

Lecture Notes in Computer Science

2489

Edited by G. Goos, J. Hartmanis, and J. van Leeuwen

Springer

Berlin

Heidelberg

New York

Barcelona

Hong Kong

London

Milan

Paris

Tokyo

Takeyoshi Dohi Ron Kikinis (Eds.)

Medical Image Computing and Computer-Assisted Intervention – MICCAI 2002

5th International Conference
Tokyo, Japan, September 25-28, 2002
Proceedings, Part II



Springer

Series Editors

Gerhard Goos, Karlsruhe University, Germany
Juris Hartmanis, Cornell University, NY, USA
Jan van Leeuwen, Utrecht University, The Netherlands

Volume Editors

Takeyoshi Dohi
Department of Mechano-informatics
Graduate School of Information Science and Technology
University of Tokyo, 7-3-1 Hongo Bunkyo-ku, 113-8656 Tokyo, Japan
E-mail: dohi@miki.pe.u-tokyo.ac.jp

Ron Kikinis
Department of Radiology, Brigham and Women's Hospital
75 Francis St., MA, 02115 Boston, USA
E-mail: kikinis@bwh.harvard.edu

Cataloging-in-Publication Data applied for

Die Deutsche Bibliothek - CIP-Einheitsaufnahme

Medical image computing and computer assisted intervention :
5th international conference ; proceedings / MICCAI 2002, Tokyo, Japan,
September 25 - 28, 2002. Takeyoshi Dohi ; Ron Kikinis (ed.). - Berlin ;
Heidelberg ; New York ; Hong Kong ; London ; Milan ; Paris ; Tokyo :
Springer
Pt. 2. - (2002)
(Lecture notes in computer science ; Vol. 2489)
ISBN 3-540-44225-1

CR Subject Classification (1998): I.5, I.4, I.3.5-8, I.2.9-10, J.3

ISSN 0302-9743

ISBN 3-540-44225-1 Springer-Verlag 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-Verlag. Violations are liable for prosecution under the German Copyright Law.

Springer-Verlag Berlin Heidelberg New York
a member of BertelsmannSpringer Science+Business Media GmbH

<http://www.springer.de>

© Springer-Verlag Berlin Heidelberg 2002
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Olgun Computergrafik
Printed on acid-free paper SPIN: 10870643 06/3142 5 4 3 2 1 0

Preface

The fifth international Conference in Medical Image Computing and Computer Assisted Intervention (MICCAI 2002) was held in Tokyo from September 25th to 28th, 2002. This was the first time that the conference was held in Asia since its foundation in 1998. The objective of the conference is to offer clinicians and scientists the opportunity to collaboratively create and explore the new medical field. Specifically, MICCAI offers a forum for the discussion of the state of art in computer-assisted interventions, medical robotics, and image processing among experts from multi-disciplinary professions, including but not limited to clinical doctors, computer scientists, and mechanical and biomedical engineers. The expectations of society are very high; the advancement of medicine will depend on computer and device technology in coming decades, as they did in the last decades.

We received 321 manuscripts, of which 41 were chosen for oral presentation and 143 for poster presentation. Each paper has been included in these proceedings in eight-page full paper format, without any differentiation between oral and poster papers. Adherence to this full paper format, along with the increased number of manuscripts, surpassing all our expectations, has led us to issue two proceedings volumes for the first time in MICCAI's history. Keeping to a single volume by assigning fewer pages to each paper was certainly an option for us considering our budget constraints. However, we decided to increase the volume to offer authors maximum opportunity to argue the state of art in their work and to initiate constructive discussions among the MICCAI audience.

It was our great pleasure to welcome all MICCAI 2002 attendees to Tokyo. Japan, in fall, is known for its beautiful foliage all over the country. The traditional Japanese architectures always catches the eyes of visitors to Japan. We hope that all the MICCAI attendees took the opportunity to enjoy Japan and that they had a scientifically fruitful time at the conference. Those who could not attend the conference should keep the proceedings as a valuable source of information for their academic activities.

We look forward to seeing you at another successful MICCAI in Toronto in 2003.

July 2002

DOHI Takeyoshi and Ron Kikinis

Organizing Committee

Honorary Chair

Kintomo Takakura

Tokyo Women's Medical University, Japan

General Chair

Takeyoshi Dohi

The University of Tokyo, Japan

Terry Peters

University of Western Ontario, Canada

Junichiro Toriwaki

Nagoya University, Japan

Program Chair

Ron Kikinis

Harvard Medical School and Brigham and Women's Hospital, USA

Program Co-chairs

Randy Ellis

Queen's University at Kingston, Canada

Koji Ikuta

Nagoya University, Japan

Gabor Szekely

Swiss Federal Institute of Technology, ETH Zentrum, Switzerland

Tutorial Chair

Yoshinobu Sato

Osaka University, Japan

Industrial Liaison

Masakatsu Fujie

Waseda University, Japan

Makoto Hashizume

Kyushu University, Japan

Hiroshi Iseki

Tokyo Women's Medical University, Japan

Program Review Committee

Alan Colchester	University of Kent at Canterbury, UK
Wei-Qi Wang	Dept. of E., Fudan University, China
Yongmei Wang	The Chinese University of Hong Kong, China
Jocelyne Troccaz	TIMC Laboratory, France
Erwin Keeve	Research Center Caesar, Germany
Frank Tendick	University of California, San Francisco, USA
Sun I. Kim	Hanyang University, Korea
Pierre Hellier	INRIA Rennes, France
Pheng Ann Heng	The Chinese University of Hong Kong, China
Gabor Szekely	Swiss Federal Institute of Technology Zurich, Switzerland
Kirby Vosburgh	CIMIT/MGH/Harvard Medical School, USA
Allison M. Okamura	Johns Hopkins University, USA
James S. Duncan	Yale University, USA
Baba Vemuri	University of Florida, USA
Terry M. Peters	The John P. Robarts Research Institute, Canada
Allen Tannenbaum	Georgia Institute of Technology, USA
Richard A. Robb	Mayo Clinic, USA
Brian Davies	Imperial College London, UK
David Hawkes	King's College London, UK
Carl-Fredrik Westin	Harvard Medical School, USA
Chris Taylor	University of Manchester, UK
Derek Hill	King's College London, UK
Ramin Shahidi	Stanford University, USA
Demetri Terzopoulos	New York University, USA
Shuqian Luo	Capital University of Medical Sciences, USA
Paul Thompson	UCLA School of Medicine, USA
Simon Warfield	Harvard Medical School, USA
Gregory D. Hager	Johns Hopkins University, USA
Kiyoyuki Chinzei	AIST, Japan
Shinichi Tamura	Osaka University, Japan
Jun Toriwaki	Nagoya University, Japan
Yukio Kosugi	Tokyo Institute of Technology, Japan
Jing Bai	Tsinghua University, China
Philippe Cinquin	UJF (University Joseph Fourier), France
Xavier Pennec	INRIA Sophia-Antipolis, France
Frithjof Kruggel	Max-Planck-Institute for Cognitive Neuro- science, Germany

