Lecture Notes in Computer Science

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
   University of California, Los Angeles, CA, 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
Advances in Artificial Reality and Tele-Existence

16th International Conference on Artificial Reality and Telexistence, ICAT 2006
Hangzhou, China, November 29 – December 1, 2006 Proceedings
Volume Editors

Zhigeng Pan  
Zhejiang University, Hangzhou, China  
E-mail: zhigengpan@gmail.com

Adrian Cheok  
National University of Singapore, Singapore  
E-mail: adriancheok@ntu.edu.sg

Michael Haller  
Upper Austria University of Applied Sciences, Hagenberg, Austria  
E-mail: haller@fh-hagenberg.at

Rynson W.H. Lau  
University of Durham, Durham DH1 3LE, UK  
E-mail: rynson.lau@durham.ac.uk

Hideo Saito  
Keio University, Yokohama, Japan  
E-mail: saito@ozawa.ics.keio.ac.jp

Ronghua Liang  
Zhejiang University, Hangzhou, China  
E-mail: rhliang@zjut.edu.cn

Library of Congress Control Number: 2006936898


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

ISSN 0302-9743  

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 2006
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 11941354 06/3142 5 4 3 2 1 0
Preface

ICAT is the oldest international conference on virtual reality and tele-existence. ICAT 2006 not only looked for innovations in the technology itself, but also explored novel ways to transfer and express information and creative ideas to the society and people.

The 16th International Conference on Artificial Reality and Telexistence was held at the Zhejiang University of Technology, Hangzhou, P.R. China from November 29 to December 1, 2006. The main purpose of the conference is to provide opportunities for researchers and practitioners to present their research findings and exchange opinions on the development and use of such systems. The conference included plenary invited talks, workshops, tutorials, and paper presentation tracks.

The main conference received 523 submissions in total from 21 different countries, including China (mainland, Hong Kong, Taiwan), USA, UK, Germany, Austria, France, Australia, Canada, Korea, Japan, Malaysia, Mexico, etc., of which 138 papers were accepted for this volume and 11 papers were invited to submit extended versions for a special issue of *International Journal of Virtual Reality* (IJVR, 5(4)). The papers in this volume cover the topics including: Artificial Reality, VR, Telexistence, AR, Mixed Reality, Ubiquitous/Wearable Computing, Visual and Auditory Displays, Rendering Techniques, Architecture for VR, Immersive Projection Technology, Techniques for Modeling VR Systems, Virtual Heritage, Motion Tracking, Innovative Applications of VR, Haptics, Evaluation of VR Techniques and Systems, VR Interaction and Navigation Techniques, Artificial Life, Distributed and Collaborative VR Systems, VR Input and Output Devices, Virtual Medicine and Health Science, Human Factors of VR, Interactive Art and Entertainment.

The wide range of questions, ideas, concepts and applications discussed in the contributions of this volume reflect the vitality and engagement of the artificial reality and tele-existence communities and their neighboring disciplines. The current research situation in these areas demands interdisciplinary cooperation and mutual stimulation. With the strong support of Springer, the proceedings of ICAT this year were published in the *Lecture Notes in Computer Science* (LNCS) series.

November 2006

Zhigeng Pan
Adrian Cheok
Michael Haller
Rynson Lau
Hideo Saito
Ronghua Liang
Organization

Committee Listings

General Honorary Co-chairs
Deren Li (Wuhan University, China)
Susumu Tachi (University of Tokyo, Japan)

General Co-chairs
Zhigeng Pan (Zhejiang University, China)
Hideo Saito (Keio University, Japan)

Program Co-chairs
Adrain Cheok (Mixed Reality Lab, Singapore)
Michael Haller (University of Applied Sciences, Hagenberg, Austria)
Rynson W.H. Lau (University of Durham, UK)

Local Chair
Qingzhang Chen (Zhejiang University of Technology)

Local Vice-Chairs
Limin Men (Zhejiang Provincial Key Lab of Optic Fiber Communication Technology)
Huageng Wan (Zhejiang University)
Decai Huang (Zhejiang University of Technology)
Ronghua Liang (Zhejiang University of Technology)

Publicity Co-chairs
Ruigang Yang (The University of Kentucky)
Xiaohong Jiang (Zhejiang University)

Publication Chair
Li Li (Hangzhou Dianzi University)

Workshop Chair
Takuya Nojima (Japan Aerospace Exploration Agency)

Demo Chair
Masahiko Inami (the University of Electro-Communications)

Financial Co-chairs
Hui Gu (Zhejiang University of Technology)
Mingmin Zhang (Zhejiang University)
International Program Committee

