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Improving the accuracy of X-ray beam visualization using augmented reality (AR)

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Demand for nondestructive testing using X-ray imaging is increasing, and it is used in a variety of situations to identify defects and damage in precision equipment. In X-ray imaging, it is difficult to accurately position the X-ray source, object, and detector on the irradiation axis because the trajectory of the X-rays is impossible to see with the human eye. In this research, we propose a system for visualizing radiation trajectories using augmented reality (AR) technology and aim to improve its accuracy. The trajectory of the X-ray irradiation was calculated by capturing transmission images while fixing the radiation irradiation direction and aperture method and changing the distance between the X-ray source and the detector. In addition, changed the way to display the radiation trajectory with AR device. Previously, the way was that using a single AR marker, and once the AR marker is recognized, its position is estimated and the AR object is displayed. The accuracy of trajectory expression can be improved by setting up multiple markers and displaying AR only while recognizing the AR marker with the camera on the AR device, or by displaying a virtual plane where the radiation trajectory intersects with the detector. This made it possible to increase the accuracy of trajectory expression.

Topics

Session C. Applied optics and engineering

Primary author: KAWAKAMI, Takumi (Shizuoka University)

Co-authors: AOKI, Toru (Shizuoka University);   KASE, Hiroki;   TAKAGI, Katsuyuki (Shizuoka University)

Presenter: KAWAKAMI, Takumi (Shizuoka University)

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