Ewert Bengtsson	Uppsala University, Finland
Ève Coste Manière	INRIA Sophia Antipolis, France
Milan Sonka	University of Iowa, USA
Branislav Jaramaz	West Penn Hospital, USA
Dimitris Metaxas	Rutgers University, USA
Tianzi Jiang	Chinese Academy of Sciences, China
Tian-ge Zhuang	Shanghai Jiao tong University, China
Masakatsu G. Fujie	Waseda University, Japan
Takehide Asano	Chiba University, Japan
Ichiro Sakuma	The University of Tokyo, Japan
Alison Noble	University of Oxford, UK
Heinz U. Lemke	Technical University Berlin, Germany
Robert Howe	Harvard University, USA
Michael I Miga	Vanderbilt University, USA
Hervé Delingette	INRIA Sophia Antipolis, France
D. Louis Collins	Montreal Neurological Institute, McGill University, Canada
Kunio Doi	University of Chicago, USA
Scott Delp	Stanford University, USA
Louis L. Whitcomb	Johns Hopkins University, USA
Michael W. Vannier	University of Iowa, USA
Jin-Ho Cho	Kyungpook National University, Korea
Yukio Yamada	University of Electro-Communications, Japan
Yuji Ohta	Ochanomizu University, Japan
Karol Miller	The University of Western Australia
William (Sandy) Wells	Harvard Medical School, Brigham and Women's Hosp., USA
Kevin Montgomery	National Biocomputation Center/Stanford University, USA
Kiyoshi Naemura	Tokyo Women's Medical University, Japan
Yoshihiko Nakamura	The University of Tokyo, Japan
Toshio Nakagohri	National Cancer Center Hospital East, Japan
Yasushi Yamauchi	AIST, Japan
Masaki Kitajima	Keio University, Japan
Hiroshi Iseki	Tokyo Women's Medical University, Japan
Yoshinobu Sato	Osaka University, Japan
Amami Kato	Osaka University School of Medicine, Japan
Eiju Watanabe	Tokyo Metropolitan Police Hospital, Japan
Miguel Angel Gonzalez Ballester	INRIA Sophia Antipolis, France
Yoshihiro Muragaki	Tokyo Women's Medical University, Japan

Makoto Hashizume	Kyushu University, Japan
Paul Suetens	K.U. Leuven, Medical Image Computing, Belgium
Michael D. Sherar	Ontario Cancer Institute/University of Toronto, Canada
Kyojiro Nambu	Medical Systems Company, Toshiba Corpora- tion, Japan
Naoki Suzuki	Institute for High Dimensional Medical Imag- ing, Jikei University School of Medicine, Japan
Nobuhiko Sugano	Osaka University, Japan
Etsuko Kobayashi	The University of Tokyo, Japan
Grégoire Malandain	INRIA Sophia Antipolis, France
Russell H. Taylor	Johns Hopkins University, USA
Maryellen Giger	University of Chicago, USA
Hideaki Koizumi	Advanced Research Laboratory, Hitachi, Ltd., Japan
Rjan Smedby	Linköping University, Sweden
Karl Heinz Hoene	University of Hamburg, Germany
Sherif Makram-Ebeid	Philips Research France
Stéphane Lavallée	PRAXIM, France
Josien Pluim	University Medical Center Utrecht, The Netherlands
Darwin G. Caldwell	University of Salford, England
Vaillant Regis	GEMS, Switzerland
Nassir Navab	Siemens Corporate Research, USA
Eric Grimson	MIT AI Lab, USA
Wiro Niessen	University Medical Center Utrecht, The Netherlands
Richard Satava	Yale University School of Medicine, USA
Takeyoshi Dohi	The University of Tokyo, Japan
Guido Gerig	UNC Chapel Hill, Department of Computer Science, USA
Ferenc Jolesz	Brigham and Womens Hospital Harvard Medi- cal School, USA
Leo Joskowicz	The Hebrew University of Jerusalem, ISRAEL
Antonio Bicchi	University of Pisa, Italy
Wolfgang Schlegel	DKFZ, Germany
Richard Bucholz	Saint Louis University School of Medicine, USA
Robert Galloway	Vanderbilt University, USA
Juan Ruiz-Alzola	University of Las Palmas de Gran Canaria, Spain

Tim Salcudean	University of British Columbia, Canada
Stephen Pizer	University of North Carolina, USA
J. Michael Fitzpatrick	Vanderbilt University, USA
Gabor Fichtinger	Johns Hopkins University, USA
Koji Ikuta	Nagoya University, Japan
Jean Louis Coatrieux	University of Rennes-INSERM, France
Jaydev P. Desai	Drexel University, USA
Chris Johnson	Scientific Computing and Imaging Institute, USA
Luc Soler	IRCAD, France
Wieslaw L. Nowinski	Biomedical Imaging Lab, Singapore
Andreas Pommert	University Hospital Hamburg-Eppendorf, Germany
Heinz-Otto Peitgen	MeVis, Germany
Rudolf Fahlbusch	Neurochirurgische Klinik, Germany
Simon Wildermuth	University Hospital Zurich, Inst. Diagnostic Radiology, Switzerland
Chuck Meyer	University of Michigan, USA
Johan Van Cleynenbreugel	Medical Image Computing, ESAT-Radiologie, K.U. Leuven, Belgium
Dirk Vandermeulen	K.U. Leuven, Belgium
Karl Rohr	International University in Germany, Germany
Martin Styner	Duke Image Analysis Lab, UNC Neuro Image Analysis Lab, Germany
Catherina R. Burghart	University of Karlsruhe, Germany
Fernando Bello	Imperial College of Science, Technology and Medicine, UK
Colin Studholme	University of California, San Francisco, USA
Dinesh Pai	University of British Columbia, Canada
Paul Milgram	University of Toronto, Canada
Michael Bronskill	University of Toronto/Sunnybrook Hospital, Canada
Nobuhiko Hata	The University of Tokyo, Japan
Ron Kikinis	Brigham and Women's Hospital and Harvard Medical School, USA
Lutz Nolte	University of Bern, Germany
Ralph Mosges	IMSIE Univ. of Cologne, Germany
Bart M. ter Haar Romeny	Eindhoven University of Technology, The Netherlands
Steven Haker	Brigham and Women's Hospital and Harvard Medical School, USA

