Haptics of Humans and Robots

-Analysis of tactile sensation of humans and development of tactile sensors/displays

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Abstracts

Technologies on tactile sensation have not been progressed compared with visual and oral technologies. For example, perpendicular axes representing the fundamental characteristics of tactile sensation has not been clarified. Role of main four mechanoreceptors underneath the skin for texture perception has not been clarified as well. Hence, the presenter have been involved in the research on mechanical characteristics of human skin and its relationship to tactile perception as well as the psychological analysis of humans touching various surface of objects. As a result relationship between humans' texture perception and physical properties has been clarified. The presenter is also involved in the development of tactile sensors and tactile displays. Examples of those sensors/displays are shown. Tactile sensors are for detecting texture of surface of objects. They can be used both for device for industry to quantify the texture of products and for humanoid robots. Tactile displays are for presenting texture, softness and friction of various objects to human fingers. The tactile displays are realized by using amplitude modulation of ultrasonic vibration of Langevin type vibrator as well as force feedback using force display. I hope those technologies are useful for progress of haptic technologies in the field of virtual reality and robotics.

Biography

Takashi Maeno received his B. S. and M. S. degrees in mechanical engineering from the Tokyo Institute of Technology, Tokyo, Japan, in 1984 and 1986, respectively. From 1986 to 1995, he worked for Canon, Inc., in Tokyo, Japan. He received his Ph. D. degree in mechanical engineering from the Tokyo Institute of Technology, Tokyo, Japan, in 1993. Since 1995, he has been with Keio University, Yokohama, Japan, where he is currently a Professor. He was a Visiting Industrial Fellow at the University of California, Berkeley, from 1990 to 1992. He was a visiting professor at Harvard University in 2001 as well. His research interests are on tactile sensors/displays, recognition of robots/humans and large scale complex system design.