Lecture Notes in Computer Science

3568

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

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

New York University, NY, USA

Doug Tygar

University of California, Berkeley, CA, USA

Moshe Y. Vardi

Rice University, Houston, TX, USA

Gerhard Weikum

Max-Planck Institute of Computer Science, Saarbruecken, Germany

Wee-Kheng Leow Michael S. Lew Tat-Seng Chua Wei-Ying Ma Lekha Chaisorn Erwin M. Bakker (Eds.)

Image and Video Retrieval

4th International Conference, CIVR 2005 Singapore, July 20-22, 2005 Proceedings



Volume Editors

Wee-Kheng Leow Tat-Seng Chua Lekha Chaisorn National University of Singapore School of Computing 3 Science Drive 2, 117543, Singapore

E-mail: {leowwk,chuats,lekha}@comp.nus.edu.sg

Michael S. Lew Erwin M. Bakker Leiden University LIACS Media Lab

Niels Bohrweg 1, 2333 CA Leiden, The Netherlands

E-mail: {mlew,erwin}@liacs.nl

Wei-Ying Ma Microsoft Research China 3F, Beijing Sigma Building 49 Zhichun Road, Haidian District, Beijing, 100080, China E-mail: wyma@microsoft.com

Library of Congress Control Number: 2005928640

CR Subject Classification (1998): H.3, H.2, H.4, H.5.1, H.5.4-5, I.4

ISSN 0302-9743

ISBN-10 3-540-27858-3 Springer Berlin Heidelberg New York ISBN-13 978-3-540-27858-0 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

springeronline.com

© Springer-Verlag Berlin Heidelberg 2005 Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India Printed on acid-free paper SPIN: 11526346 06/3142 5 4 3 2 1 0

Preface

It was our great pleasure to host the 4th International Conference on Image and Video Retrieval (CIVR) at the National University of Singapore on 20–22 July 2005. CIVR aims to provide an international forum for the discussion of research challenges and exchange of ideas among researchers and practitioners in image/video retrieval technologies. It addresses innovative research in the broad field of image and video retrieval. A unique feature of this conference is the high level of participation by researchers from both academia and industry. Another unique feature of CIVR this year was in its format – it offered both the traditional oral presentation sessions, as well as the short presentation cum poster sessions. The latter provided an informal alternative forum for animated discussions and exchanges of ideas among the participants.

We are pleased to note that interest in CIVR has grown over the years. The number of submissions has steadily increased from 82 in 2002, to 119 in 2003, and 125 in 2004. This year, we received 128 submissions from the international communities: with 81 (63.3%) from Asia and Australia, 25 (19.5%) from Europe, and 22 (17.2%) from North America. After a rigorous review process, 20 papers were accepted for oral presentations, and 42 papers were accepted for poster presentations. In addition to the accepted submitted papers, the program also included 4 invited papers, 1 keynote industrial paper, and 4 invited industrial papers. Altogether, we offered a diverse and interesting program, addressing the current interests and future trends in this area.

We were able to maintain the same stringent acceptance rate as with previous CIVR conferences. It is our hope that interest in CIVR will continue to grow, thereby raising both the quality and profile of the conference. One possibility is to expand the scope of the conference to include related topics such as indexing and retrieval of medical images, 3D models, human motion data, etc. Indeed, a small number of quality papers on 3D model classification and retrieval were accepted for CIVR 2005. Such interactions between the core retrieval community and other related communities may provide a catalyst that will help propel the conference to a greater height.

The CIVR 2005 conference was held in cooperation with the ACM SIGIR, the IEE and the Singapore Computer Society.

