

2009 8th IEEE International Symposium on Mixed and Augmented Reality

(ISMAR 2009)

**Orlando, Florida, USA
19-22 October 2009**



**IEEE Catalog Number: CFP09MAR-PRT
ISBN: 978-1-4244-5388-7**

Contents

Mixed and Augmented Reality: “Scary and Wondrous”
Vernor Vinge (Science Fiction Novelist)

Sponsors

Message from the Symposium General Chairs

Message from the Science and Technology Program Chairs

IEEE Visualization and Graphics Technical Committee

Task Force on Human Centered Computing (TFHCC)

Conference Committee

Science and Technology Area Chairs

Steering Committee

Science and Technology Program Committee & Reviewers

Keynote Speaker: Mixing Reality and Magic at Disney Theme Parks
Mark Mine (Director, Technical Concept Design, Disney Imagineering)

Keynote Speaker: UPWAKE: Art Performance fusing Dreams and Technology
Natasha Tsakos

Keynote Speaker: SixthSense: Integrating Information and the Real World
Pattie Maes (MIT Media Lab)

Awards

Papers

Session 1: User Interfaces

Using AR to Support Cross-Organisational Collaboration in Dynamic Tasks 3
Susanna Nilsson, Björn Johansson, Arne Jönsson

Interference Avoidance in Multi-User Hand-Held Augmented Reality..... 13
Ohan Oda, Steven Feiner

Continuous Natural User Interface: Reducing the Gap Between Real and Digital World 23
Nils Petersen, Didier Stricker

Session 2: Rendering

Animatronic Shader Lamps Avatars 27
Peter Lincoln, Greg Welch, Andrew Nashel, Adrian Ilie, Andrei State, Henry Fuchs

Augmenting Aerial Earth Maps with Dynamic Information..... 35
Kihwan Kim, Sangmin Oh, Jeonggyu Lee, Irfan Essa

Session 3: Human Factors

Interaction and Presentation Techniques for Shake Menus in Tangible Augmented Reality 39
Sean White, David Feng, Steven Feiner

Influence of Visual and Haptic Delays on Stiffness Perception in Augmented Reality 49
B. Knörlein, M. Di Luca, M. Harders

A User Study towards Understanding Stereo Perception in Head-worn Augmented Reality Displays	53
Mark A. Livingston, Zhuming Ai, Jonathan W. Decker	

Session 4: Tracking on Mobiles

Multiple Target Detection and Tracking with Guaranteed Framerates on Mobile Phones	57
Daniel Wagner, Dieter Schmalstieg, Horst Bischof	
Shape Recognition and Pose Estimation for Mobile Augmented Reality	65
Nate Hagbi, Oriël Bergig, Jihad El-Sana, Mark Billinghurst	
Wide Area Localization on Mobile Phones	73
Clemens Arth, Daniel Wagner, Manfred Klopschitz, Arnold Irschara, Dieter Schmalstieg	
Parallel Tracking and Mapping on a Camera Phone	83
Georg Klein, David Murray	

Session 5: Paper AR

In-Place 3D Sketching for Authoring and Augmenting Mechanical Systems.....	87
Oriël Bergig, Nate Hagbi, Jihad El-Sana, Mark Billinghurst	
Augmenting Text Document by On-Line Learning of Local Arrangement of Keypoints.....	95
Hideaki Uchiyama, Hideo Saito	
Augmented Touch without Visual Obtrusion	99
Francesco I. Cosco, Carlos Garre, Fabio Bruno, Maurizio Muzzupappa, Miguel A. Otaduy	

Session 6: Modeling

Online Environment Model Estimation for Augmented Reality	103
Jonathan Ventura, Tobias Höllerer	
In Situ Image-based Modeling.....	107
Anton van den Hengel, Rhys Hill, Ben Ward, Anthony Dick	
Dynamic Seethroughs: Synthesizing Hidden Views of Moving Objects	111
Peter Barnum, Yaser Sheikh, Ankur Datta, Takeo Kanade	

Session 7: Applications

Pick-by-Vision: A First Stress Test	115
Björn Schwerdtfeger, Rupert Reif, Willibald A. Günthner, Gudrun Klinker, Daniel Hamacher, Lutz Schega, Irina Böckelmann, Fabian Doil, Johannes Tümler	
Real-Time In-Situ Visual Feedback of Task Performance in Mixed Environments for Learning Joint Psychomotor-Cognitive Tasks	125
Aaron Kotranza, D. Scott Lind, Carla M. Pugh, Benjamin Lok	
Evaluating the Benefits of Augmented Reality for Task Localization in Maintenance of an Armored Personnel Carrier Turret	135
Steven J. Henderson, Steven Feiner	

Session 8: Tracking

A Dataset and Evaluation Methodology for Template-based Tracking Algorithms	145
Sebastian Lieberknecht, Selim Benhimane, Peter Meier, Nassir Navab	
Global Pose Estimation using Multi-Sensor Fusion for Outdoor Augmented Reality	153
Gerhard Schall, Daniel Wagner, Gerhard Reitmayr, Elise Taichmann, Manfred Wieser, Dieter Schmalstieg, Bernhard Hofmann-Wellenhof	
ESM-Blur: Handling & Rendering Blur in 3D Tracking and Augmentation.....	163
Youngmin Park, Vincent Lepetit, Woontack Woo	