Local Organizing Committee

Ichiro Sakuma	The University of Tokyo, Japan
Mitsuo Shimada	Kyushu University, Japan
Nobuhiko Hata	The University of Tokyo, Japan
Etsuko Kobayashi	The University of Tokyo, Japan

MICCAI Board

Alan C.F. Colchester (General Chair)	University of Kent at Canterbury, UK
Nicholas Ayache	INRIA Sophia Antipolis, France
Anthony M. DiGioia	UPMC Shadyside Hospital, Pittsburgh, USA
Takeyoshi Dohi	University of Tokyo, Japan
James Duncan	Yale University, New Haven, USA
Karl Heinz Höhne	University of Hamburg, Germany
Ron Kikinis	Harvard Medical School , Boston, USA
Stephen M. Pizer	University of North Carolina, Chapel Hill, USA
Richard A. Robb	Mayo Clinic, Rochester, USA
Russell H. Taylor	Johns Hopkins University, Baltimore, USA
Jocelyne Troccaz	University of Grenoble, France
Max A. Viergever	University Medical Center Utrecht, The Netherlands

Table of Contents, Part I

Robotics – Endoscopic Device

Using an Endoscopic Solo Surgery Simulator for Quantitative Evaluation of Human-Machine Interface in Robotic Camera Positioning Systems	1
<i>A. Nishikawa, D. Negoro, H. Kakutani, F. Miyazaki, M. Sekimoto, M. Yasui, S. Takiguchi, M. Monden</i>	
Automatic 3-D Positioning of Surgical Instruments during Robotized Laparoscopic Surgery Using Automatic Visual Feedback	9
<i>A. Krupa, M. de Mathelin, C. Doignon, J. Gangloff, G. Morel, L. Soler, J. Leroy, J. Marescaux</i>	
Development of a Compact Cable-Driven Laparoscopic Endoscope Manipulator	17
<i>P.J. Berkelman, P. Cinquin, J. Troccaz, J.-M. Ayoubi, C. Létoublon</i>	
Flexible Calibration of Actuated Stereoscopic Endoscope for Overlay in Robot Assisted Surgery	25
<i>F. Mourgues, È. Coste-Manière</i>	
Metrics for Laparoscopic Skills Trainers: The Weakest Link!	35
<i>S. Cotin, N. Stylopoulos, M. Ottensmeyer, P. Neumann, D. Rattner, S. Dawson</i>	
Surgical Skill Evaluation by Force Data for Endoscopic Sinus Surgery Training System	44
<i>Y. Yamauchi, J. Yamashita, O. Morikawa, R. Hashimoto, M. Mochimaru, Y. Fukui, H. Uno, K. Yokoyama</i>	
Development of a Master Slave Combined Manipulator for Laparoscopic Surgery – Functional Model and Its Evaluation	52
<i>M. Jinno, N. Matsuhira, T. Sunaoshi, T. Hato, T. Miyagawa, Y. Morikawa, T. Furukawa, S. Ozawa, M. Kitajima, K. Nakazawa</i>	
Development of Three-Dimensional Endoscopic Ultrasound System with Optical Tracking	60
<i>N. Koizumi, K. Sumiyama, N. Suzuki, A. Hattori, H. Tajiri, A. Uchiyama</i>	
Real-Time Haptic Feedback in Laparoscopic Tools for Use in Gastro-Intestinal Surgery	66
<i>T. Hu, A.E. Castellanos, G. Tholey, J.P. Desai</i>	
Small Occupancy Robotic Mechanisms for Endoscopic Surgery	75
<i>Y. Kobayashi, S. Chiyoda, K. Watabe, M. Okada, Y. Nakamura</i>	

Robotics in Image-Guided Surgery

Development of MR Compatible Surgical Manipulator toward a Unified Support System for Diagnosis and Treatment of Heart Disease	83
<i>F. Tajima, K. Kishi, K. Nishizawa, K. Kan, Y. Nemoto, H. Takeda, S. Umemura, H. Takeuchi, M.G. Fujie, T. Dohi, K. Sudo, S. Takamoto</i>	
Transrectal Prostate Biopsy Inside Closed MRI Scanner with Remote Actuation, under Real-Time Image Guidance	91
<i>G. Fichtinger, A. Krieger, R.C. Susil, A. Tanacs, L.L. Whitcomb, E. Atalar</i>	
A New, Compact MR-Compatible Surgical Manipulator for Minimally Invasive Liver Surgery	99
<i>D. Kim, E. Kobayashi, T. Dohi, I. Sakuma</i>	
Micro-grasping Forceps Manipulator for MR-Guided Neurosurgery	107
<i>N. Miyata, E. Kobayashi, D. Kim, K. Masamune, I. Sakuma, N. Yahagi, T. Tsuji, H. Inada, T. Dohi, H. Iseki, K. Takakura</i>	
Endoscope Manipulator for Trans-nasal Neurosurgery, Optimized for and Compatible to Vertical Field Open MRI	114
<i>Y. Koseki, T. Washio, K. Chinzei, H. Iseki</i>	
A Motion Adaptable Needle Placement Instrument Based on Tumor Specific Ultrasonic Image Segmentation	122
<i>J.-S. Hong, T. Dohi, M. Hasizume, K. Konishi, N. Hata</i>	

Robotics – Tele-operation

Experiment of Wireless Tele-echography System by Controlling Echographic Diagnosis Robot	130
<i>K. Masuda, N. Tateishi, Y. Suzuki, E. Kimura, Y. Wie, K. Ishihara</i>	
Experiments with the TER Tele-echography Robot	138
<i>A. Vilchis, J. Troccaz, P. Cinquin, A. Guerraz, F. Pellisier, P. Thorel, B. Tondou, F. Courrèges, G. Poisson, M. Althuser, J.-M. Ayoubi</i>	
The Effect of Visual and Haptic Feedback on Manual and Teleoperated Needle Insertion	147
<i>O. Gerovichev, P. Marayong, A.M. Okamura</i>	
Analysis of Suture Manipulation Forces for Teleoperation with Force Feedback	155
<i>M. Kitagawa, A.M. Okamura, B.T. Bethea, V.L. Gott, W.A. Baumgartner</i>	

