
Lancaster University, UK

Takeo Kanade
Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler
University of Surrey, Guildford, UK

Jon M. Kleinberg
Cornell University, Ithaca, NY, USA

Alfred Kobsa
University of California, Irvine, CA, USA

Friedemann Mattern
ETH Zurich, Switzerland

John C. Mitchell
Stanford University, CA, USA

Moni Naor
Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz
University of Bern, Switzerland

C. Pandu Rangan
Indian Institute of Technology, Madras, India

Bernhard Steffen
University of Dortmund, Germany

Madhu Sudan
Massachusetts Institute of Technology, MA, USA

Demetri Terzopoulos
University of California, Los Angeles, CA, USA

Doug Tygar
University of California, Berkeley, CA, USA

Gerhard Weikum
Max-Planck Institute of Computer Science, Saarbruecken, Germany

Nozha Boujemaa Marcin Detyniecki
Andreas Nürnberger (Eds.)

Adaptive Multimedia Retrieval: Retrieval, User, and Semantics

5th International Workshop, AMR 2007
Paris, France, July 5-6, 2007
Revised Selected Papers

Springer

Volume Editors

Nozha Boujemaa
INRIA Rocquencourt, 78153 Le Chesnay, France
E-mail: nozha.boujemma@inria.fr

Marcin Detyniecki
University Pierrre and Marie Curie
CNRS - LIP6
75016 Paris, France
E-mail: marcin.detyniecki@lip6.fr

Andreas Nürnberger
Otto-von-Guericke-University Magdeburg
Faculty of Computer Science
39106 Magdeburg, Germany
E-mail: andreas.nuernberger@ovgu.de

Library of Congress Control Number: 2008930128

CR Subject Classification (1998): H.3, H.5.1, H.5.5, I.4, I.2

LNCS Sublibrary: SL 3 – Information Systems and Application,
incl. Internet/Web and HCI

ISSN 0302-9743
ISBN-10 3-540-79859-5 Springer Berlin Heidelberg New York
ISBN-13 978-3-540-79859-0 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

Springer is a part of Springer Science+Business Media

springer.com

© Springer-Verlag Berlin Heidelberg 2008
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 12267644 06/3180 5 4 3 2 1 0

Preface

This book is a selection of the revised contributions that were initially submitted to the International Workshop on Adaptive Multimedia Retrieval (AMR 2007). The workshop was organized at the University Pierre and Marie Curie in Paris, France, during July 5–6, 2007.

The goal of the AMR workshops is to intensify the exchange of ideas between different research communities, to provide an overview of current activities in this area and to point out connections between the diverse involved researches communities, among them the most important ones focussing on multimedia retrieval and artificial intelligence. In this spirit, the first three events where collocated with Artificial Intelligence conferences: in 2003 as a workshop of the 26th German Conference on Artificial Intelligence (KI 2003); in 2004 as part of the 16th European Conference on Artificial Intelligence (ECAI 2004) and in 2005 as part of the 19th International Joint Conference on Artificial Intelligence (IJCAI 05). Because of its success, in 2006 the University of Geneva, Switzerland, organized the workshop for the first time as a standalone event.

In 2007 the workshop revealed three main topics: retrieval, user and semantics. Retrieval, a core subject, was tackled from several perspectives. Researchers were interested not only in the efficiency of the multimedia access by looking at peer-to-peer methods, middleware and databases techniques, but also in the type of retrieved data, ranging from music to images and video. The user was also at the center of attention. Several papers investigated the different ways multimedia data can be searched, as, for instance, through navigation, summaries and interaction. Particular attention was given to methods that try to model the user and its feedback. Finally, in this set of works, it becomes clear that behind the idea of retrieval and user the notion that connects both is hidden: semantics. Most of the works try to respond, at least to a certain degree, to the inherent difficulty when retrieving multimedia data: its non-correspondence between the signal description and the conceptual meaning of the object. Researchers are developing approaches that try either to bridge this gap by, for instance, proposing cross-modal content enrichment through automatic annotation methods, or to get around the difficulty by organizing the meanings through ontologies.

This last point is today at the center of the debate and is emphasized in this book with the two invited contributions presented in the first chapter: "Learning Distance Functions for Automatic Annotation of Images" by Josip Krapac and Frédéric Jurie and "Ontology: Use and Abuse" by Simone Santini. The discussion continues in the other 18 contributions that are classified here into 7 main chapters, following rather closely the workshop's sessions: Image Annotation, Feedback and User Modelling, Music Retrieval, Fusion, P2P and Middleware, Databases and Summarization and Ontology and Semantics. We believe that this book provides a good and conclusive overview of the current research in this area.

We would like to thank all members of the Program Committee for supporting us in the reviewing process, the workshop participants for their willingness to revise and extend their papers for this book, the sponsor for their financial support and Alfred Hofmann from Springer for his support in publishing this book.

