Contents – Part II

Application of VR/AR in Medicine

Augmented Reality to Enhance the Clinician’s Observation During Assessment of Daily Living Activities ........................................ 3
M. De Cecco, A. Fornaser, P. Tomasin, M. Zanetti, G. Guandalini,
P.G. Ianes, F. Pilla, G. Nollo, M. Valente, and T. Pisoni

Augmented Robotics for Electronic Wheelchair to Enhance Mobility in Domestic Environment ................................................. 22
Luca Maule, Alberto Fornaser, Paolo Tomasin, Mattia Tavernini,
Gabriele Minotto, Mauro Da Lio, and Mariolino De Cecco

Semi-automatic Initial Registration for the iRay System: A User Study ........ 33
Tian Xie, Mohammad M. Islam, Alan B. Lumsden, and Ioannis A. Kakadiaris

Teaching Materials Using AR and VR for Learning the Usage of Oscilloscope ................................................................. 43
Takashi Miyazaki, Yusuke Ohira, Hiroaki Yamamoto, and Masaaki Nishi

An Augmented Reality System for Maxillo-Facial Surgery ................. 53
Francesco Ricciardi, Chiara Copelli, and Lucio T. De Paolis

Augmented Reality and MYO for a Touchless Interaction with Virtual Organs ............................................................... 63
Chiara Indraccolo and Lucio T. De Paolis

Architecture of a Virtual Reality and Semantics-Based Framework for the Return to Work of Wheelchair Users ............................. 74
Sara Arlati, Daniele Spoladore, Stefano Mottura, Andrea Zangiacomi,
Giancarlo Ferrigno, Rinaldo Sacchetti, and Marco Sacco

Virtual Environments for Cognitive and Physical Training in Elderly with Mild Cognitive Impairment: A Pilot Study ..................... 86
Sara Arlati, Andrea Zangiacomi, Luca Greci, Simona Gabriella di Santo,
Flaminia Franchini, and Marco Sacco

Virtual System for Upper Limbs Rehabilitation in Children .............. 107
Edwin Pruna, Andrés Acurio, Jenny Tigse, Ivón Escobar,
Marco Pilatásig, and Pablo Pilatásig
3D Virtual System Through 3 Space Mocap Sensors
for Lower Limb Rehabilitation ................................................................. 119
Edwin Pruna, Marco Pilatásig, Hamilton Angueta, Christian Hernandez,
Ivón Escobar, Eddie D. Galarza, and Nancy Jacho

Robust Laparoscopic Instruments Tracking Using Colored Strips .......... 129
Virginia Mamone, Rosanna Maria Vigliarolo, Fabrizio Cutolo,
Filippo Cavallo, Simone Guadagni, and Vincenzo Ferrari

Natural User Interface to Assess Social Skills in Autistic Population .... 144
Claudia Faita, Raffaello Brondi, Camilla Tanca, Marcello Carrozzino,
and Massimo Bergamasco

RRT-Based Path Planning for Virtual Bronchoscopy Simulator .......... 155
Wilbert G. Aguilar, Vanessa Abad, Hugo Ruiz, Jenner Aguilar,
and Fabián Aguilar-Castillo

Assistance System for Rehabilitation and Valuation of Motor Skills .... 166
Washington X. Quevedo, Jessica S. Ortiz, Paola M. Velasco,
Jorge S. Sánchez, Marcelo Álvarez V., David Rivas,
and Víctor H. Andaluz

Robotic Applications in Virtual Environments for Children with Autism .... 175
Christian P. Carvajal, Luis Proaño, José A. Pérez, Santiago Pérez,
Jessica S. Ortiz, and Víctor H. Andaluz

Realism in Audiovisual Stimuli for Phobias Treatments
Through Virtual Environments ................................................................. 188
Jessica S. Ortiz, Paola M. Velasco, Washington X. Quevedo,
Marcelo Álvarez V., Jorge S. Sánchez, Christian P. Carvajal,
Luis F. Cepeda, and Víctor H. Andaluz

Virtual Out-of-Body Experience as a Potential Therapeutic Tool After
Kidney Transplantation ........................................................................... 202
Péter Csibri, Róbert Pantea, Attila Tanács, Alexandra Kiss,
and Gyula Sáry