Remote Microsurgery System for Deep and Narrow Space – Development of New Surgical Procedure and Micro-robotic Tool	163
<i>K. Ikuta, K. Sasaki, K. Yamamoto, T. Shimada</i>	

Hyper-finger for Remote Minimally Invasive Surgery in Deep Area	173
<i>K. Ikuta, S. Daifu, T. Hasegawa, H. Higashikawa</i>	

Robotics – Device

Safety-Active Catheter with Multiple-Segments Driven by Micro-hydraulic Actuators	182
<i>K. Ikuta, H. Ichikawa, K. Suzuki</i>	

A Stem Cell Harvesting Manipulator with Flexible Drilling Unit for Bone Marrow Transplantation	192
<i>K. Ohashi, N. Hata, T. Matsumura, N. Yahagi, I. Sakuma, T. Dohi</i>	

Liver Tumor Biopsy in a Respiring Phantom with the Assistance of a Novel Electromagnetic Navigation Device	200
<i>F. Banovac, N. Glossop, D. Lindisch, D. Tanaka, E. Levy, K. Cleary</i>	

Non-invasive Measurement of Biomechanical Properties of <i>in vivo</i> Soft Tissues	208
<i>Lianghao Han, Michael Burcher, J. Alison Noble</i>	

Measurement of the Tip and Friction Force Acting on a Needle during Penetration	216
<i>H. Kataoka, T. Washio, K. Chinzei, K. Mizuhara, C. Simone, A.M. Okamura</i>	

Contact Force Evaluation of Orthoses for the Treatment of Malformed Ears	224
<i>A. Hanafusa, T. Isomura, Y. Sekiguchi, H. Takahashi, T. Dohi</i>	

Computer-Assisted Correction of Bone Deformities Using A 6-DOF Parallel Spatial Mechanism	232
<i>O. Iyun, D.P. Borschneck, R.E. Ellis</i>	

Robotics – System

Development of 4-Dimensional Human Model System for the Patient after Total Hip Arthroplasty	241
<i>Y. Otake, K. Hagio, N. Suzuki, A. Hattori, N. Sugano, K. Yonenobu, T. Ochi</i>	

Development of a Training System for Cardiac Muscle Palpation	248
<i>T. Tokuyasu, S. Oota, K. Asami, T. Kitamura, G. Sakaguchi, T. Koyama, M. Komeda</i>	

Preliminary Results of an Early Clinical Experience with the Acrobot TM System for Total Knee Replacement Surgery	256
<i>M. Jakopec, S.J. Harris, F. Rodriguez y Baena, P. Gomes, J. Cobb, B.L. Davies</i>	
A Prostate Brachytherapy Training Rehearsal System – Simulation of Deformable Needle Insertion	264
<i>A. Kimura, J. Camp, R. Robb, B. Davis</i>	
A Versatile System for Computer Integrated Mini-invasive Robotic Surgery	272
<i>L. Adhami, È. Coste-Manière</i>	
Measurements of Soft-Tissue Mechanical Properties to Support Development of a Physically Based Virtual Animal Model	282
<i>C. Bruyns, M. Ottensmeyer</i>	

Validation

Validation of Tissue Modelization and Classification Techniques in T1-Weighted MR Brain Images	290
<i>M. Bach Cuadra, B. Platel, E. Solanas, T. Butz, J.-Ph. Thiran</i>	
Validation of Image Segmentation and Expert Quality with an Expectation-Maximization Algorithm	298
<i>S.K. Warfield, K.H. Zou, W.M. Wells</i>	
Validation of Volume-Preserving Non-rigid Registration: Application to Contrast-Enhanced MR-Mammography	307
<i>C. Tanner, J.A. Schnabel, A. Degenhard, A.D. Castellano-Smith, C. Hayes, M.O. Leach, D.R. Hose, D.L.G. Hill, D.J. Hawkes</i>	
Statistical Validation of Automated Probabilistic Segmentation against Composite Latent Expert Ground Truth in MR Imaging of Brain Tumors .	315
<i>K.H. Zou, W.M. Wells III, M.R. Kaus, R. Kikinis, F.A. Jolesz, S.K. Warfield</i>	
A Posteriori Validation of Pre-operative Planning in Functional Neurosurgery by Quantification of Brain Pneumocephalus	323
<i>É. Bardinnet, P. Cathier, A. Roche, N. Ayache, D. Dormont</i>	
Affine Transformations and Atlases: Assessing a New Navigation Tool for Knee Arthroplasty	331
<i>B. Ma, J.F. Rudan, R.E. Ellis</i>	
Effectiveness of the ROBODOC System during Total Hip Arthroplasty in Preventing Intraoperative Pulmonary Embolism	339
<i>K. Hagio, N. Sugano, M. Takashina, T. Nishii, H. Yoshikawa, T. Ochi</i>	

Medical Image Synthesis via Monte Carlo Simulation	347
<i>J.Z. Chen, S.M. Pizer, E.L. Chaney, S. Joshi</i>	

Performance Issues in Shape Classification	355
<i>S.J. Timoner, P. Golland, R. Kikinis, M.E. Shenton, W.E.L. Grimson, W.M. Wells III</i>	

Brain-Tumor, Cortex, Vascular Structure

Statistical Analysis of Longitudinal MRI Data: Applications for Detection of Disease Activity in MS	363
<i>S. Prima, N. Ayache, A. Janke, S.J. Francis, D.L. Arnold, D.L. Collins</i>	

Automatic Brain and Tumor Segmentation	372
<i>N. Moon, E. Bullitt, K. van Leemput, G. Gerig</i>	

Atlas-Based Segmentation of Pathological Brains Using a Model of Tumor Growth	380
<i>M. Bach Cuadra, J. Gomez, P. Hagmann, C. Pollo, J.-G. Villemure, B.M. Dawant, J.-Ph. Thiran</i>	

Recognizing Deviations from Normalcy for Brain Tumor Segmentation ...	388
<i>D.T. Gering, W.E.L. Grimson, R. Kikinis</i>	

3D-Visualization and Registration for Neurovascular Compression Syndrome Analysis	396
<i>P. Hastreiter, R. Naraghi, B. Tomandl, M. Bauer, R. Fahlbusch</i>	

3D Guide Wire Reconstruction from Biplane Image Sequences for 3D Navigation in Endovascular Interventions	404
<i>S.A.M. Baert, E.B. van der Kraats, W.J. Niessen</i>	

Standardized Analysis of Intracranial Aneurysms Using Digital Video Sequences	411
<i>S. Iserhardt-Bauer, P. Hastreiter, B. Tomandl, N. Köstner, M. Schemperschofe, U. Nissen, T. Ertl</i>	