Mark Billinghurst, New Zealand
Adrain Cheok, Singapore
Yukio Fukui, Japan
Michael Haller, Austria
Naoki Hashimoto, Japan
Larry Hodges, USA
Masa Inakage, Japan
Michael Jenkin, Canada
Fumio Kishino, Japan
Kiyoshi Kiyokawa, Japan
Frederick Li, UK
Tetsuro Ogi, Japan
Christian Reimann, Germany
Hideo Saito, Japan
Yoichi Sato, Japan
Daniel Thalmann, Switzerland
Toshio Yamada, Japan
Ruigang Yang, USA
Shunsuke Yoshida, Japan
Tony Brooks, Denmark
Gordon Clapworthy, UK
Kenji Funahashi, Japan
Soohnung Han, Korea
Wataru Hashimoto, Japan
Nicholas Holliman, UK
Shuichi Ino, Japan
Hiroyuki Kajimoto, Japan
Itaru Kitahara, Japan
Rynson W.H. Lau, UK
Robert Lindeman, USA
Kenichi Okada, Japan
Jeha Ryu, Korea
Kosuke Sato, Japan
Shamus Smith, UK
Ulrich Nlrichmann, USA
Hiroyuki Yamamoto, Japan
Hiroaki Yano, Japan
Hongbin Zha, China
Andreas Butz, Germany
Michael Cohen, Japan
Norihiro Hagita, Japan
Harold Thwaites, Malaysia
Michitaka Hirose, Japan
Yasuaki Ieki, Japan
Yutaka Ishibashi, Japan
Myloung-Hee, Korea
Yoshifumi Kitamura, Japan
Gun Lee, Korea
Takeshi Naemura, Japan
Zhiheng Pan, China
Amelia Sadagic, USA
Makoto Sato, Japan
Wookho Son, Korea
Greg Welch, USA
Unyeong Yang, Korea
Naokazu Yokoya, Japan

Reviewer Listings

Song Aiguo
Congchen Chen
Adrain Cheok
Weilong Ding
Xianyong Fang
Kenji Funahashi
Soohnung Han
Hanwu He
Decai Huang
Yutaka Ishibashi
Xiaohong Jiang
Fumio Kishino
Rynson W.H. Lau
Hua Li
Ronghua Liang
Yongkui Liu
Takeshi Naemura
Yanjun Peng
Amela Sadagic
Yoichi Sato
Chengfang Song
Zheng Tan
Jianhua Tao
Huageng Wan
Qiang Wang
Yongtian Wang
Haihong Wu
Qing Xu
Bailing Yang
Hiroaki Yano
Zhengsheng Yu
Jiawan Zhang
Wei Zhang
Bingfeng Zhou
Mark Billinghurst
Dingfang Chen
Gordon Clapworthy
Xiumin Fan
Jieqing Feng
Hui Gu
Naoki Hashimoto
Michitaka Hirose
Yasushi Ieki
Michael Jenkin
Xiaogang Jin
Itaru Kitahara
Gun Lee
Li Li
Robert Lindeman
Jianfeng Lu
Tetsuro Ogi
Xujaia Qin
Hideo Saito
Shamus Smith
Jizhou Sun
Bing Tang
Daniel Thalmann
Guoping Wang
Ruchuan Wang
Greg Welch
Lingda Wu
Xiaogang Xu
Ungyeon Yang
Zhiqiang Yao
Ruwei Yun
Maojun Zhang
Nailiandiao
Jiejie Zhu
Tony Brooks
Ling Chen
Michael Cohen
Jinglong Fang
Jun Feng
Norhiro Hagita
Wataru Hashimoto
Larry Hodges
Masa Inakage
Qingge Ji
Hiroyuki Kajimoto
Yoshifumi Kitamura
Fengxia Li
Zili Li
Yushen Liu
Xiaolan Luo
Kenichi Okada
Christian Reimann
Kosuke Sato
Wookho Son
Shusen Sun
Jie Tang
Harold Thwaites
Yangsheng Wang
Yigang Wang
Enhua Wu
Hui Xiang
Toshio Yamada
Ruigang Yang
Naokazu Yokoya
Hongbin Zha
Mingmin Zhang
XiangJun Zhao
Andreas Butz
Wei Chen
Guofu Ding
Tongzhu Fang
Yukio Fukui
Michael Hailer
Gaoqi He
Acknowledgements and Sponsoring Institutions

ICAT 2006 was sponsored by VRSJ (Virtual Reality Society in Japan) and was organized by:

- Zhejiang University of Technology
- VR Committee, China Society of Image and Graphics

However, ICAT 2006 owes its big success to the financial and organizational support of various institutions including:

- DEARC, Zhejiang University
- Computer Network and Multimedia Lab, Zhejiang University of Technology
- International Journal of Virtual Reality (IJVR)
- National Science Foundation of China

