

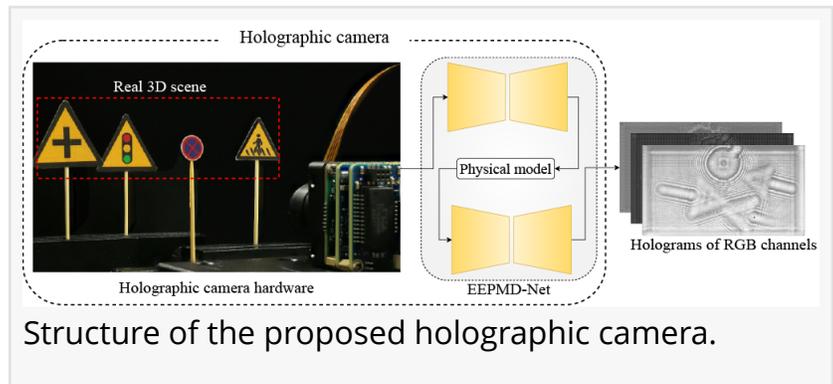
Liquid lens based holographic camera for 3D scene hologram acquisition using end-to-end physical model-driven network

USA, March 22, 2024

/EINPresswire.com/ -- There are some

technical bottlenecks in holographic technology, such as difficulty in capturing real [3D scenes](#) quickly and serious speckle noise in holographic reconstructed images. To address these challenges, Chinese scientists proposed a novel holographic camera for obtaining high-fidelity holograms of

real 3D scenes. The camera can achieve fast acquisition of high-quality holograms of real 3D scenes within 150 ms, which is expected to promote the application of holographic technology.



Structure of the proposed holographic camera.

Holography technology can restore the complete light field information of the recorded object, which has important applications in fields like biological microscopic imaging and optical micromanipulation. One important frontier of holography is the reconstruction of realistic 3D scenes. However, the development and application of holographic technology have been hindered by the huge amount of data of the 3D scenes and the laser coherence, which leads to the slow capturing speed of the real 3D scenes and the serious speckle noise of the holographic reproduced image.

In a new paper (<https://doi.org/10.1038/s41377-024-01410-8>) published in *Light: Science & Applications*, a team of scientists led by Professor Qiong-Hua Wang from Beihang University, China, Professors Song-Lin Zhuang and Da-Wei Zhang from the University of Shanghai for Science and Technology, China, have collaborated on the development of a holographic camera that can be used to acquire holograms of real 3D scenes. The camera can obtain high-quality holograms of real 3D scenes within 150 ms.

The researchers used a liquid camera based on a large-aperture liquid lens and an end-to-end physical model-driven network in the holographic camera. The liquid lens with an aperture of 10 mm has low driving voltage, fast response speed, and a wide range of optical power, which ensures the fast and high-quality capture of real 3D scenes. In addition, the well-trained end-to-end physical model driving network can quickly calculate high-quality holograms of real 3D

scenes acquired by the liquid camera. Using the proposed holographic camera, high-fidelity holographic reconstruction of the real 3D scene can be achieved at real depth.

The holographic camera solves the two major bottlenecks of the existing holographic technology, which are the difficulty in acquiring the real 3D scene quickly and the low quality of the holographic reconstructed image, and it is expected to be widely used in many fields, such as 3D display and measurement encryption.

DOI

10.1038/s41377-024-01410-8

Original Source URL

<https://doi.org/10.1038/s41377-024-01410-8>

Funding information

This work is supported by the National Key Research and Development Program of China (2021YFB2802100) and the National Natural Science Foundation of China (62020106010, 62275009, and U22A2079).

Lucy Wang

BioDesign Research

[email us here](#)

This press release can be viewed online at: <https://www.einpresswire.com/article/697968197>

EIN Presswire's priority is source transparency. We do not allow opaque clients, and our editors try to be careful about weeding out false and misleading content. As a user, if you see something we have missed, please do bring it to our attention. Your help is welcome. EIN Presswire, Everyone's Internet News Presswire™, tries to define some of the boundaries that are reasonable in today's world. Please see our Editorial Guidelines for more information.

© 1995-2024 Newsmatics Inc. All Right Reserved.