Demarcation of Aneurysms Using the Seed and Cull Algorithm	419
<i>R.A. McLaughlin, J.A. Noble</i>	

Gyrar Parcellation of the Cortical Surface Using Geodesic Voronoï Diagrams	427
<i>A. Cachia, J.-F. Mangin, D. Rivière, D. Papadopoulos-Orfanos, I. Bloch, J. Régis</i>	

Regularized Stochastic White Matter Tractography Using Diffusion Tensor MRI	435
<i>M. Björnemo, A. Brun, R. Kikinis, C.-F. Westin</i>	

Sulcal Segmentation for Cortical Thickness Measurements	443
<i>C. Hutton, E. De Vita, R. Turner</i>	

Labeling the Brain Surface Using a Deformable Multiresolution Mesh	451
<i>S. Jaume, B. Macq, S.K. Warfield</i>	

Brain – Imaging and Analysis

New Approaches to Estimation of White Matter Connectivity in Diffusion Tensor MRI: Elliptic PDEs and Geodesics in a Tensor-Warped Space	459
<i>L. O'Donnell, S. Haker, C.-F. Westin</i>	

Improved Detection Sensitivity in Functional MRI Data Using a Brain Parcelling Technique	467
<i>G. Flandin, F. Kherif, X. Pennec, G. Malandain, N. Ayache, J.-B. Poline</i>	

A Spin Glass Based Framework to Untangle Fiber Crossing in MR Diffusion Based Tracking	475
<i>Y. Cointepas, C. Poupon, D. Le Bihan, J.-F. Mangin</i>	

Automated Approximation of Lateral Ventricular Shape in Magnetic Resonance Images of Multiple Sclerosis Patients	483
<i>B. Sturm, D. Meier, E. Fisher</i>	

An Intensity Consistent Approach to the Cross Sectional Analysis of Deformation Tensor Derived Maps of Brain Shape	492
<i>C. Studholme, V. Cardenas, A. Maudsley, M. Weiner</i>	

Detection of Inter-hemispheric Asymmetries of Brain Perfusion in SPECT	500
<i>B. Aubert-Broche, C. Grova, P. Jannin, I. Buvat, H. Benali, B. Gibaud</i>	

Discriminative Analysis for Image-Based Studies	508
<i>P. Golland, B. Fischl, M. Spiridon, N. Kanwisher, R.L. Buckner, M.E. Shenton, R. Kikinis, A. Dale, W.E.L. Grimson</i>	

Automatic Generation of Training Data for Brain Tissue Classification from MRI	516
<i>C.A. Cocosco, A.P. Zijdenbos, A.C. Evans</i>	

The Putamen Intensity Gradient in CJD Diagnosis	524
<i>A. Hojjat, D. Collie, A.C.F. Colchester</i>	

A Dynamic Brain Atlas	532
<i>D.L.G. Hill, J.V. Hajnal, D. Rueckert, S.M. Smith, T. Hartkens, K. McLeish</i>	

Model Library for Deformable Model-Based Segmentation of 3-D Brain MR-Images	540
<i>J. Koikkalainen, J. Lötjönen</i>	

Co-registration of Histological, Optical and MR Data of the Human Brain	548
<i>É. Bardinnet, S. Ourselin, D. Dormont, G. Malandain, D. Tandé, K. Parain, N. Ayache, J. Yelnik</i>	

Segmentation

An Automated Segmentation Method of Kidney Using Statistical Information	556
<i>B. Tsagaan, A. Shimizu, H. Kobatake, K. Miyakawa</i>	

Incorporating Non-rigid Registration into Expectation Maximization Algorithm to Segment MR Images	564
<i>K.M. Pohl, W.M. Wells, A. Guimond, K. Kasai, M.E. Shenton, R. Kikinis, W.E.L. Grimson, S.K. Warfield</i>	

Segmentation of 3D Medical Structures Using Robust Ray Propagation ...	572
<i>H. Tek, M. Bergtholdt, D. Comaniciu, J. Williams</i>	

MAP MRF Joint Segmentation and Registration	580
<i>P.P. Wyatt, J.A. Noble</i>	

Statistical Neighbor Distance Influence in Active Contours	588
<i>J. Yang, L.H. Staib, J.S. Duncan</i>	

Active Watersheds: Combining 3D Watershed Segmentation and Active Contours to Extract Abdominal Organs from MR Images	596
<i>R.J. Lapeer, A.C. Tan, R. Aldridge</i>	

Cardiac Application

Coronary Intervention Planning Using Hybrid 3D Reconstruction	604
<i>O. Wink, R. Kemkers, S.J. Chen, J.D. Carroll</i>	

Deformation Modelling Based on PLSR for Cardiac Magnetic Resonance Perfusion Imaging	612
<i>J. Gao, N. Ablitt, A. Elkington, G.-Z. Yang</i>	

Automated Segmentation of the Left and Right Ventricles in 4D Cardiac SPAMM Images	620
<i>A. Montillo, D. Metaxas, L. Axel</i>	

Stochastic Finite Element Framework for Cardiac Kinematics Function and Material Property Analysis	634
<i>P. Shi, H. Liu</i>	

Atlas-Based Segmentation and Tracking of 3D Cardiac MR Images Using Non-rigid Registration	642
<i>M. Lorenzo-Valdés, G.I. Sanchez-Ortiz, R. Mohiaddin, D. Rueckert</i>	
Myocardial Delineation via Registration in a Polar Coordinate System	651
<i>N.M.I. Noble, D.L.G. Hill, M. Breeuwer, J.A. Schnabel, D.J. Hawkes, F.A. Gerritsen, R. Razavi</i>	
Integrated Image Registration for Cardiac MR Perfusion Data	659
<i>R. Bansal, G. Funka-Lea</i>	
4D Active Surfaces for Cardiac Analysis	667
<i>A. Yezzi, A. Tannenbaum</i>	
A Computer Diagnosing System of Dementia Using Smooth Pursuit Oculogyration	674
<i>I. Fukumoto</i>	
Combinative Multi-scale Level Set Framework for Echocardiographic Image Segmentation	682
<i>N. Lin, W. Yu, J.S. Duncan</i>	
Automatic Hybrid Segmentation of Dual Contrast Cardiac MR Data	690
<i>A. Pednekar, I.A. Kakadiaris, V. Zavaletta, R. Muthupillai, S. Flamm</i>	
Efficient Partial Volume Tissue Classification in MRI Scans	698
<i>A. Noe, J.C. Gee</i>	
In-vivo Strain and Stress Estimation of the Left Ventricle from MRI Images	706
<i>Z. Hu, D. Metaxas, L. Axel</i>	
Biomechanical Model Construction from Different Modalities: Application to Cardiac Images	714
<i>M. Sermesant, C. Forest, X. Pennec, H. Delingette, N. Ayache</i>	
Comparison of Cardiac Motion Across Subjects Using Non-rigid Registration	722
<i>A. Rao, G.I. Sanchez-Ortiz, R. Chandrashekhara, M. Lorenzo-Valdés, R. Mohiaddin, D. Rueckert</i>	
Computer Assisted Diagnosis	
From Colour to Tissue Histology: Physics Based Interpretation of Images of Pigmented Skin Lesions	730
<i>E. Claridge, S. Cotton, P. Hall, M. Moncrieff</i>	
In-vivo Molecular Investigations of Live Tissues Using Diffracting Sources	739
<i>V. Ntziachristos, J. Ripoll, E. Graves, R. Weissleder</i>	