We would like to thank all of them for offering the opportunity to organize ICAT 2006 in a way that provided a diversified scientific and social program. Especially, we would like to thank all members of the International Program Committee and Organizing Committee for their great job in defining conference topics, reviewing the large number of submitted papers, and managing to put all the material together for this great event.
Table of Contents

Anthropomorphic Intelligent Robotics, Artificial Life

Gesture Recognition Based on Context Awareness for Human-Robot Interaction ............................................................ 1
Seok-Ju Hong, Nurul Arif Setiawan, Song-Gook Kim, Chil-Woo Lee

Evolving Creatures in Virtual Ecosystems .................................................. 11
Nicolas Lassabe, Herve Luga, Yves Duthen

The Application of Affective Virtual Human in Intelligent Web Tutoring System .................................................. 21
Huiling Peng

Extracting Behavior Knowledge and Modeling Based on Virtual Agricultural Mobile Robot .................................................. 28
Xiangjun Zou, Jun Lu, Lufeng Luo, Xiwen Luo, Yanqiong Zhou

Human Motion Interpolation Using Space-Time Registration ............... 38
Zhihua Chen, Lizhuang Ma, Yan Gao, Xiaomao Wu

Multi-stream Based Rendering Resource Interception and Reconstruction in D3DPR for High-Resolution Display................. 48
Zhen Liu, Jiaoying Shi, Hua Xiong, Aihong Qin

VirtualPhonepad: A Text Input Tool for Virtual Environments .......... 58
Jaewoo Ahn, Kyungha Min

An Animation System for Imitation of Object Grasping in Virtual Reality .................................................. 65
Matthias Weber, Guido Heumer, Heni Ben Amor, Bernhard Jung

Generating Different Realistic Humanoid Motion .............................. 77
Zhenbo Li, Yu Deng, Hua Li

Handheld AR for Collaborative Edutainment ................................. 85
Daniel Wagner, Dieter Schmalstieg, Mark Billinghurst
Table of Contents

VR-Based Simulation for the Learning of Gynaecological Examination .................................................... 97
  Liliane dos Santos Machado, Ronei Marcos de Moraes

Visual Perception Modeling for Intelligent Avatars .................... 105
  Ronghua Liang, Tinan Huang, Meleagros Krokos, Jinglong Fan

Steering Behavior Model of Visitor NPCs in Virtual Exhibition .......... 113
  Kyungkoo Jun, Meeyoung Sung, Byoungjo Choi

Augmented Reality/Mixed Reality

Scalable Architecture and Content Description Language for Mobile Mixed Reality Systems ........................................ 122
  Fumihisa Shibata, Takashi Hashimoto, Koki Furuno, Asako Kimura,
  Hideyuki Tamura

A Novel Sound Localization Experiment for Mobile Audio Augmented Reality Applications .................................................... 132
  Nick Mariette

A Tangible User Interface for Remote Collaboration System Using Mixed Reality .................................................... 143
  Yuichi Bannai, Hidekazu Tamaki, Yuji Suzuki, Hiroshi Shigeno,
  Kenichi Okada

Multi-sensor Data Fusion Based on Fuzzy Integral in AR System ....... 155
  Yan Feng, Yimin Chen, Minghui Wang

AR Baseball Presentation System with Integrating Multiple Planar Markers .......................................................... 163
  Yuko Uematsu, Hideo Saito

An Efficient 3D Registration Method Using Markerless Image in AR-Based CNC Machining Simulation .......................... 175
  Z.Y. Ma, Y.P. Chen, C.M. Yuan, Z.D. Zhou

Shared Design Space: Sketching Ideas Using Digital Pens and a Large Augmented Tabletop Setup ........................................ 185
  Michael Haller, Peter Brandl, Daniel Leithinger, Jakob Leitner,
  Thomas Seifried, Mark Billinghurst