January 2008

Nozha Boujemaa
Marcin Detyniecki
Andreas Nürnberger

Organization

General Chair

Nozha Boujemaa	INRIA, Rocquencourt, France

Program Chairs

Marcin Detyniecki	CNRS, Lab. d'Informatique de Paris 6, France
Andreas Nürnberger	University of Magdeburg, Germany

Technical Chair

Christophe Marsala	Lab. d'Informatique de Paris 6 (LIP6), Paris, France

Publicity Chair

Sebastian Stober	University of Magdeburg, Germany

Local Organization

Thomas Bärecke	Lab. d'Informatique de Paris 6 (LIP6), Paris, France

Program Committee

Kobus Barnard	University of Arizona, USA
Jenny Benois-Pineau	University of Bordeaux, LABRI, France
Stefano Berretti	Università di Firenze, Italy
Susanne Boll	University of Oldenburg, Germany
Eric Bruno	University of Geneva, Switzerland
Bogdan Gabrys	Bournemouth University, UK
Ana M. García Serrano	Universidad Politécnica de Madrid, Spain
Xian-Sheng Hua	Microsoft Research, China
Philippe Joly	Université Paul Sabatier, Toulouse, France
Gareth Jones	Dublin City University, Ireland
Joemon Jose	University of Glasgow, UK
Stefanos Kollias	National Technical University of Athens, Greece
Stéphane Marchand-Maillet	University of Geneva, Switzerland

Trevor Martin	University of Bristol, UK
José María Martínez Sánchez	Universidad Autónoma de Madrid, Spain
Bernard Merialdo	Sophia Antipolis Cédex, France
Jan Nesvadba	Philips Research, The Netherlands
Gabriella Pasi	Università degli Studi di Milano Bicocca, Italy
Valery Petrushin	Accenture Technology Labs, Chicago, USA
Stefan Rüger	Imperial College London, UK
Simone Santini	Universidad Autonoma de Madrid, Spain
Raimondo Schettini	University of Milano Bicocca, Italy
Ingo Schmitt	University of Magdeburg, Germany
Nicu Sebe	Leiden University, The Netherlands
Alan F. Smeaton	Dublin City University, Ireland
Arjen De Vries	CWI, Amsterdam, The Netherlands

Supporting Institutions

INRIA, Rocquencourt, France
MUSCLE – EC Network of Excellence Multimedia Understanding through Semantics, Computation and Learning
Universite Pierre & Marie Curie, Paris, France
Laboratoire d'Informatique de Paris 6 (LIP6), France

Table of Contents

Invited Contributions

Learning Distance Functions for Automatic Annotation of Images 1
Josip Krapac and Frédéric Jurie

Ontology: Use and Abuse 17
Simone Santini

Image Annotation

Imagination: Exploiting Link Analysis for Accurate Image Annotation 32
Ilaria Bartolini and Paolo Ciaccia

Automatic Image Annotation Using a Visual Dictionary Based on Reliable Image Segmentation 45
Christian Hentschel, Sebastian Stober, Andreas Nürnberger, and Marcin Detyniecki

Improving Automatic Image Annotation Based on Word Co-occurrence 57
H. Jair Escalante, Manuel Montes, and L. Enrique Sucar

Feedback and User Modelling

Automatic Image Annotation with Relevance Feedback and Latent Semantic Analysis 71
Donn Morrison, Stéphane Marchand-Maillet, and Eric Bruno

A Novel Retrieval Refinement and Interaction Pattern by Exploring Result Correlations for Image Retrieval 85
Rongrong Ji, Hongxun Yao, Shaohui Liu, Jicheng Wang, and Pengfei Xu

User Modelling for Interactive User-Adaptive Collection Structuring 95
Andreas Nürnberger and Sebastian Stober

Music Retrieval

Searching for Music Using Natural Language Queries and Relevance Feedback 109
Peter Knees and Gerhard Widmer

Automatically Detecting Members and Instrumentation of Music Bands Via Web Content Mining 122
Markus Schedl and Gerhard Widmer

A System for Automatic Chord Transcription from Audio Using Genre-Specific Hidden Markov Models 134
Kyogu Lee

Fusion

Information Fusion in Multimedia Information Retrieval 147
Jana Kludas, Eric Bruno, and Stéphane Marchand-Maillet

Multi-level Fusion for Semantic Video Content Indexing and Retrieval 160
Rachid Benmokhtar and Benoit Huet

P2P and Middleware

Image Data Source Selection Using Gaussian Mixture Models 170
Soufyane El Allali, Daniel Blank, Wolfgang Müller, and Andreas Henrich

Designing a Peer-to-Peer Architecture for Distributed Image Retrieval 182
Akrivi Vlachou, Christos Doulkeridis, Dimitrios Mavroeidis, and Michalis Vazirgiannis

Databases and Summarization

Comparison of Dimension Reduction Methods for Database-Adaptive 3D Model Retrieval 196
Ryutarou Ohbuchi, Jun Kobayashi, Akihiro Yamamoto, and Toshiya Shimizu

Smart Photo Sticking 211
Sebastiano Battiato, Gianluigi Ciocca, Francesca Gasparini, Giovanni Puglisi, and Raimondo Schettini

How to Use SIFT Vectors to Analyze an Image with Database Templates 224
Adrien Auclair, Laurent D. Cohen, and Nicole Vincent

Ontology and Semantics

Video Semantic Content Analysis Framework Based on Ontology Combined MPEG-7 237
Liang Bai, Songyang Lao, Weiming Zhang, Gareth J.F. Jones, and Alan F. Smeaton

Trajectory Annotation and Retrieval Based on Semantics 251
Miyoung Cho, Chang Choi, Junho Choi, Hongryoul Yi, and Pankoo Kim

Author Index 265