Automatic Detection of Nodules Attached to Vessels in Lung CT by Volume Projection Analysis	746
<i>G.-Q. Wei, L. Fan, J.Z. Qian</i>	
LV-RV Shape Modeling Based on a Blended Parameterized Model	753
<i>K. Park, D.N. Metaxas, L. Axel</i>	
Characterization of Regional Pulmonary Mechanics from Serial MRI Data	762
<i>J. Gee, T. Sundaram, I. Hasegawa, H. Uematsu, H. Hatabu</i>	
Using Voxel-Based Morphometry to Examine Atrophy-Behavior Correlates in Alzheimer's Disease and Frontotemporal Dementia	770
<i>M.P. Lin, C. Devita, J.C. Gee, M. Grossman</i>	
Detecting Wedge Shaped Defects in Polarimetric Images of the Retinal Nerve Fiber Layer	777
<i>K. Vermeer, F. Vos, H. Lemij, A. Vossepoel</i>	
Automatic Statistical Identification of Neuroanatomical Abnormalities between Different Populations	785
<i>A. Guimond, S. Egorova, R.J. Killiany, M.S. Albert, C.R.G. Guttmann</i>	
Example-Based Assisting Approach for Pulmonary Nodule Classification in 3-D Thoracic CT Images	793
<i>Y. Kawata, N. Niki, H. Ohmatsu, N. Moriyama</i>	
Author Index	801

Table of Contents, Part II

Tubular Structures

Automated Nomenclature Labeling of the Bronchial Tree in 3D-CT Lung Images	1
<i>H. Kitaoka, Y. Park, J. Tschirren, J. Reinhardt, M. Sonka, G. McLennan, E.A. Hoffman</i>	
Segmentation, Skeletonization, and Branchpoint Matching – A Fully Automated Quantitative Evaluation of Human Intrathoracic Airway Trees	12
<i>J. Tschirren, K. Palágyi, J.M. Reinhardt, E.A. Hoffman, M. Sonka</i>	
Improving Virtual Endoscopy for the Intestinal Tract	20
<i>M. Harders, S. Wildermuth, D. Weishaupt, G. Székely</i>	
Finding a Non-continuous Tube by Fuzzy Inference for Segmenting the MR Cholangiography Image	28
<i>C. Yasuba, S. Kobashi, K. Kondo, Y. Hata, S. Imawaki, M. Ishikawa</i>	
Level-Set Based Carotid Artery Segmentation for Stenosis Grading	36
<i>C.M. van Bommel, L.J. Spreeuwiers, M.A. Viergever, W.J. Niessen</i>	

Interventions – Augmented Reality

PC-Based Control Unit for a Head Mounted Operating Microscope for Augmented Reality Visualization in Surgical Navigation	44
<i>M. Figl, W. Birkfellner, F. Watzinger, F. Wanschitz, J. Hummel, R. Hanel, R. Ewers, H. Bergmann</i>	
Technical Developments for MR-Guided Microwave Thermocoagulation Therapy of Liver Tumors	52
<i>S. Morikawa, T. Inubushi, Y. Kurumi, S. Naka, K. Sato, T. Tani, N. Hata, V. Seshan, H.A. Haque</i>	
Robust Automatic C-Arm Calibration for Fluoroscopy-Based Navigation: A Practical Approach	60
<i>H. Livyatan, Z. Yaniv, L. Joskowicz</i>	
Application of a Population Based Electrophysiological Database to the Planning and Guidance of Deep Brain Stereotactic Neurosurgery	69
<i>K.W. Finnis, Y.P. Starreveld, A.G. Parrent, A.F. Sadikot, T.M. Peters</i>	

An Image Overlay System with Enhanced Reality for Percutaneous Therapy Performed Inside CT Scanner	77
<i>K. Masamune, G. Fichtinger, A. Deguet, D. Matsuka, R. Taylor</i>	
High-Resolution Stereoscopic Surgical Display Using Parallel Integral Videography and Multi-projector	85
<i>H. Liao, N. Hata, M. Iwahara, S. Nakajima, I. Sakuma, T. Dohi</i>	
Three-Dimensional Display for Multi-sourced Activities and Their Relations in the Human Brain by Information Flow between Estimated Dipoles	93
<i>N. Take, Y. Kosugi, T. Musha</i>	
Interventions – Navigation	
2D Guide Wire Tracking during Endovascular Interventions	101
<i>S.A.M. Baert, W.J. Niessen</i>	
Specification Method of Surface Measurement for Surgical Navigation: Ridgeline Based Organ Registration	109
<i>N. Furushiro, T. Saito, Y. Masutani, I. Sakuma</i>	
An Augmented Reality Navigation System with a Single-Camera Tracker: System Design and Needle Biopsy Phantom Trial	116
<i>F. Sauer, A. Khamene, S. Vogt</i>	
A Novel Laser Guidance System for Alignment of Linear Surgical Tools: Its Principles and Performance Evaluation as a Man–Machine System	125
<i>T. Sasama, N. Sugano, Y. Sato, Y. Momoi, T. Koyama, Y. Nakajima, I. Sakuma, M. Fujie, K. Yonenobu, T. Ochi, S. Tamura</i>	
Navigation of High Intensity Focused Ultrasound Applicator with an Integrated Three-Dimensional Ultrasound Imaging System	133
<i>I. Sakuma, Y. Takai, E. Kobayashi, H. Inada, K. Fujimoto, T. Asano</i>	
Robust Registration of Multi-modal Images: Towards Real-Time Clinical Applications	140
<i>S. Ourselin, R. Stefanescu, X. Pennec</i>	
3D Ultrasound System Using a Magneto-optic Hybrid Tracker for Augmented Reality Visualization in Laparoscopic Liver Surgery	148
<i>M. Nakamoto, Y. Sato, M. Miyamoto, Y. Nakamjima, K. Konishi, M. Shimada, M. Hashizume, S. Tamura</i>	
Interactive Intra-operative 3D Ultrasound Reconstruction and Visualization	156
<i>D.G. Gobbi, T.M. Peters</i>	