AR Table Tennis: A Video-Based Augmented Reality Sports Game ..... 197
  Jong-Seung Park, TaeYong Kim, Jong-Hyun Yoon
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhancing Immersiveness in AR-Based Product Design</td>
<td>207</td>
</tr>
<tr>
<td><em>Taejin Ha, Yeongmi Kim, Jeha Ryu, Woontack Woo</em></td>
<td></td>
</tr>
<tr>
<td>Personal Information Annotation on Wearable Computer Users with Hybrid Peer-to-Peer Communication</td>
<td>217</td>
</tr>
<tr>
<td><em>Koji Makita, Masayuki Kanbara, Naokazu Yokoya</em></td>
<td></td>
</tr>
<tr>
<td>An Initialization Tool for Installing Visual Markers in Wearable Augmented Reality</td>
<td>228</td>
</tr>
<tr>
<td><em>Yusuke Nakazato, Masayuki Kanbara, Naokazu Yokoya</em></td>
<td></td>
</tr>
<tr>
<td>Increasing Camera Pose Estimation Accuracy Using Multiple Markers</td>
<td>239</td>
</tr>
<tr>
<td><em>Jong-Hyun Yoon, Jong-Seung Park, Chungkyue Kim</em></td>
<td></td>
</tr>
<tr>
<td>Exploring Human-Robot Interaction Through Telepresence Board Games</td>
<td>249</td>
</tr>
<tr>
<td><em>Min Xin, Ehud Sharlin</em></td>
<td></td>
</tr>
<tr>
<td>Projected Reality – Content Delivery Right onto Objects of Daily Life</td>
<td>262</td>
</tr>
<tr>
<td><em>Jochen Ehnes, Michitaka Hirose</em></td>
<td></td>
</tr>
<tr>
<td>An Evaluation of an Augmented Reality Multimodal Interface Using Speech and Paddle Gestures</td>
<td>272</td>
</tr>
<tr>
<td><em>Sylvia Irawati, Scott Green, Mark Billinghurst, Andreas Duenser, Heedong Ko</em></td>
<td></td>
</tr>
<tr>
<td>An Augmented Reality System for Computer Maintenance</td>
<td>284</td>
</tr>
<tr>
<td><em>Bo Kang, Peng Ren, Changzhi Ke</em></td>
<td></td>
</tr>
<tr>
<td>Multi-view Video Composition with Computer Graphics</td>
<td>292</td>
</tr>
<tr>
<td><em>Artem Ignatov, Manbae Kim</em></td>
<td></td>
</tr>
<tr>
<td>Floating Virtual Mirrors: Visualization of the Scene Behind a Vehicle</td>
<td>302</td>
</tr>
<tr>
<td><em>Toru Miyamoto, Itaru Kitahara, Yoshinari Kameda, Yuichi Ohta</em></td>
<td></td>
</tr>
<tr>
<td><strong>Distributed and Collaborative VR System</strong></td>
<td></td>
</tr>
<tr>
<td>A Scalable Framework for Distributed Virtual Reality Using Heterogeneous Processors</td>
<td>314</td>
</tr>
<tr>
<td><em>Qishi Wu, Jinzhu Gao, Mengxia Zhu</em></td>
<td></td>
</tr>
<tr>
<td>A Collaborative Virtual Reality Environment for Molecular Modeling</td>
<td>324</td>
</tr>
<tr>
<td><em>Sungjun Park, Jun Lee, Jee-In Kim</em></td>
<td></td>
</tr>
</tbody>
</table>
An Interest Filtering Mechanism Based on LoI.......................... 334
   Sheng Wei, Zhong Zhou, Wei Wu

Study on Data Collaboration Service for Collaborative Virtual
Geographic Environment.................................................. 344
   Jun Zhu, Jianhua Gong, Hua Qi, Tao Song

VCS: A Virtual Collaborative Space Based on Immersive
Teleconferencing .......................................................... 354
   Weidong Bao, Maojun Zhang, Wang Chen

A Scalable HLA-Based Distributed Simulation Framework for VR
Application ................................................................. 361
   Zonghui Wang, Jiaoying Shi, Xiaohong Jiang

Location-Based Device Ensemble Architecture for a Spatial Reality
Enhancement of Distributed Multimedia Presentation ............... 372
   Doo-Hyun Kim, Lila Kim, Hwasun Kwon, Dongwoon Jeon,
   Songah Chae

Haptics, Human Factors of VR

Air-Jet Button Effects in AR ............................................. 384
   Yeongmi Kim, Sehun Kim, Taejin Ha, Ian Oakley, Woontack Woo,
   Jeha Ryu

Perceptualizing a “Haptic Edge” with Varying Stiffness Based on Force
Constancy ................................................................. 392
   Jaeyoung Cheon, Seungmoon Choi

Multi-sensory Perception of Roughness: Empirical Study on Effects
of Vibrotactile Feedback and Auditory Feedback in Texture
Perception ................................................................. 406
   Ki-Uk Kyung, Dong-Soo Kwon

The Research of Spiritual Consolation Object with the Function
of Affective Computing .................................................. 416
   Yiping Tang, Hongjie Sun, Xiaokai Gu,
   Tao Deng

Real Time Dynamics and Control of a Digital Human Arm for Reaching
Motion Simulation .................................................... 425
   Huijie Yu, Ray P.S. Han
Innovative Applications of VR

Animation Preserving Simplification for MPEG Based Scalable Virtual Human ......................................................... 447

HyungSeok Kim

A Virtual Reality Training System for Robot Assisted Neurosurgery ................................................................. 457

Da Liu, Tianmiao Wang

The Experiment of Improving Students’ Spatial Ability by Using VGLS ............................................................. 467

Ruwhei Yun, Haixu Xi, Yi Li

Sketch Based 3D Animation Copy ................................................... 474

