

Interface and Experience Design with AI for VR/AR (DAIVAR'18) and AI/ML for Immersive Simulations (AMISIM'18)

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Abstract—Within this work, we present the merged workshops “Interface and Experience Design with AI for VR/AR (DAIVAR'18)” and “AI and ML for Immersive Simulations”. Both workshops have been held within the context of the IEEE Artificial Intelligence Virtual Reality (AIVR) conference in Taiwan in 2018. We introduce the goals, topics, and basic ideas of both workshops, and present some basic literature in the domain for further reading.

Keywords—HCI, experience design, artificial intelligence, virtual reality, immersive simulations, augmented reality, AR, virtual reality, VR, machine learning

I. 2ND WORKSHOP ON INTERFACE AND EXPERIENCE DESIGN WITH AI FOR VR/AI (DAIVAR'18)

This workshop is a follow up of the workshop that has been held in collaboration with SIGGRAPH Asia in 2017, and its description is based on [1]. The objective of this workshop is to invite scholars and practitioners to discuss synergies between interface and experience design in artificial intelligent reality virtual and augmented environments. The aim is to gather a cross-disciplinary team of contributors researching HCI related issues contributing to this fascinating newly emerging domain. We especially seek contributions from experts with a background in computer science, HCI, psychology/cognitive sciences, culture/communication studies, design and art to develop this fascinating intersection. Aspects can range from user-experience, technologies supporting end-users, practical applications, methods, content production, cultural implications, communication theories, up to more artistic approaches in artificial intelligent interaction.

While AI's main aim is to replicate human intelligence, AR and VR focuses its research efforts on the creation of artificial worlds either in complete virtual world, or as part of our physical environment. Many examples that bridge the two fields have emerged recently, e.g. intelligence in digital games and the utilization of computer graphics hardware for deep learning and AI. Philosophical discussions around issues arising in this new area range from ideas when things start to think to Alan Turing's work. In this workshop, we

would like to raise a question: what would happen when artificial worlds start to think, and how we humans can interact and communicate with AI through e.g. affective interfaces? Thus, while AI and VR/AR went rather distinct research pathways, we attempt to bring them together, and discuss different aspects at the intersection of machine intelligence and human interaction in a mixed reality.

The workshop intends to attract a broad range of contributions to develop this scholarly field during a full day venue. As the emphasis is on creating the synergy between VR/AR and AI/ML, we are not limited to particular areas; instead, the following exemplary topics might help to gather ideas for a possible contribution: affective and emotional computation, communication with AI, digital game analytics, utilization of computer graphics hardware for deep learning, personalization and recommender systems, UX with agents and physical robots, cultural robotics, or AI in information visualization.

Last year's workshop proceedings are available on [2], and the 2017 edition of the workshop is described in [1]. To understand the workshop thematic area, we would like to refer to the following publications, in gaining basic understanding of the workshop thematic area: [3]–[11]. Topics directly contributing to the workshop are listed in the following:

- Interaction design for AIVR
- Multimodal AI supported interaction design
- Artificial intelligence and machine learning in AIVR
- Emotions and AI in VR, AR, and smart objects
- Human-Computer-Interaction with AI in virtual worlds
- Human communication through AIVR
- Emotion enriched human-AI collaboration
- AI in digital games and other application areas
- User-Experience and interaction with AIVR
- Affective human-virtual world interaction
- Design of emotionally intelligent AIVR
- Recommender systems and personalisation in AIVR
- Information visualisation in AIVR
- Communication theory and cognitive science

- Affective ambient intelligence in mixed realities
- UX with AI agents in AIVR
- Brain interfaces in AIVR
- AI based emotion mediated communication in AIVR
- Authoring emotional intelligent interaction in AIVR
- Multimodal affective interfaces in AIVR
- Human-human emotional communication in AIVR

II. 1ST WORKSHOP ON AI AND ML FOR IMMERSIVE SIMULATIONS

Virtual and Augmented Reality opened new possibilities for immersive simulations. Ability to simulate and evaluate almost any scenario is attracting still more and more businesses, combining forces with academia. This collaboration brought exciting opportunities for applied research, focusing on optimisation of user experience and delivery of high-impact immersive content. Often, such simulations require presence of simulated mechanics, individuals or crowds, popularly represented by virtual agents, controlled by artificial intelligence. But, the computational complexity of immersive virtual environments does not allow for execution of more sophisticated AI processes without putting significant strain on hardware, rendering most current AI (i.e. planning) approaches useless. What we seek is an alternative traditional AI approach, focusing on finding the balance between computational complexity and believability the simulation. In this workshop, we invite researchers to either present fundamental research on AI and ML algorithms targeting VR simulations or showcase their solutions of applying AI and ML in VR simulations of their particular domain.

Topic of this workshop were related to:

- VR/AR/MR(=XR) technology and devices
- Low-latency and high-performance XR
- Multi-user and distributed XR
- Interaction techniques for XR
- 3D Interaction for XR simulations
- Input devices for XR
- AI for XR simulations
- ML from XR simulation
- Computer graphics techniques for XR simulations
- Computer vision techniques for XR simulations
- Human Computer Interaction for XR simulations
- Modelling and simulation
- Virtual humans and avatars
- User studies and evaluation
- Perception, presence, virtual embodiment, and cognition
- Applications of XR simulations

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