Contents

Usability, User Experience and Design in VAMR

Comparing Objective and Subjective Metrics Between Physical and Virtual Tasks ............................................. 3
S.N. Gieser, Caleb Gentry, James LePage, and Fillia Makedon

Avatar Types Matter: Review of Avatar Literature for Performance Purposes ..................................................... 14
Irwin Hudson and Jonathan Hurter

A Tool for Assessing User Experience of Fit of a Virtual Workplace ................................................................. 22
Ursula Hyrkkänen, Suvi Nenonen, and Carolyn Axtell

Preliminary Review of a Virtual World Usability Questionnaire ................................................................. 35
Crystal S. Maraj, Sushunova G. Martinez, Karla A. Badillo-Urquiola, Jonathan A. Stevens, and Douglas B. Maxwell

Smart Prototyping - Improving the Evaluation of Design Concepts Using Virtual Reality .............................. 47
Mathias Müller, Tobias Günther, Dietrich Kammer, Jan Wojdziak, Sebastian Lorenz, and Rainer Groh

Interaction Fidelity: The Uncanny Valley of Virtual Reality Interactions ..................................................... 59
Ryan P. McMahan, Chengyuan Lai, and Swaroop K. Pal

Guidelines for Graphical User Interface Design in Mobile Augmented Reality Applications ..................................... 71
Carlos Santos, Brunelli Miranda, Tiago Araujo, Nikolas Carneiro, Anderson Marques, Marcelle Mota, Jefferson Morais, and Bianchi Meiguins

The User Experience of Disney Infinity: Do Smart Toys Matter? ................................................................. 81
Shelly Welch and Peter Smith

Using Qualitative Data Analysis to Measure User Experience in a Serious Game for Premed Students ................. 92
Marjorie A. Zielke, Djakhangir Zakhidov, Daniel Jacob, and Sean Lenox
Perception, Cognition, Psychology and Behaviour in VAMR

A Holistic Evaluation of Task View Format for Training a Simulated Robot-Assisted EOD Task .................................................. 107
James P. Bliss, Eric T. Chancey, Alexandra B. Proaps, and Peter Crane

The Effects of Automation Error Types on Operators’ Trust and Reliance . . . 116
Svyatoslav Guznov, Joseph Lyons, Alexander Nelson, and Montana Woolley

Modeling Human Comprehension of Data Visualizations ....................... 125
Michael J. Haass, Andrew T. Wilson, Laura E. Matzen, and Kristin M. Divis

Auditory and Visual Properties in the Virtual Reality Using Haptic Device . . . . 135
Manabu Ishihara and Takafumi Komori

Exploring Behavioral Methods to Reduce Visually Induced Motion Sickness in Virtual Environments ............................................. 147
Behrang Keshavarz

Assessment of Kim’s Game Strategy for Behavior Cue Detection: Engagement, Flow, & Performance Aspects ................................. 156
Crystal S. Maraj, Stephanie J. Lackey, Karla A. Badillo-Urquiola, and Irwin L. Hudson

Olfactory Stimuli Increase Presence During Simulated Exposure ............... 164
Benson G. Munyan, Sandra M. Neer, Deborah C. Beidel, and Florian Jentsch

Depth Perception in Virtual Environment: The Effects of Immersive System and Freedom of Movement ........................................ 173
Adrian K.T. Ng, Leith K.Y. Chan, and Henry Y.K. Lau

Impact of Instructional Strategies on Workload, Stress, and Flow in Simulation-Based Training for Behavior Cue Analysis ................... 184
Julie N. Salcedo, Stephanie J. Lackey, and Crystal Maraj

Multimodal Interaction in VAMR

Aspects of Voice Interaction on a Mobile Augmented Reality Application . . 199
Tiago Araújo, Carlos Santos, Brunelli Miranda, Nikolas Carneiro, Anderson Marques, Marcelle Mota, Nelson Neto, and Bianchi Meiguins

Gesture Interactions for Virtual Immersive Environments: Navigation, Selection and Manipulation ............................................. 211
Paulo Dias, João Pinto, Sérgio Eliseu, and Beatriz Sousa Santos
Usability and Functionality Assessment of an Oculus Rift in Immersive and Interactive Systems Using Voice Commands ......................................................... 222

Valéria Farinazzo Martins, Paulo N.M. Sampaio, Fernanda da S. Mendes, André Santos Lima, and Marcelo de Paiva Guimarães

Research on Motion Model for Technique Movements of Competitive Swimming in Virtual Interactive Environment .................. 233

Mao Jie

Ultrafast Facial Tracker Using Generic Cameras with Applications in Intelligent Lifestyle ................................................................. 243

Yung-Hui Li, Yuan-Ting Hu, Jethro Shen, Mihai Preda, Andrei Drexler, Carmen Sosoiu, Dragos Florin Stanculescu, Paul Liu, and Joe Ye

Evaluation of Information Visualization Interaction Techniques Using Gestures and Widgets in 3D Environments ........................................ 255

Brunelli Miranda, Carlos Santos, Nikolas Carneiro, Tiago Araújo, Anderson Marques, Marcelle Mota, Nelson Neto, and Bianchi Meiguins