Difei Lu, Xiuzi Ye

Extracting Space Welding Seam for Virtual Teach-In of Robotic Welding System .............................................. 486

Wusheng Chou, Tianmiao Wang

Primary-Color-Based Spatial Layout Features and New Image Matching Algorithm Based on Dual Features ................. 494

De-cai Huang, Jia Hu, Yuan Yuan

Ridge-Valley Lines Smoothing and Optimizing ........................................ 502

Hao Jing, Weixiang Zhang, Bingfeng Zhou

Mynews: Personalization of Web Contents Transcoding for Mobile Device Users .................................................. 512

Teuk-Seob Song, Jin-Sang Lee, Yoon-Chul Choy, Soon-Bum Lim

Visualization Application in Clothing Biomechanical Design .......... 522

Ruomei Wang, Yi Li, Xiaonan Luo, Xin Zhang

Motion Tracking

Robot Position Estimation and Tracking Using the Particle Filter and SOM in Robotic Space .................................. 530

TaeSeok Jin, JangMyung Lee
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robust Motion Tracking in Video Sequences Using Particle Filter</td>
<td>540</td>
</tr>
<tr>
<td>Guixi Liu, Chunyu Fan, Enke Gao</td>
<td></td>
</tr>
<tr>
<td>Fast Motion Estimation Using Spatio-temporal Correlations</td>
<td>548</td>
</tr>
<tr>
<td>Hyo Sun Yoon, Jae Myeong Yoo, Toan Nguyen Dinh, Hwa Jeong Son,</td>
<td></td>
</tr>
<tr>
<td>Mi Seon Park, Guee Sang Lee</td>
<td></td>
</tr>
<tr>
<td>Bi-directional Passenger Counting on Crowded Situation Based on Color</td>
<td>557</td>
</tr>
<tr>
<td>Images</td>
<td></td>
</tr>
<tr>
<td>Ning Liu, Chengying Gao</td>
<td></td>
</tr>
<tr>
<td>Moving Object Detection Based on a New Level Set Algorithm Using</td>
<td>565</td>
</tr>
<tr>
<td>Directional Speed Function</td>
<td></td>
</tr>
<tr>
<td>Dong-Gyu Sim</td>
<td></td>
</tr>
<tr>
<td>An Integrated Robot Vision System for Multiple Human Tracking</td>
<td>575</td>
</tr>
<tr>
<td>and Silhouette Extraction</td>
<td></td>
</tr>
<tr>
<td>Jung-Ho Ahn, Sooyeong Kwak, Cheolmin Choi, Kilcheon Kim, Hyeran Byun</td>
<td></td>
</tr>
<tr>
<td>Disparity Weighted Histogram-Based Object Tracking for Mobile Robot</td>
<td>584</td>
</tr>
<tr>
<td>Systems</td>
<td></td>
</tr>
<tr>
<td>Cheolmin Choi, Jungho Ahn, Seungwon Lee, Hyeran Byun</td>
<td></td>
</tr>
<tr>
<td>Towards Robust 3D Reconstruction of Human Motion from Monocular Video</td>
<td>594</td>
</tr>
<tr>
<td>Cheng Chen, Yueeting Zhuang, Jun Xiao</td>
<td></td>
</tr>
<tr>
<td>Wavelet Scalable Video Coding with Minimal Average Temporal Distance</td>
<td>604</td>
</tr>
<tr>
<td>for Motion Estimation</td>
<td></td>
</tr>
<tr>
<td>Changhoon Yim, Hojin Ha, Bae-Keun Lee, Woo-Jin Han</td>
<td></td>
</tr>
<tr>
<td>Single Camera Remote Eye Gaze Tracking Under Natural Head Movements</td>
<td>614</td>
</tr>
<tr>
<td>Ruian Liu, Shijiu Jin, Xiaorong Wu</td>
<td></td>
</tr>
<tr>
<td>Real Time Computer Simulation</td>
<td></td>
</tr>
<tr>
<td>High-Quality Shear-Warp Volume Rendering Using Efficient Supersampling and Pre-integration Technique</td>
<td>624</td>
</tr>
<tr>
<td>Heewon Kye, Kyounsgu Oh</td>
<td></td>
</tr>
</tbody>
</table>
A Simple, Efficient Method for Real-Time Simulation of Smoke Shadow ................................. 633
   Minghao Yang, Guangzheng Fei, Minyong Shi, Yongsong Zhan

Reducing Interrupt Latency at Linux Kernel Level for Real-Time Network ........................................... 643
   Dae Sung Lee, Jeong Seob Kim, Jaehyun Park, Ki Chang Kim

Investigation of Surface Integrity in the Case of Chemical Mechanical Polishing Silicon Wafer by Molecular Dynamics Simulation Method .......................... 651
   Xuesong Han

Independent Component Analysis Approach for the Neurobiological Recording Data ........................................ 660
   Minghai Yao, Jing Hu, Qinglong Gu

