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Three Dimensional X-ray CT ReadingAssistanc e System with Video See Through Display

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Abstract

In recent years, the amount of information in three-dimensional X-ray Computed Tomography (3D X-ray CT) has been increasing, and research on Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) representations using computer graphics rendering has progressed. Conventionally, medical professionals have used Digital Imaging and Communications in Medicine (DICOM) viewer software to display data captured with 3D X-ray CT in three directions (axial, sagittal, and coronal section) on a PC monitor. Since surface and volume rendering on AR, VR, and MR is primarily used, making it is difficult for the observer to accurately represent the region of interest. In our previous research, a 3D expression system that 2D cross-section images output from DICOM on the surface-rendered object has been proposed. In this study, a representation method using a 3D expression system and showing AR images allows the user to check the internal structure of an object imaged by 3D X-ray CT in any position and rotation has been newly proposed. In addition, in order to express a cross-section of a virtual object at close range in real-time, HTC VIVE Pro, which is a camera-mounted device connected to a PC, enabled a video see-through expression. As a result, a 3D X-ray CT reading assistance system enabled the user to confirm the internal structure of a specific part of a CT-imaged object in a virtual reality space while maintaining shading and a three-dimensional impression.

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