Projection Profile Matching for Intraoperative MRI Registration Embedded in MR Imaging Sequence	164
<i>N. Hata, J. Tokuda, S. Morikawa, T. Dohi</i>	

Simulation

A New Tool for Surgical Training in Knee Arthroscopy	170
<i>G. Megali, O. Tonet, M. Mazzoni, P. Dario, A. Vascellari, M. Marcacci</i>	
Combining Volumetric Soft Tissue Cuts for Interventional Surgery Simulation	178
<i>M. Nakao, T. Kuroda, H. Oyama, M. Komori, T. Matsuda, T. Takahashi</i>	
Virtual Endoscopy Using Cubic QuickTime-VR Panorama Views	186
<i>U. Tiede, N. von Sternberg-Gospos, P. Steiner, K.H. Höhne</i>	
High Level Simulation & Modeling for Medical Applications – Ultrasound Case	193
<i>A. Chihoub</i>	
Generation of Pathologies for Surgical Training Simulators	202
<i>R. Sierra, G. Székely, M. Bajka</i>	
Collision Detection Algorithm for Deformable Objects Using OpenGL	211
<i>S. Aharon, C. Lenglet</i>	
Online Multiresolution Volumetric Mass Spring Model for Real Time Soft Tissue Deformation	219
<i>C. Paloc, F. Bello, R.I. Kitney, A. Darzi</i>	
Orthosis Design System for Malformed Ears Based on Spline Approximation	227
<i>A. Hanafusa, T. Isomura, Y. Sekiguchi, H. Takahashi, T. Dohi</i>	
Cutting Simulation of Manifold Volumetric Meshes	235
<i>C. Forest, H. Delingette, N. Ayache</i>	
Simulation of Guide Wire Propagation for Minimally Invasive Vascular Interventions	245
<i>T. Alderliesten, M.K. Konings, W.J. Niessen</i>	
Needle Insertion Modelling for the Interactive Simulation of Percutaneous Procedures	253
<i>S.P. DiMaio, S.E. Salcudean</i>	
3D Analysis of the Alignment of the Lower Extremity in High Tibial Osteotomy	261
<i>H. Kawakami, N. Sugano, T. Nagaoka, K. Hagio, K. Yonenobu, H. Yoshikawa, T. Ochi, A. Hattori, N. Suzuki</i>	

Simulation of Intra-operative 3D Coronary Angiography for Enhanced Minimally Invasive Robotic Cardiac Intervention	268
<i>G. Lehmann, D. Habets, D.W. Holdsworth, T. Peters, M. Drangova</i>	
Computer Investigation into the Anatomical Location of the Axes of Rotation in the Normal Knee	276
<i>S. Martelli, A. Visani</i>	
Modeling	
Macroscopic Modeling of Vascular Systems	284
<i>D. Szczerba, G. Székely</i>	
Spatio-temporal Directional Filtering for Improved Inversion of MR Elastography Images	293
<i>A. Manduca, D.S. Lake, R.L. Ehman</i>	
RBF-Based Representation of Volumetric Data: Application in Visualization and Segmentation	300
<i>Y. Masutani</i>	
An Anatomical Model of the Knee Joint Obtained by Computer Dissection	308
<i>S. Martelli, F. Acquaroli, V. Pinskerova, A. Spettol, A. Visani</i>	
Models for Planning and Simulation in Computer Assisted Orthognatic Surgery	315
<i>M. Chabanas, C. Marecaux, Y. Payan, F. Boutault</i>	
Simulation of the Exophthalmia Reduction Using a Finite Element Model of the Orbital Soft Tissues	323
<i>V. Luboz, A. Pedrono, P. Swider, F. Boutault, Y. Payan</i>	
A Real-Time Deformable Model for Flexible Instruments Inserted into Tubular Structures	331
<i>M. Kukuk, B. Geiger</i>	
Modeling of the Human Orbit from MR Images	339
<i>Z. Li, C.-K. Chui, Y. Cai, S. Amrith, P.-S. Goh, J.H. Anderson, J. Teo, C. Liu, I. Kusuma, Y.-S. Siow, W.L. Nowinski</i>	
Accurate and High Quality Triangle Models from 3D Grey Scale Images . .	348
<i>P.W. de Bruin, P.M. van Meeteren, F.M. Vos, A.M. Vossepoel, F.H. Post</i>	
Intraoperative Fast 3D Shape Recovery of Abdominal Organs in Laparoscopy	356
<i>M. Hayashibe, N. Suzuki, A. Hattori, Y. Nakamura</i>	

Statistical Shape Modeling

Integrated Approach for Matching Statistical Shape Models with Intra-operative 2D and 3D Data	364
<i>M. Fleute, S. Lavallée, L. Desbat</i>	
Building and Testing a Statistical Shape Model of the Human Ear Canal . .	373
<i>R. Paulsen, R. Larsen, C. Nielsen, S. Laugesen, B. Ersbøll</i>	
Shape Characterization of the Corpus Callosum in Schizophrenia Using Template Deformation	381
<i>A. Dubb, B. Avants, R. Gur, J. Gee</i>	
3D Prostate Surface Detection from Ultrasound Images Based on Level Set Method	389
<i>S. Fan, L.K. Voon, N.W. Sing</i>	
A Bayesian Approach to <i>in vivo</i> Kidney Ultrasound Contour Detection Using Markov Random Fields	397
<i>M. Martín, C. Alberola</i>	
Level Set Based Integration of Segmentation and Computational Fluid Dynamics for Flow Correction in Phase Contrast Angiography	405
<i>M. Watanabe, R. Kikinis, C.-F. Westin</i>	
Comparative Exudate Classification Using Support Vector Machines and Neural Networks	413
<i>A. Osareh, M. Mirmehdi, B. Thomas, R. Markham</i>	
A Statistical Shape Model for the Liver	421
<i>H. Lamecker, T. Lange, M. Seebass</i>	
Statistical 2D and 3D Shape Analysis Using Non-Euclidean Metrics	428
<i>R. Larsen, K.B. Hilger, M.C. Wrobel</i>	
Kernel Fisher for Shape Based Classification in Epilepsy	436
<i>N. Vohra, B.C. Vemuri, A. Rangarajan, R.L. Gilmore, S.N. Roper, C.M. Leonard</i>	
A Noise Robust Statistical Texture Model	444
<i>K.B. Hilger, M.B. Stegmann, R. Larsen</i>	
A Combined Statistical and Biomechanical Model for Estimation of Intra-operative Prostate Deformation	452
<i>A. Mohamed, C. Davatzikos, R. Taylor</i>	