Novel Devices and Technologies in VAMR

Immersion in Cardboard VR Compared to a Traditional Head-Mounted Display ................................................................. 269

Ashfaq Amin, Diane Gromala, Xin Tong, and Chris Shaw

2D and 3D Iconography on Augmented Reality Interfaces ......................... 277

Luiz Henrique Cavalcanti

Optimizing 3D Object Visualization on the Web ......................... 287

João Victor de Figueirêdo Leite, João Marcelo Xavier Natário Teixeira, and Veronica Teichrieb

Holographic Humans ................................................................. 299

Alexiei Dingli and Nicholas Mifsud

Screen Space Cone Tracing for Glossy Reflections ................................. 308

Lukas Hermanns, Tobias Franke, and Arjan Kuijper

Lifetime and Deployment Limits for Mobile, 3D-Perceptual Applications . . 319

Yan Liu, Yun Li, Lennart Johnsson, and Andrew A. Chien

Study of a Virtual Conference in a Mirror World with Avatars and HMD . . 330

Evelyne Lombardo, Christophe Guion, and Joaquin Keller

Using iBeacons for Location-Based Tracking in Alternate Reality Games:
A Pilot Study ................................................................. 339

Alexia Mandeville and Carrie Crossley
Augmenting Reality Through Wearable Devices .............................. 348
  Peter A. Smith

Virtual Humans as Centaurs: Melding Real and Virtual ...................... 356
  William R. Swartout

**VAMR Applications in Aviation, Space and the Military**

Mixed Reality Training of Military Tasks: Comparison of Two Approaches
Through Reactions from Subject Matter Experts ................................. 363
  Roberto Champney, Julie N. Salcedo, Stephanie J. Lackey,
  Stephen Serge, and Michelle Sinagra

Augmented Reality for the US Air Force ........................................ 375
  Amber Gilbert

Research on the Use of Puppeteering to Improve Realism in Army
Simulations and Training Games .................................................... 386
  Tami Griffith, Tabitha Dwyer, Corey Kinard, Jeremy R. Flynn,
  and Vic Kirazian

Tasking Teams: Supervisory Control and Task Management of
Autonomous Unmanned Systems ....................................................... 397
  Robert S. Gutzwiller and Douglas S. Lange

From Interface to Interspace Conceptual Framework for Multimodal Flight
Deck Controls ................................................................. 406
  Daniela Kratchounova

Virtual Reality Based Navigation Training for Astronaut Moving in a
Simulated Space Station .......................................................... 416
  Xiang Liu, Yuqing Liu, Xiuxing Zhu, Ming An, and Fuchao Hu

Application of Virtual Environments for Infantry Soldier Skills Training:
We are Doing it Wrong .............................................................. 424
  Douglas B. Maxwell

Test-Bed for Integrated Ground Control Station Experimentation and
Rehearsal: Crew Performance and Authority Pathway Concept
Development ................................................................. 433
  Derek McColl, Simon Banbury, and Ming Hou

Object Manipulation by Virtual Menu Interaction Using Free-Hand Input in
a Desktop Virtual Reality Maritime Situation Display ....................... 446
  Ronald Meyer, Alexander Mertens, Jeronimo Dzaack,
  and Christopher M. Schlick
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Performance-Based Training Evaluation for an Augmented Virtuality</td>
<td>454</td>
</tr>
<tr>
<td>Call for Fire Training System</td>
<td></td>
</tr>
<tr>
<td>Stephen R. Serge, Julie N. Salcedo, Roberto Champney, Stephanie J.</td>
<td></td>
</tr>
<tr>
<td>Lackey, and Gino Fragomeni</td>
<td></td>
</tr>
<tr>
<td>The Effect of Agent Reasoning Transparency on Automation Bias:</td>
<td>465</td>
</tr>
<tr>
<td>An Analysis of Response Performance</td>
<td></td>
</tr>
<tr>
<td>Julia L. Wright, Jessie Y.C. Chen, Michael J. Barnes, and P.A.</td>
<td></td>
</tr>
<tr>
<td>Hancock</td>
<td></td>
</tr>
<tr>
<td>Medicine, Health and Well-Being Applications of VAMR</td>
<td>481</td>
</tr>
<tr>
<td>Utilizing Digital Game Environments for Training Prosthetic Use</td>
<td></td>
</tr>
<tr>
<td>Matt Dombrowski, Peter A. Smith, and Ryan Buysens</td>
<td></td>
</tr>
<tr>
<td>Full-Body Portable Virtual Reality for Personal Protective Equipment</td>
<td>490</td>
</tr>
<tr>
<td>James Coleman Eubanks, Veena Somareddy, Ryan P. McMahan, and Alfonso</td>
<td></td>
</tr>
<tr>
<td>A. Lopez</td>
<td></td>
</tr>
<tr>
<td>New Emergency Medicine Paradigm via Augmented Telemedicine</td>
<td>502</td>
</tr>
<tr>
<td>Gregorij Kurillo, Allen Y. Yang, Victor Shia, Aaron Bair, and Ruzena</td>
<td></td>
</tr>
<tr>
<td>Bajcsy</td>
<td></td>
</tr>
<tr>
<td>Advances and Tendencies: A Review of Recent Studies on Virtual Reality for Pain Management</td>
<td>512</td>
</tr>
<tr>
<td>Zhejun Liu, Sijia Wangluo, and Hua Dong</td>
<td></td>
</tr>
<tr>
<td>Hand Tracking and Haptic-Based Jugular Neonate Central Venous Access Procedure</td>
<td>521</td>
</tr>
<tr>
<td>Tatiana Ortegon-Sarmiento, Alvaro Uribe-Quevedo, Byron Perez-Gutierrez, Lizeth Vega-Medina, and Gerardo Tibamoso</td>
<td></td>
</tr>
<tr>
<td>ANSIABLE: A Virtual World Ecosystem for Improving Psycho-Social Well-being</td>
<td>532</td>
</tr>
<tr>
<td>Tammy Ott, Peggy Wu, Jacki Morie, Peter Wall, Jack Ladwig, Eric</td>
<td></td>
</tr>
<tr>
<td>Chance, Kip Haynes, Bryan Bell, Christopher Miller, and Kim Binsted</td>
<td></td>
</tr>
<tr>
<td>Immersive Gatekeeper Training System for Suicide Prevention in HMD Based Virtual Environments</td>
<td>544</td>
</tr>
<tr>
<td>Sinwoo Park and Changhoon Park</td>
<td></td>
</tr>
<tr>
<td>Animation Validation of Obese Virtual Pediatric Patients Using a FLACC Pain Scale</td>
<td>552</td>
</tr>
<tr>
<td>Toni B. Pence, Lauren C. Dukes, and Larry F. Hodges</td>
<td></td>
</tr>
</tbody>
</table>
XVIII Contents