Patient Specific Virtual and Physical Simulation Platform for Surgical
Minimally-Invasive Cardiothoracic Surgery ........................................... 211
Giuseppe Turini, Sara Condino, Sara Sinceri, Izadyar Tamadon,
Simona Celi, Claudio Quaglia, Michele Murzi, Giorgio Soldani,
Arianna Menciassi, Vincenzo Ferrari, and Mauro Ferrari

Using of 3D Virtual Reality Electromagnetic Navigation for Challenging
Cannulation in FEVAR Procedure ............................................................ 221
Roberta Piazza, Sara Condino, Aldo Alberti, Davide Giannetti,
Vincenzo Ferrari, Marco Gesi, and Mauro Ferrari
A Tailored Serious Game for Preventing Falls of the Elderly .......................... 230
Estelle Courtial, Giuseppe Palestra, and Mohamed Rebiai

Application of VR/AR in Cultural Heritage

Finger Recognition as Interaction Media in Augmented Reality
for Historical Buildings in Matsum and Kesawan Regions of Medan City . . 243
Mohammad Fadly Syahputra, Ridho K. Siregar,
and Romi Fadillah Rahmat

An Innovative Real-Time Mobile Augmented Reality Application in Arts . . 251
Chutisant Kerdvilvech

Augmented Reality and UAVs in Archaeology: Development
of a Location-Based AR Application .................................................. 261
Maria Concetta Botrugno, Giovanni D’Errico,
and Lucio Tommaso De Paolis

Photogrammetric Approaches for the Virtual Reconstruction
of Damaged Historical Remains ......................................................... 271
D. Costantino, M.G. Angelini, and V. Baiocchi

Web Tool as a Virtual Museum of Ancient Archaeological Ruins in Peru . . 282
Eva Savina Malinverni, Roberto Pierdicca, Francesca Colosi,
and Roberto Orazi

Virtual Reality Meets Intelligence in Large Scale Architecture ................. 297
Ahmet Kose, Eduard Petlenkov, Aleksei Tepljakov,
and Kristina Vassiljeva

A Virtual Travel in Leonardo’s Codex of Flight ..................................... 310
Marcello Carrozzino, Chiara Evangelista, Claudia Faita,
Mihai Duguleana, and Massimo Bergamasco

Visualising a Software System as a City Through Virtual Reality .......... 319
Nicola Capece, Ugo Erra, Simone Romano, and Giuseppe Scanniello

Implementation of Player Position Monitoring for Tanjung Pura
Palace Virtual Environment ......................................................... 328
Mohammad Fadly Syahputra, Muhammad Iqbal Rizki, Siti Fatimah,
and Romi Fadillah Rahmat

Computer Graphics

Differential G-Buffer Rendering for Mediated Reality Applications .......... 337
Tobias Schwandt and Wolfgang Broll
Solid Angle Based Ambient Obscurance in Image Space

Dario Scarpa and Ugo Erra

“Shape-Curvature-Graph”: Towards a New Model of Representation for the Description of 3D Meshes

Arnaud Polette, Jean Meunier, and Jean-Luc Mari

Semantics-Supported Collaborative Creation of Interactive 3D Content

Krzysztof Walczak

Feature Fusion of HOG and GSP for Smile Recognition

Hemant Kumar Meena, Kamlesh Kumar Sharma, and S.D. Joshi

Real-Time 3D Modeling with a RGB-D Camera and On-Board Processing

Wilbert G. Aguilar, Guillermo A. Rodríguez, Leandro Álvarez, Sebastián Sandoval, Fernando Quisaguano, and Alex Limaico

Real-Time Detection and Simulation of Abnormal Crowd Behavior

Wilbert G. Aguilar, Marco A. Luna, Julio F. Moya, Marco P. Luna, Vanessa Abad, Hugo Ruiz, and Humberto Parra

Human Computer Interaction

Steering Versus Teleport Locomotion for Head Mounted Displays

Chris G. Christou and Poppy Aristidou

Mixed Reality-Based User Interaction Feedback for a Hand-Controlled Interface Targeted to Robot Teleoperation

