



IEEE Virtual Reality 2008

Reno, Nevada, USA

March 8 - 12, 2008

Proceedings



Contents

Supporting Organizations	viii
Message from the General Chairs.....	ix
Message from the Program Chairs	xi
IEEE Computer Society Visualization and Graphics Technical Committee	xii
Conference Committee.....	xiii
Steering Committee	xiii
International Program Committee.....	xiv
Reviewers.....	xv
IEEE VGTC Virtual Reality Career Award 2008: Bowen Loftin.....	xvi
IEEE VGTC Virtual Reality Technical Achievement Award 2008: Bernd Fröhlich	xvii
Keynote Address: Story in Virtual Environments.....	xix
Scott Fisher (University of Southern California)	

Papers and Sketches

Session 1: Augmented & Mixed Reality

Providing a Wide Field of View for Effective Interaction in Desktop Tangible Augmented Reality.....	3
Seokhee Jeon, Gerard J. Kim	
Capturing Images with Sparse Informational Pixels using Projected 3D Tags.....	11
Li Zhang, Neesha Subramaniam, Robert Lin, Ramesh Raskar, Shree Nayar	
Envisor: Online Environment Map Construction for Mixed Reality	19
Stephen DiVerdi, Jason Wither, Tobias Höllerer	

Session 2: User Study of AR/MR/VR Systems

A Mixed Reality Approach for Merging Abstract and Concrete Knowledge	27
John Quarles, Samsun Lampotang, Ira Fischler, Paul Fishwick, Benjamin Lok	
An Empirical Study of Hear-Through Augmented Reality: Using Bone Conduction to Deliver Spatialized Audio.....	35
Robert W. Lindeman, Haruo Noma, Paulo Gonçalves de Barros	
User Boresighting for AR Calibration: A Preliminary Analysis (SKETCH).....	43
Magnus Axholt, Stephen Peterson, Stephen R. Ellis	
Using an Eye-Tracking System to Improve Camera Motions and Depth-of-Field Blur Effects in Virtual Environments (SKETCH).....	47
Sébastien Hillaire, Anatole Lécuyer, Rémi Cozot, Géry Casiez	

Session 3: Multiplayer & Collaborative VE/MR

Object-Capability Security in Virtual Environments.....	51
Martin Scheffler, Jan P. Springer, Bernd Froehlich	
Mobile Group Dynamics in Large-Scale Collaborative Virtual Environments	59
Trevor J. Dodds, Roy A. Ruddle	

Massively Multiplayer Online Worlds as a Platform for Augmented Reality Experiences (SKETCH).....	67
Tobias Lang, Blair MacIntyre, Iker Jamardo Zugaza	
Symmetric Model of Remote Collaborative MR Using Replicas (SKETCH)	71
Shun Yamamoto, Hidekazu Tamaki, Yuta Okajima, Yuichi Bannai, Kenichi Okada	
Session 4: Industrial Applications	
The Two-User Seating Buck: Enabling Face-to-Face Discussions of Novel Car Interface Concepts.....	75
Holger Salzmann, Bernd Froehlich	
Augmented Reality for Industrial Building Acceptance	83
Ralph Schoenfelder, Dieter Schmalstieg	
Session 5: Virtual Human and Avatars	
IPSViz: An After-Action Review Tool for Human-Virtual Human Experiences	91
Andrew B. Raij, Benjamin C. Lok	
Virtual Human + Tangible Interface = Mixed Reality Human: An Initial Exploration with a Virtual Breast Exam Patient	99
Aaron Kotranza, Benjamin Lok	
Creating a Speech Enabled Avatar from a Single Photograph (SKETCH)	107
Dmitri Bitouk, Shree K. Nayar	
High-Fidelity Avatar Eye-Representation (SKETCH)	111
William Steptoe, Anthony Steed	
Session 6: Perception & Evaluations	
Circular, Linear, and Curvilinear Vection in a Large-screen Virtual Environment with Floor Projection.....	115
Laura C. Trutoiu, Betty Mohler, Jörg Schulte-Pelkum, Heinrich H. Bühlhoff	
Evaluation of Reorientation Techniques for Walking in Large Virtual Environments	121
Tabitha C. Peck, Mary C. Whitton, Henry Fuchs	
Showing Users the Way: Signs in Virtual Worlds (SKETCH)	129
Daniel C. Cliburn, Stacy L. Rilea	
An Evaluation of Immersive Displays for Virtual Human Experiences (SKETCH)	133
Kyle Johnsen, Benjamin Lok	
Session 7: Tracking & 3D Reconstruction	
Advanced tracking through efficient image processing and visual-inertial sensor fusion.....	137
Gabriele Bleser, Didier Stricker	
Hybrid Feature Tracking and User Interaction for Markerless Augmented Reality	145
Taehee Lee, Tobias Höllerer	
Rapid Creation of Large-scale Photorealistic Virtual Environments	153
Charalambos Poullis, Suya You, Ulrich Neumann	
Session 8: Display & Rendering	
Automultiscopic display by revolving flat-panel displays.....	161
Koichi Hirota, Kazuyoshi Tagawa, Yasuhiro Suzuki	
Managing Visual Clutter: A Generalized Technique for Label Segregation using Stereoscopic Disparity	169
Stephen Peterson, Magnus Axholt, Stephen R. Ellis	

