20th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications (VISIGRAPP 2025)

Volume 1: GRAPP, HUCAPP, IVAPP

Porto, Portugal
26-28 February 2025

Part 1 of 2

Editors:

Thomas Bashford-Rogers
Daniel Meneveaux
Mehdi Ammi
Mounia Ziat
Stefan Janicke
Helen Purchase
Petia Radeva
Antonino Furnari
Kadi Bouatouch
A. Augusto Sousa

ISBN: 979-8-3313-1867-3

Printed from e-media with permission by:

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

Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2025) by SCITEPRESS – Science and Technology Publications, Lda.
All rights reserved.

Printed with permission by Curran Associates, Inc. (2025)

For permission requests, please contact SCITEPRESS – Science and Technology Publications, Lda. at the address below.

SCITEPRESS – Science and Technology Publications, Lda.
Avenida de S. Francisco Xavier, Lote 7 Cv. C,
2900-616 Setúbal, Portugal

Phone: +351 265 520 185
Fax: +351 265520 186

info@scitepress.org

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
Email: curran@proceedings.com
Web: www.proceedings.com

CONTENTS

INVITED SPEAKERS

KEYNOTE SPEAKERS

Crowds and Graphics: Beyond Animation and Visual Effects 5
Julien Pettré

On the Importance of Visualisation in a Data Driven Society 7
Daniel Archambault

Haptic Intelligence 11
Katherine J. Kuchenbecker

Lifelong Visual Representation Learning 13
Diane Larlus

20TH INTERNATIONAL CONFERENCE ON COMPUTER GRAPHICS THEORY AND APPLICATIONS

FULL PAPERS

Tutrace: Editable Animated Vector Shape from Video 19
Loïc Vital

Ground Awareness in Deep Learning for Large Outdoor Point Cloud Segmentation 29
Kevin Qiu, Dimitri Bulatov and Dorota Iwaszczuk

Oasis: A Real-Time Hydraulic and Aeolian Erosion Simulation with Dynamic Vegetation 39
Alexander Maximilian Nilles, Lars Günther and Stefan Müller

Evaluation of Body Parts Representations in Motion Reconstruction 53
Philippe de Clermont Gallerande, Quentin Avril, Philippe Henri Gosselin, Ferran Argelaguet and Ludovic Hoyet

Galerkin Enhanced Graph-Based FEM for Interactive Fracture and Sculpting Applications 65
Avirup Mandal, Parag Chaudhuri and Subhasis Chaudhuri

Fast Detection of Jitter Artifacts in Human Motion Capture Models 77
Mateusz Pawłowicz, Witold Alda and Krzysztof Boryczko

Efficient Modeling of 3D Epithelial Cell Structure Dynamics via Backbone Spreads 89
Javier Buceta, Stefan Funke and Sabine Storandt

AI-Informed Interactive Task Guidance in Augmented Reality 101
Viacheslav Tekaev and Raffaele de Amicis

Single-Exemplar Lighting Style Transfer via Emissive Texture Synthesis and Optimization 113
Pierre Ecormier-Nocca, Lukas Lipp, Annalena Ulschmid, David Hahn and Michael Wimmer

Backface Distance Fields: Relaxing Signed Distance Fields 127
Róbert Bán, Csaba Bálint and Gábor Valasek

Curvy: A Parametric Cross-Section Based Surface Reconstruction 139
Aradhya N. Mathur, Apoorv Khattar and Ojaswa Sharma

Enhancing Sketch Animation: Text-to-Video Diffusion Models with Temporal Consistency and Rigidity Constraints 151
Gaurav Rai and Ojaswa Sharma

Exploring Seated Locomotion Techniques in Virtual Reality for People with Limited Mobility 161
Marlene Huber, Simon Kloiber, Annalena Ulschmid, Agata Marta Soccini, Alessandro Clocchiatti, Hannes Kaufmann and Katharina Krösl

SHORT PAPERS

Ray-LUT: A Lookup-Based Method for Camera Lens Simulation in Real-Time Using Ray Tracing 177
Jan Honsbrok, Sina Mostafawy, Jens Herder and Alina Huldtgren

