Lecture Notes in Computer Science 3872

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

Editorial Board

Horst Bunke A. Lawrence Spitz (Eds.)

Document Analysis Systems VII

7th International Workshop, DAS 2006
Nelson, New Zealand, February 13-15, 2006
Proceedings

Springer

Volume Editors

Horst Bunke
University of Bern
Department of Computer Science
Neubrückstr. 10, 3012 Bern, Switzerland
E-mail: bunke@iam.unibe.ch

A. Lawrence Spitz
DocRec Ltd
34 Strathaven Place, Atawhai, Nelson 7001, New Zealand
E-mail: spitz@docrec.com

Library of Congress Control Number: 2005939178

CR Subject Classification (1998): I.5, H.3, I.4, I.7, J.1, J.2

LNCS Sublibrary: SL 6 – Image Processing, Computer Vision, Pattern Recognition, and Graphics

ISSN 0302-9743
ISBN-10 3-540-32140-3 Springer Berlin Heidelberg New York
ISBN-13 978-3-540-32140-8 Springer Berlin Heidelberg New York

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 11669487 06/3142 5 4 3 2 1 0

Preface

DAS 2006 is the Seventh International Association for Pattern Recognition Workshop on Document Analysis Systems and was held in Nelson, New Zealand. DAS 2006 built on the tradition of past workshops held in Kaiserslautern, Germany (1994), Malvern, PA (1996), Nagano, Japan (1998), Rio de Janeiro, Brazil (2000), Princeton, NJ (2002), and Florence, Italy (2004). The goal of this meeting was to bring together those who have designed systems, or systems components, to solve real-world problems in document analysis.

Document analysis systems is inherently an interdisciplinary field encompassing such diverse disciplines as image processing, pattern recognition, document structure and natural language processing. DAS 2006 attempted to bring these disciplines together and to provide interactions between systems developers, suppliers and end users.

We received 78 papers from 19 countries. Each submission was reviewed by three reviewers. In addition to the Program Committee members, 42 other reviewers helped in this process. From those submissions and their reviews, we went through the difficult and sometimes painful process of ranking papers for acceptance or rejection. In the end we accepted 33 papers for oral presentation and 22 for presentation at poster sessions.

We, the Co-chairmen of DAS 2006, wish to express our gratitude to all of our colleagues who have reviewed the papers submitted for this conference.

We are proud to have brought two distinguished speakers to Nelson for keynote addresses: Ian Witten of the University of Waikato, the father of the New Zealand Digital Library, and James Fruchterman, a pioneer in modern commercial optical character recognition and currently CEO of Benetech.

We owe a special debt of gratitude to Marcus Liwicki of the University of Bern for his tireless work at maintaining the website, managing the flow of papers and reviews into the ConfMan system and assembling the proceedings for publication by Springer. He was ably assisted by Andreas Schlapbach.

We are fortunate that Siemens, Hitachi and Humanware provided DAS with financial support, and we thank them for doing so. Additionally, following the DAS tradition, the organizers of DAS 2004 have passed on the surplus from running that workshop for our use.

But ultimately it is the collection of authors who submitted papers to DAS to whom we owe the greatest gratitude. It is on them and their high-quality submissions that the success of DAS 2006 relies.

February 2006

Horst Bunke and Larry Spitz
Program Chairs
DAS 2006

Organization

DAS 2006 was organized by DocRec Ltd.

Executive Committee

Conference Chairs: Larry Spitz (DocRec Ltd, New Zealand)
Horst Bunke (University of Bern, Switzerland)

Program Committee

Apostolos Antonacopoulos (UK)
Henry Baird (USA)
Thomas Breuel (Germany)
Horst Bunke (Switzerland)
Andreas Dengel (Germany)
David Doermann (USA)
Andrew Downton (UK)
Michael Fairhurst (UK)
Hiromichi Fujisawa (Japan)
Venugopal Govindaraju (USA)
Tin Kam Ho (USA)
Jianying Hu (USA)
Rolf Ingold (Switzerland)
Rangachar Kasturi (USA)
Koichi Kise (Japan)
Seong-Whan Lee (Korea)
Daniel Lopresti (USA)
Raghavan Manmatha (USA)
Simone Marinai (Italy)
Udo Miletzki (Germany)
Yasuaki Nakano (Japan)
Larry Spitz (New Zealand)
Karl Tombre (France)

Referees

Stefan Agne
Andrew Bagdanov
Ardhendu Behera
Koustav Bhattacharya
Alain Biem
Jean-Luc Blöchle
Matthew Boonstra
Jakob Brendel
Joshua Candamo
Farzin Deravi

Faisal Farooq
Gunnar Grimnes
Richard Guest
Sanaul Hoque
Gareth Howells
Jonathan Hull
Masakazu Iwamura
Stefan Jaeger
Thomas Kieninger
Malte Kiesel
Bertin Klein
Dar-Shyang Lee
Hansheng Lei
Jian Liang
Rainer Lindwurm
Vasant Manohar
Dalila Mekhaldi
David Mihalcik
Tristan Miller
Pranab Mohanty
Sunita Nayak
Shinichiro Omachi
Christoph Pesch
Maurizio Rigamonti
Thomas Roth-Berghofer
Sven Schwarz
Karthik Sridharan
Seiichi Uchida
Himanshu Vajaria
Ludger van Elst
Shankar Vembu
Alan Yang

Sponsoring Institutions

Siemens AG, Munich, Germany
HumanWare Group, Christchurch, New Zealand
Hitachi Central Research Laboratory, Tokyo, Japan

Scientific Sponsors

DocRec Ltd, Atawhai, Nelson, New Zealand
University of Bern, Switzerland
International Association for Pattern Recognition

Table of Contents

Session 1: Digital Libraries

Session 2: Image Processing

Session 3: Handwriting 1

Session 4: Document Structure and Format

Session 5: Tables

Session 6: Handwriting 2

Session 7: Language and Script Identification

Session 9: Systems and Performance Evaluation

Session 10: Retrieval and Segmentation

Posters