3DUI Electronic Syringe for Neonate Central Venous Access Procedure Simulation .............................................................................................................. 565
Gerardo Tibamoso, Sergio Medina-Papagayo, Lizeth Vega-Medina, Byron Perez-Gutierrez, and Alvaro Uribe-Quevedo

Medutainment-Based AR Rally: Disaster Medical Learning Tool for Citizens .............................................................................................................. 574
Ikushi Yoda and Momo Shiroyama

VAMR in Industry, Design and Engineering

Interactive VR-based Visualization for Material Flow Simulations .......................... 587
Jan Berssenbrügge, Jörg Stöcklein, and Daniel Köchling

Low-Cost Mixed Reality Simulator for Industrial Vehicle Environments ............... 597
Daniel Kade, Markus Wallmyr, Tobias Holstein, Rikard Lindell, Hakan Ürey, and Öğuzhan Özcan

Collaborative Design of Material Handling Systems Using Distributed Virtual Reality Environments ................................................................. 609
Orthodoxos Kipouridis, Moritz Roidl, Marcus Röschinger, Michael ten Hompel, and Willibald A. Günther

Investigating Low-Cost Virtual Reality Technologies in the Context of an Immersive Maintenance Training Application ............................................. 621
Courtney McNamara, Matthew Proetsch, and Nelson Lerma

Tangible Augmented Reality and Engineering Product Dissection .......................... 633
Chloe McPherson and Rafael Radkowski

smARt.Assembly – Projection-Based Augmented Reality for Supporting Assembly Workers ........................................................................................................ 643
Oliver Sand, Sebastian Büttner, Volker Paelke, and Carsten Röcker

Virtual Tailor for Garment Design ........................................................................ 653
Andrea Vitali, Lorenzo D’Amico, and Caterina Rizzi

An Interactive Augmented Reality Furniture Customization System ..................... 662
Tzu-Chien Young and Shana Smith

Novel Virtual Environments

Ghost Hunter – An Augmented Reality Ghost Busting Game ........................................ 671
Stuart Armstrong and Kyle Morrand
Immersive Journalism in VR: Four Theoretical Domains for Researching a Narrative Design Framework .......................... 679
   Gary M. Hardee

Virtual Environments as Communication Technologies of Faith .............. 691
   John F. Kay

Geometry Explorer: Facilitating Geometry Education with Virtual Reality . . 702
   Chengyuan Lai, Ryan P. McMahan, Midori Kitagawa,
   and Iolani Connolly

Intelligent Virtual Environment Using a Methodology Oriented to Agents . . 714
   Sandra Mateus and John Branch

Applying Virtual Reality in City Planning ........................................ 724
   Minh-Tu Nguyen, Hai-Khanh Nguyen, Khanh-Duy Vo-Lam,
   Xuan-Gieng Nguyen, and Minh-Triet Tran

A Role of Augmented Reality in Educational Contents: Intermediating Between Reality and Virtual Reality ....................... 736
   Shohei Tsuchida and Shu Matsuura

Author Index ............................................. 747
Virtual, Augmented and Mixed Reality
Lackey, S.; Shumaker, R. (Eds.)
2016, XIX, 749 p. 304 illus., Softcover
ISBN: 978-3-319-39906-5