Fast Approximate Symmetry Plane Computation as a Density Peak of Candidates 185
Alex König and Libor Váša

Geometry and Texture Completion of Partially Scanned 3D Objects Through Material Segmentation 193
Jelle Vermandere, Maarten Bassier and Maarten Vergauwen

Finding the Shear Reflection Symmetry Plane in a 3D Point Cloud 203
Vítek Poór, Ivana Kolingerová and Damjan Strnad

A Method for Standardizing Eye-Tracking and Behavioral Data in Real and Virtual Environments 211
Maxime Dumonteil, Marc J.-M. Macé, Valérie Gouranton, Théophane Nicolas and Ronan Gaugne

Lightweight Visualisation for Vortex Tracking in Airflow Acquisition 223
Nicolas Courilleau, Louis-Wilhelm Raban-Schürmann, Daniel Meneveaux, Kamel Abed-Meraim and Anas Sakout

A Whole New World: Can Virtual Reality Help to Understand Non-Euclidean Geometries? 231
Maé Mavromatis, Ronan Gaugne, Rémi Coulon and Valérie Gouranton

Efficient Tiling of Point Features to 3D Tiles with Discrete LOD 239
Samuel Rundel and Raffaele De Amicis

AI-Accelerated Viewshed Computation for High-Resolution Elevation Models 251
Cédric Schwencke, Dominik Stütz and Dimitri Bulatov

Forge: Extending Anvil for Visual Evaluation of Rendering Pipelines 259
Kevin Napoli, Keith Bugeja and Sandro Spina

A Proposed Immersive Digital Twin Architecture for Automated Guided Vehicles Integrating Virtual Reality and Gesture Control 267
Mokhtar Ba Wahal, Maram Selsabila Mahmoudi, Ahmed Bahssain, Ikrame Rekabi, Abdelhalim Saeed, Mohamad Alzarif, Mohamed Ellethy, Neven Elsayed, Mohamed Abdelsalam and Tamer ElBatt

Design and Development of an Interactive and Intelligent Wood Harvester Machine Operator Simulator 276
Barve Pranjali Ramesh, Ian Backus and Raffaele de Amicis

Second Order Differential Properties of Tensor Product Fractal Surfaces 284
Clement Poull, Christian Gentil, Celine Roudet, Lucie Druoton and Michaël Roy

Deep Image-Based Adaptive BRDF Measure
Wen Cao 292

ARPΔ: Hardware-Accelerated Ray-Traced Photon Differentials
Adrian De Barro, Keith Bugeja and Sandro Spina 300

Multiple Multi-Modal AI for Semantic Annotations of 3D Spatial Data
Lee Kent, Hermenegildo Solheiro and Keisuke Toyoda 308

Symmetry Detection and Symmetrization in Cellular Automata
Vít Gregor and Ivana Kolingerová 317

Beyond the Ragdoll: Designing a Safe-Falling Controller for Physically Simulated Characters
Lovro Boban and Mirko Sužnjević 323

MCPro: A Procedural Method for Topologically Correct Isosurface Extraction Based on Marching Cubes
Julian Stahl and Roberto Grosso 331

Generative Narrative-Driven Game Mechanics for Procedural Driving Simulators
Nelson Bilber Rodrigues, António Coelho and Rosaldo J. F. Rossetti 339

Parallel Axis Split Tasks for Bounding Volume Construction with OpenMP
Gustaf Waldemarson and Michael Doggett 347

Diffusion Transformer Framework for Speech-Driven Stylized Gesture Generation
Nada Elmasry, Yanbo Cheng and Yingying Wang 355

Semi-Automatic Generation of Rotoscope Animation Using SAM and k-means Clustering
Mizuki Sakakibara and Tomokazu Ishikawa 363

Blending Realities: Accessible Mixed Reality for Tremor Rehabilitation in Parkinson's Disease
Xinjun Li and Zhenhong Lei 371