Advanced Multi-Frame Rate Rendering Techniques.....	177
Jan P. Springer, Christopher Lux , Dirk Reiners, Bernd Froehlich	
Transparent Cockpit: Visual Assistance System for Vehicle Using Retro-reflective Projection Technology (SKETCH)	185
Takumi Yoshida, Kensei Jo, Kouta Minamizawa, Hideaki Nii, Naoki Kawakami, Susumu Tachi	
New Rendering Approach for Composable Volumetric Lenses (SKETCH)	189
Christopher M. Best, Christoph W. Borst	

Session 9: 3D Interfaces and Tangible Space

Tiered Developer-Centric Representations for 3D Interfaces: Concept-Oriented Design in Chasm.....	193
Chadwick A. Wingrave, Doug A. Bowman	
VARU Framework: Enabling Rapid Prototyping of VR, AR and Ubiquitous Applications.....	201
Sylvia Irawati, Sangchul Ahn, Jinwook Kim, Heedong Ko	
Case Study of Haptic Methods for Selection on CAD Models (SKETCH).....	209
Flavien Picon, Mehdi Ammi, Patrick Bourdot	
Cutting, Deforming and Painting of 3D meshes in a Two Handed Viso-haptic VR System (SKETCH)	213
Adam Faeth, Michael Oren, Jonathan Sheller, Sean Godinez, Chris Harding	

Session 10: Training & Education

Spatial Electronic Mnemonics for Augmentation of Human Memory	217
Yasushi Ikei , Hirofumi Ota	
GVT: a platform to create virtual environments for procedural training	225
Stéphanie Gerbaud, Nicolas Mollet, Franck Ganier, Bruno Arnaldi, Jacques Tisseau	
Distance Education System for Teaching Manual Skills in Endoscopic Paranasal Sinus Surgery Using “HyperMirror” Telecommunication Interface (SKETCH).....	233
Toru Kumagai, Juli Yamashita, Osamu Morikawa, Kazunori Yokoyama, Shin’ichi Fujimaki, Taku Konishi	
Inexpensive Immersive Projection (SKETCH)	237
Nancy P. Y. Yuen, William C. Thibault	

Posters

Virtual 3D World Construction by Inter-connecting Photograph-based 3D Models	243
Takashi Aoki, Tomohiro Tanikawa, Michitaka Hirose	
An initial study into augmented inward looking exploration and navigation in CAVE-like IPT systems	245
Rob Aspin	
Uncertainty Boundaries for Complex Objects in Augmented Reality	247
Jijian Chen, Blair MacIntyre	
MIRELA: A Language for Modeling and Analyzing Mixed Reality Applications Using Timed Automata	249
Jean-Yves Didier, Bachir Djafri, Hanna Klauedel	
EEG-based navigation of immersing virtual environment using common spatial patterns	251
Junya Fujisawa, Hideaki Touyama, Michitaka Hirose	
Extending X3D with Perceptual Auditory Properties	253
Katharina Garbe, Iris Herbst	
Piavca: A Framework for Heterogeneous Interactions with Virtual Characters.....	255
Marco Gillies	