July 2005

Wee-Kheng Leow, Michael S. Lew Tat-Seng Chua, Wei-Ying Ma

International Conference on Image and Video Retrieval 2005

Organization

Organizing Committee

General Co-chairs Tat-Seng Chua

National University of Singapore

Wei-Ying Ma

Microsoft Research, Asia

Program Co-chairs Wee Kheng Leow

National University of Singapore

Michael S. Lew

LIACS Media Lab and Leiden University

Practitioner Co-chairs Liang Tien Chia

Nanyang Technological University

Sébastien Gilles LTU Technologies

Publications Chair Erwin M. Bakker

LIACS Media Lab and Leiden University

Lekha Chaisorn

National University of Singapore

Publicity Co-chairs Yi-Ping Hung

National Taiwan University

Yelizaveta Marchenko

National University of Singapore

Posters and Demos Chair Terence Sim

National University of Singapore

Local Arrangements Chair Rui Shi

National University of Singapore

Conference Secretariat Catherine Tan

National University of Singapore

Program Committee

Kiyo Aizawa Erwin M. Bakker Ana Benitez Patrick Bouthemy Phoebe Chen Edward Cooke Alberto Del Bimbo

John Eakins

Graham Finlayson David Forsyth

Theo Gevers
Abby Goodrum
Patrick Gros
Cathal Gurrin

Alan Hanjalic Richard Harvey Alex G. Hauptmann

Paola Hobson

Chiou-Ting Candy Hsu

Yi-Ping Hung Ichiro Ide Horace Ip City Alejandro Jaimes Jesse S. Jin

Mohan Kankanhalli

Josef Kittler Shang-Hong I

Shang-Hong Lai Hervé Le

Hyowon Lee Suh-Yin Lee

Clement Leung

Paul H. Lewis

Mingjing Li Joo Hwee Lim

Ching-Yung Lin

Tiecheng Liu R. Manmatha

Stephane Marchand-Maillet

Jiri (George) Matas

Bernard Merialdo

University of Tokyo
Leiden University
Thomson Research
IRISA/INRIA
Deakin University
Dublin City University
University of Florence
University of Northumbria
University of East Anglia

UC Berkeley

University of Amsterdam Syracuse University IRISA/CNRS

Dublin City University

Delft University of Technology University of East Anglia Carnegie Mellon University Motorola Research Labs National Tsing Hua University

National Taiwan University
National Institute of Informatics

Fuji Xerox

University of Sydney

University of Hong Kong

National University of Singapore

University of Surrey

National Tsing Hua University Borgne Dublin City University

Dublin City University

National Chiao Tung University

Victoria University

University of Southampton Microsoft Research Asia

Institute for Infocomm Research

IBM Research

University of South Carolina

University of Massachusetts Amherst

University of Geneva Czech Technical University

Eurecom

Table of Contents

Invited Presentations

Lessons for the Future from a Decade of Informedia Video Analysis	
Research Alexander G. Hauptmann	1
1100aunuur C. 11aupintuitti	
Large Scale Evaluations of Multimedia Information Retrieval:	
The TRECVid Experience	
Alan F. Smeaton	11
Image and Video Retrieval from a User-Centered Mobile Multimedia	
Perspective	
Susanne Boll	18
Multimedia Research Challenges for Industry	
John R. Smith, Milind Naphade, Apostol (Paul) Natsev,	
Jelena Tesic	28
Industrial Presentations	
Practical Applications of Multimedia Search	
Ramesh Jain	38
Video Story Segmentation and Its Application to Personal Video	
Recorders	
Keiichiro Hoashi, Masaru Sugano, Masaki Naito,	
Kazunori Matsumoto, Fumiaki Sugaya	39
High-Speed Dialog Detection for Automatic Segmentation of Recorded	
TV Program	
Hisashi Aoki	49
Intellectual Property Management & Protection and Digital Right	
Management in MPEG	
Sheng-Mei Shen	59
The Law II of the Alian Decision	
Towards Media Semantics: An I2R Perspective Qibin Sun	60
George Date	UU