Real-Time Virtual Surgery Simulation Employing MM-Model and Adaptive Spatial Hash ......................... 666
   Shaoting Zhang, Lizu Gu, Weiming Liang, Jingsi Zhang, Feng Qian

Creating Dynamic Panorama Using Particle Swarm Optimization ........................................ 676
   Yan Zhang, Zhengxing Sun, Wenhui Li

Real-Time and Realistic Simulation of Large-Scale Deep Ocean Surface ........................................ 686
   Xin Zhao, FengXia Li, ShouYi Zhan

Exploiting Frame-to-Frame Coherence for Rendering Terrain Using Continuous LOD ......................... 695
   Jing Zhang, Guojun Chen

Light Field Modeling and Its Application to Remote Sensing Image Simulation ........................................ 705
   Mingxiang Huang, Jianhua Gong, Zhou Shi, Lihui Zhang

Simple and Fast Terrain Rendering Using Graphics Hardware ........................................ 715
   Hanli Zhao, Xiaogang Jin, Jianbing Shen

Animating Grass in Real-Time ................................................................................................. 724
   Linqiang Yao, Liyu Tang, Chongcheng Chen, Jingjing Sun

Gaussian Mixture Model in Improved HLS Color Space for Human Silhouette Extraction .................. 732
   Nurul Arif Setiawan, Seok-Ju Hong, Jang-Woon Kim, Chil-Woo Lee
Geometry Compression Using Spherical Wavelet .......................... 742
   Guojun Peng, Jiawan Tan, Zhigeng Pan, Yicheng Jin

Tools and Technique for Modeling VR Systems

Dynamic Radiosity on Multi-resolution Models ............................ 753
   Hui Xiao, Gary Tam, Frederick Li, Rynson W.H. Lau

Mesh Simplification Algorithm Based on N-Edge Mesh Collapse .......... 764
   Hua-hong Chen, Xiao-nan Luo, Ruo-tian Ling

3-D Personalized Face Reconstruction Based on Multi-layer
and Multi-region with RBFs ................................................... 775
   Yongzhao Zhan, Rongrong Shen, Jianming Zhang

Recognition and Location of Fruit Objects Based on Machine Vision .... 785
   Hui Gu, Yaya Lu, Jilin Lou, Weitong Zhang

A New Algorithm of Gray Watermark Embedding .......................... 796
   Yong-zeng Shen, Min-jie zhang, Feng Liu

A Semiautomatic Nonrigid Registration in Liver Cancer Treatment
with an Open MR System .......................................................... 802
   Songyuan Tang, Yen-wei Chen, Rui Xu, Yongtian Wang,
   Shigehiro Morikawa, Yoshimasa Kurumi

Example-Based Realistic Terrain Generation .............................. 811
   Qicheng Li, Guoping Wang, Feng Zhou, Xiaohui Tang, Kun Yang

Bayesian Mesh Reconstruction from Noisy Point Data ..................... 819
   Guiping Qian, Ruofeng Tong, Wen Peng, Jinxing Dong

Efficient Retrieval of 3D Models Based on Integer Medial
Axis Skeleton ................................................................. 830
   Yong Tang, Xuefan Zhang

Implicit Surface Boolean Operations Based Cut-and-Paste Algorithm
for Mesh Models ................................................................. 839
   Xujia Qin, Xinhua Yang, Hongbo Zheng

Meshes Simplification Based on Reverse Subdivision ...................... 849
   Jian-ping Ma, Xiao-nan Luo, Shi-jia Ma, Guifeng Zheng
Kd-Tree Based OLS in Implicit Surface Reconstruction with Radial
Basis Function ................................................. 861
   Peizhi Wen, Xiaojun Wu, Tao Gao, Chengke Wu

Retrieving 3D CAD Model with Regional Entropy Distributions ...... 871
   Liu Wei, He Yuanjun

Virtual Tang-Style Timber-Frame Building Complex .................... 880
   Deren Li, Yixuan Zhu, Zhiqiang Du, Tao Hong

An Accelerating Rendering Method of Hybrid Point and Polygon
for Complex Three-Dimensional Models .................................. 889
   Aimin Hao, Guifen Tian, Qinping Zhao, Zhide Li

User Mediated Hypermedia Presentation Generation on the Semantic
Web Framework .................................................. 901
   Jayan C. Kurian, Payam M. Barnaghi, Michael Ian Hartley

Progressive Transmission of Vector Map Data Based on Polygonal
Chain Simplification ............................................. 908
   Haisheng Zhan, Guangxin Li

Image-Based Fast Small Triangle Rasterization ........................... 918
   Jim X. Chen, Harry Wechsler, Jian Cui