Registration – 2D/D Fusion

”Gold Standard” 2D/3D Registration of X-Ray to CT and MR Images . . .	461
<i>D. Tomažević, B. Likar, F. Pernuš</i>	

A Novel Image Similarity Measure for Registration of 3-D MR Images X-Ray Projection Images.....	469
<i>T. Rohlfing, C.R. Maurer Jr.</i>	

Registration of Preoperative CTA and Intraoperative Fluoroscopic Images for Assisting Aortic Stent Grafting	477
<i>H. Imamura, N. Ida, N. Sugimoto, S. Eiho, S. Urayama, K. Ueno, K. Inoue</i>	

Preoperative Analysis of Optimal Imaging Orientation in Fluoroscopy for Voxel-Based 2-D/3-D Registration	485
<i>Y. Nakajima, Y. Tamura, Y. Sato, T. Tashiro, N. Sugano, K. Yonenobu, H. Yoshikawa, T. Ochi, S. Tamura</i>	

Registration – Similarity Measures

A New Similarity Measure for Nonrigid Volume Registration Using Known Joint Distribution of Target Tissue: Application to Dynamic CT Data of the Liver	493
<i>J. Masumoto, Y. Sato, M. Hori, T. Murakami, T. Johkoh, H. Nakamura, S. Tamura</i>	

2D-3D Intensity Based Registration of DSA and MRA – A Comparison of Similarity Measures.....	501
<i>J.H. Hipwell, G.P. Penney, T.C. Cox, J.V. Byrne, D.J. Hawkes</i>	

Model Based Spatial and Temporal Similarity Measures between Series of Functional Magnetic Resonance Images	509
<i>F. Kherif, G. Flandin, P. Ciuciu, H. Benali, O. Simon, J.-B. Poline</i>	

A Comparison of 2D-3D Intensity-Based Registration and Feature-Based Registration for Neurointerventions.....	517
<i>R.A. McLaughlin, J. Hipwell, D.J. Hawkes, J.A. Noble, J.V. Byrne, T. Cox</i>	

Multi-modal Image Registration by Minimising Kullback-Leibler Distance .	525
<i>A.C.S. Chung, W.M. Wells III, A. Norbash, W.E.L. Grimson</i>	

Cortical Surface Registration Using Texture Mapped Point Clouds and Mutual Information	533
<i>T.K. Sinha, D.M. Cash, R.J. Weil, R.L. Galloway, M.I. Miga</i>	

Non-rigid Registration

A Viscous Fluid Model for Multimodal Non-rigid Image Registration Using Mutual Information	541
<i>E. D’Agostino, F. Maes, D. Vandermeulen, P. Suetens</i>	

Non-rigid Registration with Use of Hardware-Based 3D Bézier Functions . .	549
<i>G. Soza, M. Bauer, P. Hastreiter, C. Nimsky, G. Greiner</i>	
Brownian Warps: A Least Committed Prior for Non-rigid Registration . . .	557
<i>M. Nielsen, P. Johansen, A.D. Jackson, B. Lautrup</i>	
Using Points and Surfaces to Improve Voxel-Based Non-rigid Registration .	565
<i>T. Hartkens, D.L.G. Hill, A.D. Castellano-Smith, D.J. Hawkes, C.R. Maurer Jr., A.J. Martin, W.A. Hall, H. Liu, C.L. Truwit</i>	
Intra-patient Prone to Supine Colon Registration for Synchronized Virtual Colonoscopy	573
<i>D. Nain, S. Haker, W.E.L. Grimson, E. Cosman Jr, W.W. Wells, H. Ji, R. Kikinis, C.-F. Westin</i>	
Nonrigid Registration Using Regularized Matching Weighted by Local Structure	581
<i>E. Suárez, C.-F. Westin, E. Rovaris, J. Ruiz-Alzola</i>	
Inter-subject Registration of Functional and Anatomical Data Using SPM	590
<i>P. Hellier, J. Ashburner, I. Corouge, C. Barillot, K.J. Friston</i>	

Visualization

Evaluation of Image Quality in Medical Volume Visualization: The State of the Art	598
<i>A. Pommert, K.H. Höhne</i>	
Shear-Warp Volume Rendering Algorithms Using Linear Level Octree for PC-Based Medical Simulation	606
<i>Z. Wang, C.-K. Chui, C.-H. Ang, W.L. Nowinski</i>	
Line Integral Convolution for Visualization of Fiber Tract Maps from DTI	615
<i>T. McGraw, B.C. Vemuri, Z. Wang, Y. Chen, M. Rao, T. Mareci</i>	
On the Accuracy of Isosurfaces in Tomographic Volume Visualization	623
<i>A. Pommert, U. Tiede, K.H. Höhne</i>	
A Method for Detecting Undisplayed Regions in Virtual Colonoscopy Its Application to Quantitative Evaluation of Fly-Through Methods	631
<i>Y. Hayashi, K. Mori, J. Hasegawa, Y. Suenaga, J. Toriwaki</i>	

Novel Imaging Techniques

3D Respiratory Motion Compensation by Template Propagation	639
<i>P. Rösch, T. Netsch, M. Quist, J. Weese</i>	

An Efficient Observer Model for Assessing Signal Detection Performance
of Lossy-Compressed Images 647
B.M. Schmanske, M.H. Loew

Statistical Modeling of Pairs of Sulci in the Context
of Neuroimaging Probabilistic Atlas 655
I. Corouge, C. Barillot

Two-Stage Alignment of fMRI Time Series Using the Experiment Profile
to Discard Activation-Related Bias 663
L. Freire, J.-F. Mangin

Real-Time DRR Generation Using Cylindrical Harmonics 671
F. Wang, T.E. Davis, B.C. Vemuri

Strengthening the Potential of Magnetic Resonance
Cholangiopancreatography (MRCP) by a Combination of High-Resolution
Data Acquisition and Omni-directional Stereoscopic Viewing 679
*T. Yamagishi, K.H. Höhne, T. Saito, K. Abe, J. Ishida, R. Nishimura,
T. Kudo*

Author Index 687