

Recent research toward ultra-realistic communication system in NICT

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Reconstruction of 3D scene or displaying much information intuitively is one of the dreams of human being even now. Many science fiction movies depict these sorts of information displays. NICT is developing 3D technologies toward ultra-realistic communication. In this paper, I will introduce some of the recent researches in NICT.

Holography is the technology to ideally reconstruct 3D objects in space. Especially, electronic holography that uses electronic devices such as liquid crystal display (LCD) is expected as a future 3D visual system since it can present moving objects. NICT developed the electronic holography system as shown in Fig. 1[1]. Fig. 1(a) and (b) depict the overview of the system and reconstructed 3D objects respectively.

This system contains sixteen 4K-LCDs to enlarge 3D image size and optical system to ignore the gaps between LCDs. The total number of pixels is 15360x8640, and the image size is diagonally 8.5cm with 5.6-degree viewing angle without image gap.

One of the biggest challenges for 3D display is the size of reconstructed 3D objects. NICT developed 200-inch 3D display named REI (Ray Emergent Imaging) as shown in Fig. 2 [2]. In Fig. 2 (a), the boy and the girl are real human beings, and the blue vehicle is reconstructed 3D objects. This system includes a 200-inch screen that is specially designed for glasses-free 3D display. REI is now open to the public in Osaka, Japan as shown in Fig. 2 (b). Everybody can enjoy it freely anytime. The video contents there are changed frequently, such as temple, historical tea set and CG images.

NICT developed the tabletop 3D display “fvision.”[3] as shown in Fig. 3. Fig. 3 (a), (b) and (c) depict the concept of this system, reconstructed 3D objects and overview of the system respectively. Observers can see reconstructed 3D objects freely from any viewpoints around the table. In addition, observers can put some real materials around the reconstructed 3D objects. This system would be suitable not only business purpose but also the entertainment purpose.

The size of hologram data is huge, and it is also one of the most serious topics in multi-view system. To overcome this issue, Moving Picture Expert Group (MPEG) tries to develop a new algorithm to compress multi-view data efficiently. NICT developed our new approach and contributed to the MPEG meeting. Our algorithm focuses on hologram reconstruction from compressed multi-view data [4].

NICT develops 3D technologies for next-generation information display.



Fig. 1 The System using sixteen 4K-LCDs



Fig. 3 Tabletop 3D Display “fVisiOn”



Fig. 2 Large-size Glasses-free 3D Display “REI”

References

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