On Volume Distribution Features Based 3D Model Retrieval ............. 928
   Mingyong Pang, Wenjun Dai, Gangshan Wu, Fuyan Zhang

Personalized Model Deformation Based on Slice Space
Representation ................................................................... 938
   Lifeng Ren, Mingmin Zhang, Yunlong Xu, Zhigeng Pan

Flexible Camera Setup for Visual Based Registration on 2D Interaction
Surface with Undefined Geometry Using Neural Network ............... 948
   Ary Setijadi Prihatmanto, Michael Haller, Roland Wagner

Painterly Rendering with Vector Field Based Feature Extraction ....... 960
   Chen Pang, Mingli Song, Jiajun Bu, Chun Chen, Dong Wang

Ubiquitous/Wearable Computing

Reducing Time Cost of Distributed Run-Time Infrastructure ........... 969
   Zhong Zhou, Qinping Zhao
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wearable Multimodal Interface for Helping Visually Handicapped Persons</td>
<td>980</td>
</tr>
<tr>
<td><em>Byeong-Seok Shin, Honam Ahn, Gye Young Kim</em></td>
<td></td>
</tr>
<tr>
<td>Personalized Primary Port: Analysis of User View for the Smart Environment</td>
<td>989</td>
</tr>
<tr>
<td><em>Wei-jin Park, Junhwan Kim, Doo-Hwan Bae</em></td>
<td></td>
</tr>
<tr>
<td>Mobile Information Presentation Schemes for Supra-adaptive Logistics Applications</td>
<td>998</td>
</tr>
<tr>
<td><em>Björn Schwerdtfeger, Troels Frimor, Daniel Pustka, Gudrun Klinker</em></td>
<td></td>
</tr>
<tr>
<td>Interactive Collaborative Scene Assembly Using AR on Mobile Phones</td>
<td>1008</td>
</tr>
<tr>
<td><em>Miroslav Andel, Alexander Petrovski, Anders Henrysson, Mark Ollila</em></td>
<td></td>
</tr>
<tr>
<td>Design of the Multimedia Communication Protocol and System for Wireless LAN</td>
<td>1018</td>
</tr>
<tr>
<td><em>Qingzhang Chen, Jianghong Han, Keji Mao</em></td>
<td></td>
</tr>
<tr>
<td><strong>Virtual Heritage, Virtual Medicine and Health Science</strong></td>
<td></td>
</tr>
<tr>
<td>Representation of Color in Ancient Noh Masks</td>
<td>1026</td>
</tr>
<tr>
<td><em>Xin Yin, Yasuo Miichi, Hiromi T. Tanaka</em></td>
<td></td>
</tr>
<tr>
<td>Modeling and Immersive Display of Cultural Heritage</td>
<td>1035</td>
</tr>
<tr>
<td><em>Lei Zhao, Duan-qing Xu, Yi Li, Yi-min Yu</em></td>
<td></td>
</tr>
<tr>
<td>Personalized Content Presentation for Virtual Gallery</td>
<td>1045</td>
</tr>
<tr>
<td><em>Wonil Kim, Hanku Lee, Kyungro Yoon, Hyungseok Kim, Changdak Jung</em></td>
<td></td>
</tr>
<tr>
<td>Accessible Information from Radiated Sound of Extracorporeal Shock Wave Lithotriptor for Improving Fragmentation Efficiency</td>
<td>1055</td>
</tr>
<tr>
<td><em>Yun Seok Jang, Jin Ho Choi</em></td>
<td></td>
</tr>
<tr>
<td>Visualization of Segmented Color Volume Data Using GPU</td>
<td>1062</td>
</tr>
<tr>
<td><em>Koo-Joo Kwon, Byeong-Seok Shin</em></td>
<td></td>
</tr>
<tr>
<td>Research on Segmentation Algorithm of 3d Medical Data</td>
<td>1070</td>
</tr>
<tr>
<td><em>Yanjun Peng, Dandan Zhang, Weidong Zhao, Jiaoying Shi, Yongguo Zheng</em></td>
<td></td>
</tr>
</tbody>
</table>
Kidney Diseases Diagnosis System for Sensation Type Using Physiological Signal Analysis ................................................. 1078  
*Bong-hyun Kim, Se-hwan Lee, Dong-uk Cho*

A Computer-Aided Driving Posture Prediction System Based on Driver Comfort ................................................................. 1088  
*Qun Wu, Shiwu Luo, Shouqian Sun*

Height-Based Deformation and Ray Supersampling for Colon Unfolding ................................................................. 1098  
*Honam Ahn, Byeong-Seok Shin*

Content-Based Retrieval of Cultural Relic Images in Digital Museum ................................................................. 1108  
*Tongwei Ren, Gangshan Wu*

