2022 IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR 2022)

Virtual Conference 12 – 14 December 2022



IEEE Catalog Number: CFP22O53-POD ISBN: 978-1-6654-5726-2

Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP22O53-POD

 ISBN (Print-On-Demand):
 978-1-6654-5726-2

 ISBN (Online):
 978-1-6654-5725-5

ISSN: 2771-7445

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA

Phone: (845) 758-0400 Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



2022 IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR) AIVR 2022

Table of Contents

Message from the General Co-Chairs Message from the Program Co-Chairs Organizing Committee Program Committee	xiii xv
Technical Papers	
An End-to-end Learning-Based Approach to 3D Novel View Style Transfer	1
Comparison of Data Encodings and Machine Learning Architectures for User Identification on Arbitrary Motion Sequences	11
Efficient and Iterative Training for High-Performance Light Field Synthesis Jun-Hua Ko (National Taiwan University, Taiwan) and Homer Chen (National Taiwan University, Taiwan)	20
Improving Accessibility of Elevation Control in an Immersive Virtual Environment	26
Multimodal Embodied Conversational Agents: A Discussion of Architectures, Frameworks and Modules for Commercial Applications	36

Special Session AI

A Unique Approach to Efficient Fraudulent Signature Detection using Deep Convolutional Neural Network, Xception, and EfficientNet
Cumulative Evidence for Scene Change Detection and Local Map Updates
Smart Motion Trails for Animating in VR
Special Session VR/AR
Empathizing with Virtual Agents: the Effect of Personification and General Empathic Tendencies
WiM-Based Group Navigation for Collaborative Virtual Reality
Invited Paper
VR, Deepfakes and Epistemic Security 9 Nadisha-Marie Aliman (Utrecht University, The Netherlands) and Leon Kester (TNO Netherlands, The Netherlands)
Poster Papers
OpenXtract: A Blender Add-On for the Accelerated Extraction of the Objects of Interest
XR Management Training Simulator Supported by Content-Based Scenario Recommendation 10 Irene Gironacci (Swinburne University of Technology, Australia)

Visualization of Machine Learning Uncertainty in AR-Based See-Through Applications	09
Multi-Head Instance Segmentation of Indoor Scenes for AR/DR Applications	14
Re-Enacting Football Matches in VR using Virtual Agents' Realistic Behaviours	19
Capture and Recognition of Bead Weaving Activities using Hand Skeletal Data and an LSTM Deep Neural Network	24
Toward a Generative Pipeline for an AR Tour of Contested Heritage Sites	30
The Design and Development of a Goal-Oriented Framework for Emotional Virtual Humans 1 Samad Roohi (La Trobe University, Australia) and Richard Skarbez (La Trobe University, Australia)	35
Direct Interaction Word-Gesture Text Input in Virtual Reality	40
Late-Breaking-Work	
Comparative Experiment of Attention Prompting Methods using VR Driving Simulator	44
Active Visualization of Visual Cues on Hand for Better User Interface Design Generalization in Mixed Reality	49

Mixed Reality with Hardware Acceleration: Implementing the Multimodal user Interface Vision	153
Nektarios Deligiannakis (National and Kapodistrian University of Athens, Greece), Maria-Evangelia Pavlopoulou (National and Kapodistrian University of Athens, Greece), Vassilis Papataxiarxis (National and Kapodistrian University of Athens, Greece), and Stathes Hadjiefthymiades (National and Kapodistrian University of Athens, Greece)	
Touching the Explanations: Explaining Movie Recommendation Scores in Mobile Augmented Reality	157
Attention Score: Objective Measure of Attentiveness in Immersive Omnidirectional Videos Jay Bhanushali (Indian Institute of Technology Madras, India), Achsah Steffi John (Madras Crocodile Bank Trust, India), and Manivannan Muniyadi (Indian Institute of Technology Madras, India)	163
A Qualitative Analysis of Interaction Techniques in a Virtual Reality Instruction Environment: Experiences From a Case Study	171
Towards Casually Captured 6DoF VR Videos	176
Behavioral Avoidance Test: Comparison Between in vivo and Virtual Reality using Questionnaires and Psychophysiology	180
OCR Enhanced Augmented Reality Indoor Navigation Ilya Pivavaruk (University of Nevada, Las Vegas) and Jorge Fonseca Cacho (University of Nevada, Las Vegas)	186
Comparing Meditation and Immersive Virtual Environment for Relaxation	193
VRVideos: A Flexible Pipeline for Virtual Reality Video Creation Anthony Dickson (University of Otago, New Zealand), Jeremy Shanks (University of Otago, New Zealand), Jonathan Ventura (California Polytechnic State University, USA), Alistair Knott (Victoria University of Wellington, New Zealand), and Stefanie Zollmann (University of Otago, New Zealand)	199

