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Representation of the internal structure of an object imaged by 3D X-ray CT using mixed reality

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Demand for X-ray inspection has been increasing in recent years, and research in advanced fields is progressing, including the development of high-definition X-ray CT. On the other hand, since the human eye can only spatially grasp the surface information of a three-dimensional object, the three-dimensional information captured by X-ray CT is confirmed as images from three directions: sagittal, axial, and coronal sections. On the other hand, the representation of three-dimensional X-ray CT imaging data by Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR) has been studied, but these methods are limited to the representation of the superficial structure of the object. In this study, the objective was to spatially represent the internal structure of an object imaged using mixed reality. By combining a spatial reality display with motion capture, overlaying a DICOM 2D image on a cross-section of a "surface-rendered" model of the object, the observer can view the cross-section in the desired direction and position as if he/she were grasping, moving, and rotating the contents of the object with his/her hands. The result is that the proposed method is able to display the cross section of a box containing internal information. As a result, the proposed method is shown to be effective as a useful 3D method for 3D X-rays, which are voxel data containing internal structure.

Topics

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