Posters

Integration of Georegistered Information on a Virtual Globe.....	169
Zhuming Ai, Mark A. Livingston	
Forked! A Demonstration of Physics Realism in Augmented Reality.....	171
David Beaney, Brian Mac Namee	
Contextual In-Situ Visualization for Port Placement in Keyhole Surgery: Evaluation of Three Target Applications by Two Surgeons and Eighteen Medical Trainees	173
Christoph Bichlmeier, Stuart Holdstock, Sandro Michael Heining, Simon Weidert, Ekkehard Euler, Oliver Kutter, Nassir Navab	
Using Optical Flow as Lightweight SLAM Alternative.....	175
Gabriele Bleser, Gustaf Hendeby	
Advanced Training Methods using an Augmented Reality Ultrasound Simulator.....	177
Tobias Blum, Sandro Michael Heining, Oliver Kutter, Nassir Navab	
Object Recognition and Localization while Tracking and Mapping.....	179
Robert O. Castle, David W. Murray	
Streaming Mobile Augmented Reality on Mobile Phones.....	181
David M. Chen, Sam S. Tsai, Ramakrishna Vedantham, Radek Grzeszczuk, Bernd Girod	
MoleAR!ert - An Augmented Reality Game Based On Lemmings	183
Sandy Engelhardt, Annabell Langs, Gerrit Lochmann, Irini Schmidt, Stefan Müller	
A Setup for Evaluating Detectors and Descriptors for Visual Tracking.....	185
Steffen Gauglitz, Tobias Höllerer, Petra Krahwinkler, Jürgen Roßmann	
Photo-based Industrial Augmented Reality Application Using a Single Keyframe Registration Procedure.....	187
Pierre Georgel, Selim Benhimane, Jürgen Sotke, Nassir Navab	
Evaluating the Trackability of Natural Feature-Point Sets.....	189
Lukas Gruber, Stefanie Zollmann, Daniel Wagner, Dieter Schmalstieg	
Robust Pose Estimation in Untextured Environments for Augmented Reality Applications	191
Wei Guan, Lu Wang, Jonathan Mooser, Suya You, Ulrich Neumann	
In-situ Refinement Techniques for Outdoor Geo-Referenced Models Using Mobile AR.....	193
Thuong N. Hoang, Bruce H. Thomas	
Temporal Calibration in Multisensor Tracking Setups	195
Manuel Huber, Michael Schlegel, Gudrun Klinker	
Integrating Conversational Virtual Humans and Mannequin Patient Simulators to Present Mixed Reality Clinical Training Experiences.....	197
Yongho Hwang, Samsun Lampotang, Nikolaus Gravenstein, Isaac Luria, Benjamin Lok	
Mobile Augmented Reality based 3D Snapshots	199
Peter Keitler, Frieder Pankratz, Björn Schwerdtfeger, Daniel Pustka, Wolf Rödiger, Gudrun Klinker, Christian Rauch, Anup Chathoth, John Collomosse, Yi-Zhe Song	
Effects of Sizes and Shapes of Props in Tangible Augmented Reality	201
Eun Kwon, Gerard J. Kim, Sangyoon Lee	
A Replication Study Testing the Validity of AR Simulation in VR for Controlled Experiments.....	203
Cha Lee, Scott Bonebrake, Tobias Höllerer, Doug A. Bowman	
Physical-Virtual Tools for Spatial Augmented Reality User Interfaces	205
Michael R. Marnier, Bruce H. Thomas, Christian Sandor	
Head-Mounted Virtual Loupe with Sight-based Activation for Surgical Applications	207
Anabel Martin-Gonzalez, Sandro-Michael Heining, Nassir Navab	

Interactive Model Reconstruction with User Guidance	209
Qi Pan, Gerhard Reitmayr, Tom W. Drummond	
Egocentric Space-Distorting Visualizations for Rapid Environment Exploration in Mobile Mixed Reality	211
Christian Sandor, Andrew Cunningham, Ulrich Eck, Donald Urquhart, Graeme Jarvis, Arindam Dey, Sebastien Barbier, Michael R. Marner, Sang Rhee	
Multitouch Interaction for Tangible User Interfaces	213
Hartmut Seichter, Raphaël Grasset, Julian Looser, Mark Billinghurst	
Immersive Image-Based Modeling of Polyhedral Scenes	215
Gilles Simon	
Real-time Representation of Inter-reflection for Cubic Marker	217
Yuki Uranishi, Akimichi Ihara, Hiroshi Sasaki, Yoshitsugu Manabe, Kunihiro Chihara	
A Solution for Navigating User-Generated Content	219
Severi Uusitalo, Peter Eskolin, Petros Belimpasakis	
Vision based People Tracking for Ubiquitous Augmented Reality Applications.....	221
Christian A.L. Waechter, Daniel Pustka, Gudrun J. Klinker	
Consistent Real-time Lighting for Virtual Objects in Augmented Reality	223
Ryan Christopher Yeoh, Steven ZhiYing Zhou	

Tutorials

Comprehensive Tutorials	226
Charlie Hughes, John Quarles	

Workshops

Experiential Learning with Mixed and Augmented Reality	227
Eileen Smith	
Transforming Lives: High-Performance, High-Risk Training with Mixed Reality	227
Mary Trier	
Industrial Workshop: Manufacturing the Future	228
Noora Guldemond	
Mobile Magic Wand: Augmented Reality on Mobile Devices.....	228
Christine Perey	
Lets Go Out: Research in Outdoor Mixed and Augmented Reality.....	229
Christian Sandor, Itaru Kitahara, Gerhard Reitmayr, Steven Feiner, Yuichi Ohta	
AR 2.0: Social Augmented Reality - Social Computing meets Augmented Reality.....	229
Tobias Höllerer, Dieter Schmalstieg, Mark Billinghurst	

Panel

Proposal of International Voluntary Activities on Establishing Benchmark Test Schemes for AR/MR Geometric Registration and Tracking Methods	233
Hideyuki Tamura, Hirokazu Kato, the TrakMark Working Group	

Author Index