Redgraph: Navigating Semantic Web Networks using Virtual Reality.....	257
Harry Halpin, David J. Zielinski, Rachael Brady, Glenda Kelly	
Multi-dimensional Interactive City Exploration through Mixed Reality	259
Iris Herbst, Anne-Kathrin Braun, Rod McCall, Wolfgang Broll	
VFire: Virtual Fire in Realistic Environments	261
Roger V. Hoang, Joseph D. Mahsman, David T. Brown, Michael A. Penick, Frederick C. Harris Jr., Timothy J. Brown	
3D Virtual Haptic Cone for Intuitive Vehicle Motion Control	263
B.Horan, Z.Najdovski, S. Nahavandi	
Psychophysical Influence on Tactual Impression by Mixed-Reality Visual Stimulation.....	265
Akiko Iesaki, Akihiro Somada, Asako Kimura, Fumihisa Shibata, Hideyuki Tamura	
The Effects of Virtual Reality, Augmented Reality, and Motion Parallax on Egocentric Depth Perception	267
Adam Jones, J. Edward Swan II, Gurjot Singh, Eric Kolstad	
Immersive 3D Environment for Remote Collaboration and Training of Physical Activities	269
Gregorij Kurillo, Ruzena Bajcsy, Klara Nahrsted, Oliver Kreylos	
E-MAT: The Extremities-Multiple Application Trainer for Haptic-based Medical Training	271
Todd Lazarus, Glenn A. Martin, Razia Nayeem, Jennifer Fowlkes, Dawn Riddle	
MIRAGE: A Touch Screen based Mixed Reality Interface for Space Planning Applications	273
Gun A. Lee, Hyun Kang, Wookho Son	
Camera Parameter Estimation Method Using Infrared Markers for Live TV Production	275
Hideki Mitsumine, Yuko Yamanouchi, Takashi Fukaya, Hidehiko Okubo, Seiki Inoue	
Vertex-preserving Cutting of Elastic Objects	277
Megumi Nakao, Kotaro Minato, Naoto Kume, Shin-ichiro Mori, Shinji Tomita	
Bezier Surface Editing Using Marker-based Augmented Reality	279
David O’Gwynn, John Johnstone	
Conversational Pointing Gestures for Virtual Reality Interaction: Implications from an Empirical Study.....	281
Thies Pfeiffer, Marc E. Latoschik, Ipke Wachsmuth	
Integrating Gyroscopes into Ubiquitous Tracking Environments.....	283
Daniel Pustka, Manuel Huber, Gudrun Klinker	
Coordination Policies for Co-located Collaborative Travel	285
Andreas Simon, Christian Stern	
A Load Simulation and Metrics Framework for Distributed Virtual Reality	287
H. Lally Singh, Denis Gračanin, Kresimir Matkovic	
HOG on a WIM	289
Aaron Stafford, Wayne Piekarski, Bruce H. Thomas	
A Universal Virtual Locomotion System: Supporting Generic Redirected Walking and Dynamic Passive Haptics within Legacy 3D Graphics Applications	291
Frank Steinice, Timo Ropinski, Gerd Bruder, Klaus Hinrichs, Harald Frenz, Markus Lappe	
Assessing the Effects of Orientation and Device on 3D Positioning.....	293
Robert J. Teather, Wolfgang Stuerzlinger	
Creating Meaningful Environment Models for Augmented Reality	295
Eduardo E. Veas, Dieter Schmalstieg	

Identifying Motion Capture Tracking Markers with Self-Organizing Maps	297
Matthias Weber, Heni Ben Amor, Thomas Alexander	
User-Centered Multimodal Interaction Graph for Design Reviews	299
Martin Witzel, Giuseppe Conti, Raffaele De Amicis	

Panels

User Studies in VR: What Can We Learn From Them and What Are They Good For?	303
Organizer: Joseph J. LaViola Jr.	
Getting around in Virtual Environments	305
Organizer: Betty Mohler	
Building the Future Of – and a Career in – VR	308
Organizers: Gabriel Zachmann, Robert Lindeman	

Tutorials

Virtual Reality Technology - An Introduction	311
Presenter: Grigore Burdea	
Integration of Haptics in Virtual Environments: from Perception to Rendering	311
Presenters: Matthias Harders, Anatole Lécuyer, Dinesh Pai	
Designing multi-projector VR systems: from bits to bolts	312
Presenters: Luciano P. Soares, José Miguel Salles Dias, Joaquim A. Jorge, Alberto B. Raposo, Bruno R. de Araujo	
Virtual Reality in the Physical Sciences.....	312
Presenters: Oliver Kreylos, Eric Cowgill, Magali Billen	

Workshops

Virtual Cityscapes: Key Research Issues in Modeling Large-Scale Immersive Urban Environments	313
Organizers: Ming C. Lin, Peter G. Selfridge	
MMVE'08: Workshop on Massively Multiuser Virtual Environment.....	314
Organizers: Gregor Schiele, Daniel Weiskopf, Ben Leong, Sun-Yun Hu,	
SEARIS - Software Engineering and Architectures for Interactive Systems	315
Organizers: Marc Erich Latoschik, Dirk Reiners, Roland Blach, Pablo Alejandro Figueroa Forero, Raimund Dachsel	
VR 2008 workshop on Future Standards for Immersive VR	316
Organizers: Nicholas F. Polys, Anthony Steed, Johannes Behr, Don Brutzman	
Author Index.....	Inside Back Cover