**Shape measurement based on a combination of one-dimensional digital holography and lateral sample scanning**

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Digital holography is used in a wide range of fields, including medical science and biology, and one application is industrial measurement. Digital holography is suitable for factory line inspection due to its non-detective property, micrometer-order accuracy, and real-time performance. However, the measurement of shape using this technology in factories is time-consuming, which affects the speed of quality inspection on the production line. Therefore, we propose a method to reduce unnecessary point measurements using a one-dimensional image instead of a two-dimensional one. This approach increases calculation speed and thus solves the inspection speed problem. In this study, we used a Michelson interferometer as the optical system. We provide an overview of the process. First, one-dimensional information is acquired using an image sensor. Next, we moved on to in-calculator processing. Here, we selected the Fourie transform method. The acquired one-dimensional interference fringe data is applied to the fast Fourier transform to obtain a spectrum. After acquiring the first-order light, the inverse Fourier transform is performed to obtain amplitude and phase information. By repeating this series of processes, a single image is finally acquired. Compared to two-dimensional input, the amount of data to be processed is overwhelmingly small.

Short biography:

Yuma Sato was born in 2001 in Oshu, Iwate Prefecture. He graduated from Iwate Prefectural Mizusawa High School in March 2020 and entered Utsunomiya University in April. In 2021, he moved on to the Information Electronics and Optics Course in the Faculty of Engineering. He is a member of Hayasaki Laboratory in Center for Optical Research and Education (CORE). His research field is digital holography.

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