Reconstruction of the Botanical Trees from Single-View Images Using Signed Distance Functions
Anna Semrau and Dariusz Sawicki 376

Reinforcement Learning-Enhanced Procedural Generation for Dynamic Narrative-Driven AR Experiences
Aniruddha Srinivas Joshi 385

A Virtual Reality Prototype for Evaluating Emotion Induced by Poetry and Ambient Electronic Music
Irene Fondón and María Luz Montesinos 398

Lightweight Transformer Occupancy Networks for 3D Virtual Object Reconstruction
Claudia Melis Tonti and Irene Amerini 408

Integrating Generative AI in Architectural Education: A Comparative Study of Traditional, Stock LLMs, and Custom Tools
Abdelrahman Aly, Abdelsamie Elazazy and Nada Sharaf 415

VIRTA-Yoke: A Virtual-Integrated Poka-Yoke System for Error Prevention and Operator Training in Manufacturing Processes
Guillermo Leale, Baltazar Cortina and Rodrigo D'Andrea 421

Manipulating Gloss of Real Objects Under Omnidirectional Lighting
Yuki Miyoshi, Ryo Kawahara and Takahiro Okabe 429

9TH INTERNATIONAL CONFERENCE ON HUMAN COMPUTER INTERACTION THEORY AND APPLICATIONS

FULL PAPERS

Digital Assistant in a Point of Sales
Emilia Lesiak, Grzegorz Wolny, Bartosz Przybył and Michał K. Szczerbak 439

Impact of Team Models in Hierarchical Human-Agent Decision-Making Teams
Ranjani Narayanan and Karen M. Feigh 452

Evaluating Preattentive Processing in Game Settings with Consistent Visual Scenes
Ilir Jusufi and Niclas Andersson 464

Exploring Extended Reality (XR) in Teaching AI: A Comparative Study of XR and Desktop Environments
Miguel A. Feijoo-Garcia, Yiqun Zhang, Yiyin Gu, Alejandra J. Magana, Bedrich Benes and Voicu Popescu 472

Analyzing the Developer's Sentiment in Software Components: A Decade-Long Study of the Apache Project
Tien Rahayu Tulili, Ayushi Rastogi and Andrea Capiluppi 483

Effects of Overloading Command Capacity of Multiplexed FastTap Menus on Spatial Learning in Tablets
Sayeem Md Abdullah and Md. Sami Uddin 495

Effective Mitigation of Cognitive Load in Complex Mixed Reality Tasks
Callum Smith, Karen Rafferty, Vishal Sharma and Eben Rainey 506

Closing the Digital Gap for Incarcerated Students Using Learning Management Systems in the USA
Johannes A. Badejo, Joyram Chakraborty, Elyshia Aseltine, Lawrence O. Oyaniyi and Oluwafemi P. Badejo 518

SHORT PAPERS

Hands-Free VR
Jorge Askur Vazquez Fernandez, Jae Joong Lee, Santiago Andrés Serrano Vacca, Alejandra Magana, Radim Peša, Bedrich Benes and Voicu Popescu 533

A Serious Game for Early Detection and Assessment of Social Apathy: A Pilot Study
Cristina Díez Bort, Razeen Hussain, Valeria Manera, Manuela Chessa and Fabio Solari 543

Exploring Standard and Novel Interactions on a Multi-Touch-Enhanced Mouse
Mahmoud Sadeghi and David Ahlström 551

Immersive versus Non-Immersive Virtual Reality Environments: Comparing Different Visualization Modalities in a Cognitive-Motor Dual-Task
Marianna Pizzo, Matteo Martini, Fabio Solari and Manuela Chessa 561

Combining Redirection with Common Game Elements
Mathieu Lutfallah, Joel Hauser, Edoardo Negri and Andreas Kunz 569

HeyThere: Design and Evaluation of an Augmented Reality Multiplayer Social Game
Wenxuan Zheng, Yuzheng Wu, Ziming Li, Yue Li, Diego Monteiro and Hai-Ning Liang 577