Video Retrieval Techniques

A Comparison of Score, Rank and Probability-Based Fusion Methods for Video Shot Retrieval Kieran McDonald, Alan F. Smeaton	61
EMD-Based Video Clip Retrieval by Many-to-Many Matching Yuxin Peng, Chong-Wah Ngo	71
Video Story Segmentation and Event Detection	
Visual Cue Cluster Construction via Information Bottleneck Principle and Kernel Density Estimation Winston H. Hsu, Shih-Fu Chang	82
Story Segmentation in News Videos Using Visual and Text Cues Yun Zhai, Alper Yilmaz, Mubarak Shah	92
Boundary Error Analysis and Categorization in the TRECVID News Story Segmentation Task Joaquim Arlandis, Paul Over, Wessel Kraaij	103
Semantic Event Detection in Structured Video Using Hybrid HMM/SVM Tae Meon Bae, Cheon Seog Kim, Sung Ho Jin, Ki Hyun Kim, Yong Man Ro	113
Semantics in Video Retrieval	
What Can Expressive Semantics Tell: Retrieval Model for a Flash-Movie Search Engine Dawei Ding, Jun Yang, Qing Li, Wenyin Liu, Liping Wang	123
The Use and Utility of High-Level Semantic Features in Video Retrieval Michael G. Christel, Alexander G. Hauptmann	134
Image Indexing and Retrieval	
Efficient Shape Indexing Using an Information Theoretic Representation Eric Spellman, Baba C. Vemuri	145
Efficient Compressed Domain Target Image Search and Retrieval Javier Bracamonte, Michael Ansorge, Fausto Pellandini, Pierre-André Farine	154

An Effective Multi-dimensional Index Strategy for Cluster Architectures Li Wu, Timo Bretschneider	164
Image/Video Annotation and Clustering	
Systematic Evaluation of Machine Translation Methods for Image and Video Annotation Paola Virga, Pinar Duygulu	174
Automatic Image Semantic Annotation Based on Image-Keyword Document Model Xiangdong Zhou, Lian Chen, Jianye Ye, Qi Zhang,	
Baile Shi	184
Region-Based Image Clustering and Retrieval Using Multiple Instance Learning	
Chengcui Zhang, Xin Chen	194
Interactive Video Retrieval and Others	
Interactive Video Search Using Multilevel Indexing John Adcock, Matthew Cooper, Andreas Girgensohn, Lynn Wilcox	205
Assessing Effectiveness in Video Retrieval Alexander G. Hauptmann, Wei-Hao Lin	215
Image/Video Retrieval Applications	
Person Spotting: Video Shot Retrieval for Face Sets Josef Sivic, Mark Everingham, Andrew Zisserman	226
Robust Methods and Representations for Soccer Player Tracking and Collision Resolution	00-
Lluis Barceló, Xavier Binefa, John R. Kender	237
Modeling Multi-object Spatial Relationships for Satellite Image Database Indexing and Retrieval	
Grant Scott, Matt Klaric, Chi-Ren Shyu	247

Video Processing, Retrieval and Multimedia Systems (Poster)

Matching Yuxin Peng, Chong-Wah Ngo	257
Domain Knowledge Ontology Building for Semantic Video Event Description Dan Song, Hai Tao Liu, Miyoung Cho, Hanil Kim,	
Pankoo Kim	267
An Effective News Anchorperson Shot Detection Method Based on Adaptive Audio/Visual Model Generation Sang-Kyun Kim, Doo Sun Hwang, Ji-Yeun Kim, Yang-Seock Seo	276
Dialogue Sequence Detection in Movies Bart Lehane, Noel O'Connor, Noel Murphy	286
Person Tracking and Multicamera Video Retrieval Using Floor Sensors in a Ubiquitous Environment Gamhewage C. de Silva, T. Ishikawa, T. Yamasaki, K. Aizawa	297
Style Similarity Measure for Video Documents Comparison Siba Haidar, Philippe Joly, Bilal Chebaro	307
An Invariant Representation for Matching Trajectories Across Uncalibrated Video Streams Walter Nunziati, Stan Sclaroff, Alberto Del Bimbo	318
Cyclic Sequence Comparison Using Dynamic Warping Nafiz Arica	328
Design and Implementation of a Bandwidth Sensitive Distributed Continuous Media File System Using the Fibre Channel Network Cuneyt Akinlar, Sarit Mukherjee	336
Advanced Documents Authoring Tool Kwangjin Hong, Keechul Jung	346
A Complete Keypics Experiment with Size Functions Andrea Cerri, Massimo Ferri, Daniela Giorgi	357
Using Projective Invariant Properties for Efficient 3D Reconstruction Bo-Ra Seok, Yong-Ho Hwang, Hyun-Ki Hong	367

