Special Issue on VR for Culture and Heritage: The Experience of Cultural Heritage with Virtual Reality (Part II)

Guest Editors' Introduction

Eugene Ch'ng
NVIDIA Joint-Lab on Mixed Reality
University of Nottingham Ningbo China

Yiyu Cai
School of Mechanical & Aerospace Engineering
Nanyang Technological University Singapore

Harold Thwaites
Centre for Research Creation in Digital Media
Sunway University, Malaysia

1. Part II Introduction

The guest editors' introduction in the first part of this special issue (*Presence 26*-3) highlighted the transmutability of human culture. It also highlighted the apparent perpetuity of material culture, which will eventually decline and diminish either through time or through anthropogenic hazards and unfortunate environmental disasters. The introduction continued by emphasizing the need for the research community to progress beyond digital records by investigating, through research and applications, the utility of virtual access through virtual reality.

Part I, therefore, focused on the observed shift of the use of 3D technology for documenting or reconstructing heritage sites and monuments toward the experience of past culture and heritage through immersive virtual environments. The previous volume gathered five thematic papers focusing on the virtual-reality experience of cultural heritage. Here in the second part, we continue the special issue with new methods and developments for substantiating concepts with further applications of virtual environments for cultural heritage.

2. The Scope of this Special Issue

In "Forgotten Industrial Heritage in Virtual Reality—Case Study: Old Power Plant in Piešt'any, Slovakia," Vladimír Hain and Michal Ganobjak examine a case study of the virtual reconstruction of an old power plant in the city of Piešt'any. The contribution highlights the purposeful use of VR technology onsite to recreate the experience of the historical environment.

Ronald Zamora-Musa, Jeimy Vélez, and Heyder Paez-Logreira present a virtual tour of the island of San Andrés in Colombia in the article "Evaluating Learnability in a 3D Heritage Tour," evaluating usefulness of the experience and learnability.

The article by Yiyu Cai, Jianmin Zheng, Yuzhe Zhang, Xiaoqun Wu, Yong Chen, Bingquan Tan, Bianyue Yang, Tianrui Liu, and Nadia Thalmann, titled "Madam Snake White: A Case Study on Virtual Reality Continuum Applications for Singaporean Culture and Heritage at Haw Par Villa," investigates the effective and integrated solution for developing Virtual Reality-Continuum applications for culture and heritage. The methods article looks at the feasibility and effectiveness of digitization, 3D mapping, 3D printing, and augmented reality for culture and heritage of Madam Snake White in Singapore.

In "Data-Driven Modeling for Chinese Ancient Architecture," Pu Ren, Yan Wang, Mingquan Zhou, Zhongke Wu, Pengbo Zhou, and Juan Zhang propose a data-driven approach to synthesize 3D models from existing 3D data, filling the gap between academic studies and the aspects of VR engineering with the aim of 3D content creation, VR development and applications.

The article "Alternating Reality: An Interweaving Narrative of Physical and Virtual Cultural Exhibitions" by Thuong N. Hoang and Travis N. Cox explores Alternating Reality (AltR) narrative for supporting communication of cultural heritage as an interweaving experience that alternates between real and virtual environments.

Wee-Ching Pang, Choon-Yue Wong, and Gerald Seet explore the conception of social robots for guiding tours and the learning of languages and cultures. The article "Exploring the Use of Robots for Museum Settings and for Learning Heritage Languages and Cultures at the Chinese Heritage Centre" develops two types of social robots—a virtual human character and a humanoid robot—to explore the feasibility of using robots for cultural education.

3.   Conclusion

This special issue continues from Part I by complementing the earlier articles with developments of new methodologies for substantiating concepts, and extended applications of virtual environments for the experience and learning of cultural heritage.

The trend toward the full capture of tangible heritage and its experiential aspects, and the contribution of immersive virtual environments for facilitating the experience and learning of culture and heritage, looks to be promising. However, the notion of creating authentic experiences which contribute to something akin to "virtual time travel" into the past is challenging, for it involves the attempt to connect human perceptions and physiological interactions with virtual reality. Although challenging, the progress could have significant impact on the sustainable preservation and communication of cultural heritage covering the expanse of the entire recorded human history. The research community, therefore, has much to do to progress the field. As such, *Presence* looks forward to articles advancing the cause in future issues.