Laura Cancedda, Alberto Cannavò, Giuseppe Garofalo, Fabrizio Lamberti, Paolo Montuschi, and Gianluca Paravati

Development and Heuristic Evaluation of Semi-immersive Hand-Gestural Virtual Reality Interface for Luxury Brands Online Stores

Samar Altarteer, Vassilis Charissis, David Harrison, and Warren Chan

Remote Touch Interaction with High Quality Models Using an Autostereoscopic 3D Display

Adriano Mancini, Paolo Clini, Carlo Alberto Bozzi, Eva Savina Malinverni, Roberto Pierdicca, and Romina Nespeca

Versatile Augmented Reality Scenes for Tangible Interaction in Real-World Environments

Rafał Wojciechowski

Cascade Classifiers and Saliency Maps Based People Detection

Wilbert G. Aguilar, Marco A. Luna, Julio F. Moya, Vanessa Abad, Hugo Ruiz, Humberto Parra, and William Lopez

Author Index
Contents – Part I

Virtual Reality

Cognitive Control Influences the Sense of Presence in Virtual Environments with Different Immersion Levels

Boris B. Velichkovsky, Alexey N. Gusev, Alexander E. Kremlev, and Sergey S. Grigorovich

Defining an Indicator for Navigation Performance Measurement in VE Based on ISO/IEC15939

Ahlem Assila, Jeremy Plouzeau, Frédéric Merienne, Aida Erfanian, and Yaoping Hu

A Study of Transitional Virtual Environments

Maria Sisto, Nicolas Wenk, Nabil Ouerhani, and Stéphane Gobron

Walk-able and Stereo Virtual Tour based on Spherical Panorama Matrix

Yanxiang Zhang and Ziqiang Zhu

Virtual Reality Applied to Industrial Processes

Víctor H. Andaluz, Daniel Castillo-Carrión, Roberto J. Miranda, and Juan C. Alulema

Training of Tannery Processes Through Virtual Reality

Víctor H. Andaluz, Andrea M. Pazmiño, José A. Pérez, Christian P. Carvajal, Francisco Lozada, Jeferson Lascano, and Jessica Carvajal

Virtual Environments for Motor Fine Skills Rehabilitation with Force Feedback

Víctor H. Andaluz, Cartagena Patricio, Naranjo José, Agreda José, and López Shirley

Towards Modeling of Finger Motions in Virtual Reality Environment

Sven Nõmm, Aaro Toomela, and Jaroslav Kulikov

Industrial Heritage Seen Through the Lens of a Virtual Reality Experience

David Checa, Mario Alaguero, and Andres Bustillo

Multiple NUI Device Approach to Full Body Tracking for Collaborative Virtual Environments

Paolo Leoncini, Bogdan Sikorski, Vincenzo Baraniello, Francesco Martone, Carlo Luongo, and Mariano Guida
Giovanni Avveduto, Camilla Tanca, Cristian Lorenzini, Franco Tecchia, Marcello Carrozzino, and Massimo Bergamasco

Robots Coordinated Control for Service Tasks in Virtual Reality Environments 164

RRT* GL Based Path Planning for Virtual Aerial Navigation 176
Wilbert G. Aguilar, Stephanie Morales, Hugo Ruiz, and Vanessa Abad

Virtual Reality System for Training in Automotive Mechanics 185

Math Model of UAV Multi Rotor Prototype with Fixed Wing Aerodynamic Structure for a Flight Simulator 199
David Orbea, Jessica Moposita, Wilbert G. Aguilar, Manolo Paredes, Gustavo León, and Aníbal Jara-Olmedo

Exploiting Factory Telemetry to Support Virtual Reality Simulation in Robotics Cell 212
Vladimir Kuts, Gianfranco E. Modoni, Walter Terkaj, Toivo Tähemaa, Marco Sacco, and Tauno Otto

A VR-CAD Data Model for Immersive Design: The cRea-VR Proof of Concept 222
Pierre Martin, Stéphane Masfrand, Yujiro Okuya, and Patrick Bourdot

Motion Style Transfer in Correlated Motion Spaces 242
Alex Kilias and Christos Mousas

Pixel Reprojection of 360 Degree Renderings for Small Parallax Effects 253
Joakim Bruslund Haurum, Christian Nygaard Daugbjerg, Péter Rohoska, Andrea Coifman, Anne Juhler Hansen, and Martin Kraus