Exploring Resource Distribution Networks in Virtual Environments
Demos
On the Plane: A Roleplaying Game for Simulating Ingroup-Outgroup Biases in Virtual Reality 207 Caglar Yildirim (Massachusetts Institute of Technology, USA) and D. Fox Harrell (Massachusetts Institute of Technology, USA)
Digital Twins for Distributed Collaborative Work in Shared Production
VIPER: A Virtual Platform to Experience Robots
Augmented Reality-Based Worker Assistance for People with Cognitive Disabilities

WALL-ET: Assistance in Supermarkets and Warehouses Through Social Cognitive Robots	219
Workshop XRiM - XR Technologies in Museums	
Tangible User Interface to Learn About Voronoi Diagrams 2 Nobuyuki Umezu (Ibaraki University, Japan) and Satoshi Iijima (Ibaraki University, Japan)	221
Toward Inclusivity: Virtual Reality Museums for the Visually Impaired2 Tycho Zaal (Utrecht University, the Netherlands), Almila Akdag Salah (Utrecht University, the Netherlands), and Wolfgang Hürst (Utrecht University, the Netherlands)	22 5
Representing Cross-Cultural Links of Artifacts in Museums with Augmented Reality	234
Bringing Museums to Juvenile Prison Inmates Through Virtual Reality	<u>2</u> 37
Ant-Man Vision in the Museum with Interactive and Immersive Surreal Experience Based on	
Machine Learning	242
Users as Craftspeople: Demonstrating Traditional Crafts using Interactive Immersive Virtual Reality	245
Comparison of GPS Data Acquisition for Open Air Museums by Two APIs	248

Visualizing Difference Between Bodily Movements of Athletes and Users Learning to Play Baseball
Nobuyuki Umezu (Ibaraki University, Japan) and Souta Akiyama (Ibaraki University, Japan)
Workshop AIRXRLES - AI & XR for Learning, Education, and Serious Gaming
To Evaluate the Learning Attention and Effectiveness in Three Remote Learning Approaches using EEG, Eyetracking and Traditional Exam
Fostering Students' Engineering Competence by Adopting Augmented Reality: a Proposed Randomized Controlled Trial Study
Motivational Benefits and Usability of a Handheld Augmented Reality Game for Anatomy Learning
Table Tennis Skill Learning in VR with Step by Step Guides using Forehand Drive as a Case Study
Calvin Ku (National Tsing Hua University, Taiwan), Jian-Jia Weng (National Tsing Hua University, Taiwan), Yu-Hsin Wang (National Tsing Hua University, Taiwan), Dong-Xian Wu (National Tsing Hua University, Taiwan), Yi-Min Lau (National Tsing Hua University, Taiwan), Wan-Lun Tsai (National Cheng Kung University, Taiwan), Tse-Yu Pan (National Tsing Hua University, Taiwan), Te-Cheng Wu (National Tsing Hua University, Taiwan), Hung-Kuo Chu (National Tsing Hua University, Taiwan), and Min-Chun Hu (National Tsing Hua University, Taiwan)
Author Index