

Sodeisha Avant-grade Ceramic: High Fidelity Digitization, Virtual Reality, and Interaction Design

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Abstract—This prototype presents the VR research project of “Sodeisha”. These ceramic works were created by the Japanese post-war artist group, known as ‘Sodeisha’. There are currently over 50 avant-grade Sodeisha ceramic artworks stored in the collection of Newcastle Art Gallery (Australia), but it is impossible to display all of these important pieces throughout the year. During the VR demonstration, participants will work as a curator to experience one of the largest collections of Sodeisha ceramics outside of Japan, which the collection was recently featured in a large-scale exhibition.

Keywords—Virtual Reality, Digital Humanities

I. INTRODUCTION AND BACKGROUND

In the context of digital heritage, the key intention of this work is to explore how high-fidelity virtual reality (VR) could enhance the interest, engagement and the curiosity of audience. Various extended reality technologies have been extensively used in the past to create interactive exhibition experiences [1][2], and positive results can be anticipated with using digital elements in enhancing users’ experience in a public exhibition and educational setting.

II. DIGITIZATION, VIRTUAL REALITY, INTERACTION DESIGN

This early prototype involves three parts of digitalization, which aims to provide a high-fidelity virtual reality user experience that comes with adequate interaction design.

A. High Dynamic Range Photogrammetry Scans

The Sodeisha ceramics are the key subjects of this work. However, most of these unique ceramics have highly reflective surfaces/textures and they cannot be scanned under any high contrast or ordinary lighting condition. To solve this, high dynamic range (HDR) computational photography technique has been used for capturing and preserving the widest exposure range of color information of the ceramics, as shown in Fig. 1. Direct physical contact with the ceramics was avoided as a best practise in handling these collections, however, we experimented with a gloss meter that has been helpful in gauging the approximated properties of the reflectance map using ceramic samples from generic source.

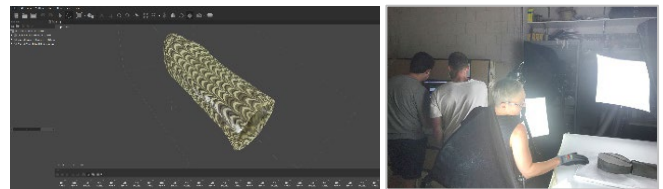


Fig. 1. HDR photogrammetry and VR interaction with the scans.

B. VR Nature Environment with Heavy Foliage

Fig. 2 shows the aesthetic features of the scene recreated, inspired by the nature appearance of the Blue Mountains, with the consideration matching to the theme of the exhibition, “connected to Australia”. Pixelation in VR display can be a severe issue for user experience, we experimented with the option of anti-aliasing computer graphics solution for providing a smoother graphical experience.

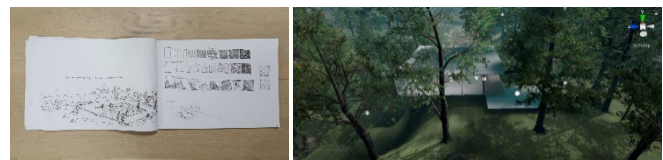


Fig. 2. VR nature environment creation process.

C. Virtual Hands

In this prototype demonstration, to enhance the “sense of presence”, users work with a pair of VR-enabled full-arms (dynamic simulation movement/bending), as shown in Fig. 3.

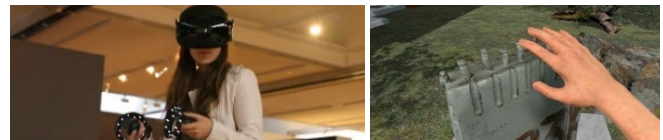


Fig. 3. User with VR interaction.

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