Immersiveness of News: How Croatian Students Experienced 360-Video News 263
Mato Brautović, Romana John, and Marko Potrebica

Interactive 3D Symphony in VR Space 270
Yanxiang Zhang, Clayton Elieisar, and Abassin Sourou Fangbemi

Virtual Bodystorming: Utilizing Virtual Reality for Prototyping in Service Design 279
Costas Boletsis, Amelia Karahasanovic, and Annita Fjuk
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capturing Reality for a Billiards Simulation</td>
<td>289</td>
</tr>
<tr>
<td>Fuche Wu and Andrew Dellinger</td>
<td></td>
</tr>
<tr>
<td>Operating Virtual Panels with Hand Gestures in Immersive VR Games:</td>
<td>299</td>
</tr>
<tr>
<td>Experiences with the Leap Motion Controller</td>
<td></td>
</tr>
<tr>
<td>Yin Zhang and Oscar Meruvia-Pastor</td>
<td></td>
</tr>
<tr>
<td>Virtual Reality Toolset for Material Science: NOMAD VR Tools</td>
<td>309</td>
</tr>
<tr>
<td>Rubén Jesús García-Hernández and Dieter Kranzlmüller</td>
<td></td>
</tr>
<tr>
<td>Measuring the Impact of Low-Cost Short-Term Virtual Reality on the User Experience</td>
<td>320</td>
</tr>
<tr>
<td>Mario Alaguero, David Checa, and Andres Bustillo</td>
<td></td>
</tr>
</tbody>
</table>

**Augmented and Mixed Reality**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malek Akrashidi, Khalid Almohamadi, Michael Gardner, and Victor Callaghan</td>
<td></td>
</tr>
<tr>
<td>ARSSET: Augmented Reality Support on SET</td>
<td>356</td>
</tr>
<tr>
<td>Andrea Sanna, Fabrizio Lamberti, Francesco De Pace, Roberto Iacoviello, and Paola Sunna</td>
<td></td>
</tr>
<tr>
<td>Overcoming Location Inaccuracies in Augmented Reality Navigation</td>
<td>377</td>
</tr>
<tr>
<td>Christian A. Wiesner and Gudrun Klinker</td>
<td></td>
</tr>
<tr>
<td>The Use of Augmented Reality Glasses for the Application in Industry 4.0</td>
<td>389</td>
</tr>
<tr>
<td>Roberto Pierdicca, Emanuele Frontoni, Rama Pollini, Matteo Trani, and Lorenzo Verdini</td>
<td></td>
</tr>
<tr>
<td>Augmented Reality Applications for Education: Five Directions for Future Research</td>
<td>402</td>
</tr>
<tr>
<td>Juan Garzón, Juan Pavón, and Silvia Baldiris</td>
<td></td>
</tr>
<tr>
<td>Semantic Exploration of Distributed AR Services</td>
<td>415</td>
</tr>
<tr>
<td>Krzysztof Walczak, Rafał Wojciechowski, and Adam Wójtowicz</td>
<td></td>
</tr>
<tr>
<td>Automated Marker Augmentation and Path Discovery in Indoor Navigation for Visually Impaired.</td>
<td>427</td>
</tr>
<tr>
<td>Raees Khan ShahSani, Sehat Ullah, and Sami Ur Rahman</td>
<td></td>
</tr>
<tr>
<td>Virtual Product Try-On Solution for E-Commerce Using Mobile Augmented Reality</td>
<td>438</td>
</tr>
<tr>
<td>Anuradha Welivita, Nanduni Nimalsiri, Ruchiranga Wickramasinghe, Upekka Pathirana, and Chandana Gamage</td>
<td></td>
</tr>
</tbody>
</table>
DyMAR: Introduction to Dynamic Marker Based Augmented Reality Using Smartwatch ................................. 448
   Satyaki Roy, Pratiti Sarkar, and Surojit Dey

The Smartkuber Case Study: Lessons Learned from the Development of an Augmented Reality Serious Game for Cognitive Screening .......... 457
   Costas Boletsis and Simon McCallum

Author Index ................................................................. 473