

All-holographic holographic telepresence

Minwook Kim^{1,2,†}, Chansuk Park^{3,†}, Chulmin Oh^{1,2,†}, YongKeun Park^{1,2,4,*}

¹ Department of Physics, Korea Advanced Institute of Science and Technology, Daejeon, 34141, Republic of Korea.

² KAIST Institute for Health Science and Technology, Korea Advanced Inst

³ Samsung Electro-Mechanics, Inc., Suwon, 16677, Korea

⁴ Tomocube Inc., Daejeon, 34109, Republic of Korea

* E-mail : yk.park@kaist.ac.kr

[†] These authors contributed equally to this work.

Telepresence in its definition, is a method enabling the users who are mutually far away to experience realistic vision or feeling of each other. Since its emergence in various science fiction movies the concept has fascinated and drawn attention to researchers and engineers. In addition to its aesthetically pleasing features, it also has various practical potential applications such as telemedicine, prototyping, advertising, three dimensional(3D) maps, and entertainment.

There has been attempts to realize 3D telepresence using various methods. One of the most favored methods is to utilize special display medium such as immersive display or headgears [1-2]. These streaming systems however are far from ideal type of telepresence system since the scene cannot be delivered directly to naked eye. Holographic telepresence, which is believed to be ultimate form of the telepresence system also has been proposed [3]. Holographic pattern which is to be delivered was computed by 3D rendering procedure and additional CGH calculation procedure. The delivered pattern information was printed on photopolymer using a laser pulse. Since the former scene must be erased before printing the following scene, the framerate of the system was reported to be less than 1Hz.

In this paper, we propose all-holographic telepresence system as a real-time 3D video streaming method, without need of recording medium. The all-holographic nature of the proposed system enables us to stream a continuous scene without any 3D rendering procedure. By using speckle-based holographic imaging and various gradient descent (GD) reconstruction algorithms, we were able to demonstrate real-time streaming of 3D scene.

References

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