Multimodal Feedback Estimation for Knob Interactions in Virtual Reality for Control Panels 588
Valentina Gorobets, Long Cheng, Helene Lussi and Andreas Kunz

Automatic Transcription and Detection of the MTM-1 Hand Motions Performed in Virtual Reality 596
Valentina Gorobets, Roman Billeter and Andreas Kunz

Impact of Starting Position on Decision-Making in Virtual Reality 604
Valentina Gorobets, Mathieu Lutfallah, Khashayar Ilbegi Teymouri and Andreas Kunz

CSV: Visual Support for Understanding Card Synergy in Digital Collectible Card Games 611
Yicheng Xue and Hiroshi Hosobe

XR-Assisted 3D Reconstruction: Improving Model Quality Through Real-Time Feedback 619
Colin Ummerle and Markus Friedrich

The Exhausted Brain Theory: An Energy-Based Framework for Understanding Visually Induced Motion Sickness 627
Diego Monteiro and Hai-Ning Liang

Showing, Telling, and Collaborating: Investigating the Relative Benefits of Videoconferencing and Different Augmented Reality Embodiments for Remote Meetings 639
James J. Cummings and Erin W. Wertz

Vida Migrante: Empathy and the Migrant Experiences Through Data Visualization 653
Alberto Meouchi, Enrique Casillas and Sarah E. Williams

Virtual Kitchen: Using a Touch Table for Cognitive Rehabilitation in Activities of Daily Living 666
Paul Richard, Emmanuelle Richard, Maxime Macé and Teddy Louisy

Sharing and Accessing Autobiographical Memories Tied with Media 674
Francisco Ludovico and Teresa Chambel

Formalization of Pre-Learning Instructional Method Based on Information Processing of Learner Driver 682
Yuta Kurihara, Motoki Shino, Wataru Miyazaki, Minori Kizaki, Katsuko T. Nakahira and Muneo Kitajima

16TH INTERNATIONAL CONFERENCE ON INFORMATION VISUALIZATION THEORY AND APPLICATIONS

FULL PAPERS

Evaluating Transformers Learning by Representing Self-Attention Weights as a Graph 695
Rebecca Leygonie, Sylvain Lobry and Laurent Wendling

Inconspicuous Guides: A Qualitative Study to Understand the Degree of Intrusiveness in Visualization Onboarding 706
Margit Pohl, Benjamin Potzmann, Christina Stoiber and Wolfgang Aigner

Interactive Platform for Surveys in Information Visualisation 718
Barbara Nascimento, João M. Cunha and Evgheni Polisciuc

RapViz: Rhyme Detection and Visualization of Rap Music 730
Paul Müller, Lukas Panzer and Fabian Beck

SnakeTrees: A Visualization Solution for Discovery and Exploration of Audiovisual Features
Xiao Tan, Ünsal Satan, Jonas Zellweger, Gaudenz Halter, Barbara Flückiger, Renato Pajarola and Alexandra Diehl 740

Investigating the Propagation of CT Acquisition Artifacts along the Medical Imaging Pipeline
Jakob Peischl and Renata G. Raidou 752

GLIMPSE-Med: Single-Screen Visualization of Multivariate Time Series for a Single Individual
Hugo Le Baher, Jérôme Azé, Sandra Bringay, Pascal Poncelet, Arnaud Sallaberry and Caroline Dunoyer 765

AlertSets: Supporting Exploratory Analysis of Cybersecurity Alerts Through Set Interactions
Franziska Becker, Christoph Müller, David Karpuk, Tanja Blascheck and Thomas Ertl 776

SHORT PAPERS

Evaluating LLMs for Visualization Tasks
Saadiq Rauf Khan, Vinit Chandak and Sougata Mukherjea 791

Pulsating Uncertainties: Visualization and Highlighting of Uncertainty in 3D Data Using Animated 2D Transfer Functions
Viktor Leonhardt, Tobias Neeb, Christoph Garth and Alexander Wiebel 799