Virtual Biology Modeling Method Based on Validity Confirmation Mechanism ........................................................................ 1118  
*Ying Liang, Wen-Yong Wang, Shao-Chun Zhong, Qing-Rong Zhang, Yao Wang, Xiao-Lin Quan, Qian Xu*

**Virtual Reality**

Virtual Reconstruction of Two Types of Traffic Accident by the Tire Marks ........................................................................ 1128  
*Xiaoyun Zhang, Xianlong Jin, Jie Shen*

A Seamless Visualization Model of the Global Terrain Based on the QTM ........................................................................ 1136  
*Xuesheng Zhao, Jianjun Bai, Jun Chen, Zhilin Li*

Photographs Alignment and High Dynamic Range Image Composition Based on Varying Exposure Levels ............................................ 1146  
*Shungang Hua, Lidan Wang*

Elastic Algorithm: A New Path Planning Algorithm About Auto-navigation in 3D Virtual Scene .............................................. 1156  
*Yong Chen, Ke-qin Wu, Dong Wang, Ge Chen*

Mental Representation of Spatial Structure in a Virtual Room-Sized Space ........................................................................ 1166  
*Zhiqiang Luo, Henry Been-Lirn Duh*

A Novel Planar Walking Algorithm for Virtual Walking Machine ..................................................................................... 1175  
*Jangwoo Park, Jungwon Yoon, Yo-An Lim, Jeha Ryu*
XXII Table of Contents

An Interactive System of Virtual Face Pose Estimation ................. 1186
Zheng-yi Wu, Jian Shi, Xiaoming Tong, Zheng Tan

An Efficient Manipulation of Game Contents on Heterogeneous Platforms Using MR Interface ........................................... 1193
Gi Sook Jung, Seung-Dae Jeong, Kyung Ho Jang, Soon Ki Jung

Manipulation of Field of View for Hand-Held Virtual Reality .......... 1204
Jane Hwang, Jaehoon Jung, Gerard Joung hyun Kim

Hierarchical 3D Data Rendering System Synchronizing with HTML .... 1212
Yousuke Kimura, Tomohiro Mashita, Atsushi Nakazawa, Takashi Machida, Kiyoshi Kiyokawa, Haruo Tamekura

Fragment Indexing of XML-Based Metadata for Digital TV Contents ....................................................... 1223
Hyoseop Shin, Minsoo Lee, Seokhyun Son

Using a MyoKinetic Synthesizer to Control of Virtual Instruments ... 1233
Duk Shin, Atsushi Katayama, K young sik Kim, Hiroyuki Kambara, Makoto Sato, Yasuharu Koike

VR Interaction and Navigation Techniques

View-Dependent Simplification of Complex Urban Scenes Using Weighted Quad trees ...................................................... 1243
Bum-Jong Lee, Jong-Seung Park, Mee Young Sung

Indoor Environment Modeling for Interactive VR – Based Robot Security Service .............................................................. 1253
Sangwoo Jo, Yong-Moo Kwon, Hanseok Ko

Research on Mass Terrain Data Storage and Scheduling Based on Grid GIS ............................................................ 1263
Jing Zhang, Hai Huang

Multi-touch Interaction for Table-Top Display ................................ 1273
Song-Gook Kim, Jang-Woon Kim, Ki-Tae Bae, Chil-Woo Lee

Reliable Omnidirectional Depth Map Generation for Indoor Mobile Robot Navigation Via a Single Perspective Camera ............... 1283
Chuanjiang Luo, Feng Zhu, Zelin Shi
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhanced 3D Interaction with Augmented Visual Information</td>
<td>1293</td>
</tr>
<tr>
<td>Dongwook Lee, Jinah Park</td>
<td></td>
</tr>
<tr>
<td>Research and Application of Virtual Reality in the Field of Web-Based Education</td>
<td>1305</td>
</tr>
<tr>
<td>Chengling Zhao, Zhaohua Zhang</td>
<td></td>
</tr>
<tr>
<td>Indoor/Outdoor Pedestrian Navigation with an Embedded GPS/RFID/Self-contained Sensor System</td>
<td>1310</td>
</tr>
<tr>
<td>Masakatsu Kourogi, Nobuchika Sakata, Takashi Okuma, Takeshi Kurata</td>
<td></td>
</tr>
<tr>
<td>A Communication Model of Scents Mediated by Sense-Descriptive Adjectives</td>
<td>1322</td>
</tr>
<tr>
<td>Yuichi Bannai, Masayuki Ishizawa, Hiroshi Shigeno, Kenichi Okada</td>
<td></td>
</tr>
<tr>
<td>Hand Shape Recognition Using a Mean-Shift Embedded Active Contour (MEAC)</td>
<td>1333</td>
</tr>
<tr>
<td>Eun Yi Kim</td>
<td></td>
</tr>
<tr>
<td>Author Index</td>
<td>1343</td>
</tr>
</tbody>
</table>