Table of Contents	XV
Web-Based Hybrid Visualization of Medical Images Sun K. Yoo, Jaehong Key, Kuiwon Choi, Jinho Jo	376
Similarity-Based Retrieval Method for Fractal Coded Images in the Compressed Data Domain Takanori Yokoyama, Toshinori Watanabe, Hisashi Koga	385
A Robust Image Enhancement Technique for Improving Image Visual Quality in Shadowed Scenes Li Tao, Vijayan K. Asari	395
Contents Recycling Using Content-Based Image Retrieval on Mobile Device Eunjung Han, Anjin Park, Keechul Jung	405
Trading Precision for Speed: Localised Similarity Functions Peter Howarth, Stefan Rüger	415
Content-Based Object Movie Retrieval by Use of Relevance Feedback Li-Wei Chan, Cheng-Chieh Chiang, Yi-Ping Hung	425
Towards Automatic Classification of 3-D Museum Artifacts Using Ontological Concepts Simon Goodall, Paul H. Lewis, Kirk Martinez	435
Chi-Square Goodness-of-Fit Test of 3D Point Correspondence for Model Similarity Measure and Analysis Jun Feng, Horace H.S. Ip	445
Image Feature Extraction, Indexing and Retrieval (Poster)	
Edge-Based Spatial Descriptor for Content-Based Image Retrieval N.W. Kim, T.Y. Kim, J.S. Choi	454
Distributional Distances in Color Image Retrieval with GMVQ-Generated Histograms Sangoh Jeong	465
A Novel Texture Descriptor Using Over-Complete Wavelet Transform and Its Fractal Signature	400
Oina Wana David Fena	476

Region Filtering Using Color and Texture Features for Image Retrieval	
Cheng-Chieh Chiang, Ming-Han Hsieh, Yi-Ping Hung, Greg C. Lee	487
Automatic Annotation of Images from the Practitioner Perspective Peter G.B. Enser, Christine J. Sandom, Paul H. Lewis	497
Automated Image Annotation Using Global Features and Robust Nonparametric Density Estimation Alexei Yavlinsky, Edward Schofield, Stefan Rüger	507
Semantic Annotation of Image Groups with Self-Organizing Maps Markus Koskela, Jorma Laaksonen	518
A Conceptual Image Retrieval Architecture Combining Keyword-Based Querying with Transparent and Penetrable Query-by-Example Mohammed Belkhatir, Philippe Mulhem, Yves Chiaramella	528
On Image Retrieval Using Salient Regions with Vector-Spaces and Latent Semantics Jonathon S. Hare, Paul H. Lewis	540
Natural/Man-Made Object Classification Based on Gabor Characteristics Minhwan Kim, Changmin Park, Kyongmo Koo	550
Image Object Recognition by SVMs and Evidence Theory Zijian Deng, Bicheng Li, Jun Zhuang	560
Improvement on PCA and 2DPCA Algorithms for Face Recognition Vo Dinh Minh Nhat, Sungyoung Lee	568
Person Search Made Easy Nazlı İkizler, Pınar Duygulu	578
Learning Shapes for Image Classification and Retrieval Natasha Mohanty, Toni M. Rath, Audrey Lee, R. Manmatha	589
A Heuristic Search for Relevant Images on the Web Feiyang Yu, Horace H.S. Ip, Clement H. Leung	599
Image Browsing: Semantic Analysis of NN^k Networks Daniel Heesch, Stefan Rüger	609

Automated Liver Detection in Ultrasound Images Nualsawat Hiransakolwong	619
A Weakly Supervised Approach for Semantic Image Indexing and Retrieval	
Nicolas Maillot, Monique Thonnat	629
Aspect-Based Relevance Learning for Image Retrieval Mark J. Huiskes	639
Content-Free Image Retrieval by Combinations of Keywords and User Feedbacks Shingo Uchihashi, Takeo Kanade	650
Improved AdaBoost-Based Image Retrieval with Relevance Feedback via Paired Feature Learning	
Szu-Hao Huang, Qi-Jiunn Wu, Shang-Hong Lai	660
Author Index	671

Table of Contents XVII