MillefioriAnalyzer: Machine Learning, Computer Vision and Visual Analytics for Provenance Research of Ancient Roman Artefacts
Alexander Wiebel, Oliver Gloger and Hella Eckardt 807

Empowering Facility Managers: Multimodal Location-Based Visualization for Smart Sanitizer Dispensers Management
Victor-Adriel De-Jesus-Oliveira, Thomas Bigler, Florian Grassinger, Michael Zauchinger, Albert Treytl and Wolfgang Aigner 815

Interactive Wind Simulation in Settlement Areas
Michael Burch, Raphael Brunold and Ralf-Peter Mundani 823

Designing Explainable and Counterfactual-Based AI Interfaces for Operators in Process Industries
Yanqing Zhang, Leila Methnani, Emmanuel Brorsson, Elmira Zohrevandi, Andreas Darnell and Kostiantyn Kucher 831

Reflections on the Uses and Available Choices of Categorical Colorschemes
Sara Di Bartolomeo, Raphael Buchmüller, Alexander Frings, Johannes Fuchs and Daniel Keim 843

Why Does It Look like this? Introducing a Preliminary Framework for Explainable Graph Drawing (XGD)
Keisi Çela, Stef van den Elzen, Jarke van Wijk and Alessio Arleo 851

HoloGraphs: An Interactive Physicalization for Dynamic Graphs
Daniel Pahr, Henry Ehlers and Velitchko Filipov 859

Delphi: A Natural Language Interface for 2.5D Treemap Visualization of Source Code
Adrian Jobst, Daniel Atzberger, Willy Scheibel, Jürgen Döllner and Tobias Schreck 867

LIC-R: Line Integral Convolution Revisited
Khatereh Mohammadi, Marco Agus, Ahmad Abushaikha and Jens Schneider 875

A Subspace Projection Based Technique for Visualizing Machine Learning Models 887
Ziqian Bi, Raymond Gao and Shiaofen Fang

Immersive in Situ Visualizations for Monitoring Architectural-Scale Multiuser MR Experiences 895
Zhongyuan Yu, Daniel Zeidler, Krishnan Chandran, Lars Engeln, Kelsang Mende and Matthew McGinity

Active Physicalization of Temporal Bone 903
Fatemeh Yazdanbakhsh and Faramarz Samavati

Penta: Towards Visualizing Compound Graphs as Set-Typed Data 913
Henry Ehlers, Mario Kerndler and Renata G. Raidou

PyNarrative: A Python Library for Data Storytelling 922
Angelica Lo Duca and Roberto Olinto Barsotti

Posterizing Diagrams with Top-Down Layout 930
Maximilian Kasperowski and Reinhard von Hanxleden

Generative Artificial Intelligence for Immersive Analytics 938
Chaoming Wang, Veronica Sundstedt and Valeria Garro

Colorimetric Compensation in Video Mapping for Luggage Inspection 947
Maëlan Poyer and Christophe Hurter

C4D3: A View-Level Abstraction and Coordination Library for Building Coordinated Multiple Views with D3 955
Omkar S. Chekuri and Chris Weaver

SPViz: A DSL-Driven Approach for Software Project Visualization Tooling 967
Niklas Rentz and Reinhard von Hanxleden

Multivariate Time Series Visualization for a Single Individual: A Scoping Review Using PRISMA-ScR 975
Hugo Le Baher, Jérôme Azé, Sandra Bringay, Pascal Poncelet, Arnaud Sallaberry and Caroline Dunoyer

Visual Analytics for the Analysis of Sleep Quality 983
Maria Tsiobra, Georgios Nikolis, Christos Diamantakis, Matthew Salanitro, Ilias Kalamaras, Vasilis Lwlis, Thomas Penzel, Konstantinos Votis and Dimitrios Tzovaras

Studying Parallel Coordinates Under Varying Aspect Ratios 992
Leon Meka, Mirjam Kronsteiner and Johanna Schmidt

ScaleVis: Interactive Exploration of Measurement Instrument Verification Data 1000
Haris Memić, Sanjin Radoš, Almira Softić and Krešimir Matković

AUTHOR INDEX