

Experience of Various-Shaped Hands (Asso. Prof. J. Ota and Dr. N. Miyata@AIST)

In designing hand tools, especially about shape and layout, there are two essential points: consideration of various hand shapes, experience of touching and manipulating products directly. To get evaluations based on various hand shapes, it needs many test subjects and much time. Computer manikin addresses this problem, and the technology about generating various hand shapes, modeling of the human hand has been developed. However, this method cannot give touching products directly. So we have been exploring the system that provides experiencing different-shape hand (Fig.1).

For analogous-shape hands, we have developed the system gives feeling that the size of my own hand has been changed. It is composed of optical system (Fig.2) and analogous objects (Fig.3), makes visual change of only hand size. The feeling can be made by a difference between touch experiences in this system and predictions.

For various-shape hands, it is necessary to consider the effect of visual delay on the feeling, which is inevitable accompaniment to VR devices. “Sense of agency” and “sense of ownership” are essential for fundamental functions of hand: manipulation and perception of objects. These senses are affected by visual delay. We investigated the allowable visual delay about different-sized hand experience in which these senses can be felt by using the system shown in Fig.4, and concluded it to be 100 [ms].

Keywords: Different-Sized Hands, Allowable Visual Delay, Product Design

References

- 1) K. Terabayashi, N. Miyata, M. Makiko, M. Mochimaru, J. Ota: “A Study on Immersive Hand Manipulation for VR Systems”, Proc. of ROBOMECH’06, 2A1-D10, 2006. (In Japanese)

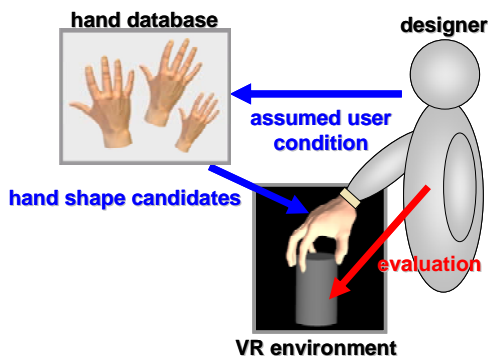


Fig. 1 Concept of Various-Hands Experience



Fig. 2 Wearable Optical Equipment

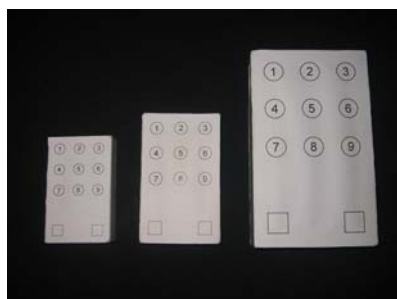


Fig. 3 Analogous Objects

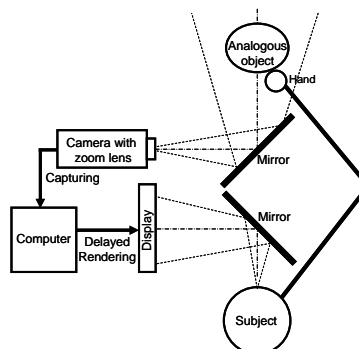


Fig. 4 Visual-Delayed System