

**ESTABLISHING HUMAN-MACHINE COMMUNICATION THROUGH
KINESIOLOGY AND LINGUISTICS INTEGRATION**

Yoshihiko Nakamura

(The University of Tokyo, Graduate School of Information Science and Technology, Professor)

【Outline of survey】

The advance of Robot Technology (RT) is about to change what the human-machine interface used to be. Humanoid robots with morphological similarity to the human beings, that is due to the advance in hardware technology, will change the relationship between the humans and the machines from a static, stiff, dry and ostensible one to a sensible, flexible, intimate, and intuitive one. The technology such as dynamic simulation and motion analysis will provide the means for computers to estimate human somatosensory sensations. The horizon shows the possibility of the human-machine interface with which computers or robots communicate using gestures and natural language. By establish human-machine communication through integration of kinesiological information and linguistic information, this study aims to:

- (A) solve the fundamental problem of machine intelligence,
- (B) establish the technological foundation of robot intelligence
- (C) investigate the principle of higher information processing of the humans, and
- (D) provide an approach to study "theory of mind" in the brain science

【Expected results】

Integrating kinesiology and natural language brings out the new machines that communicate with the humans using gestures and natural languages. Establishing technology with which a machine acquires the knowledge using its body movements and linguistic association, a robot becomes communicable with an ordinary person and starts assistance in the human daily life.

【References by the principal investigator】

- T. Inamura, Y. Nakamura and I. Toshima: "Embodied Symbol Emergence based on Mimesis Theory," Intern. J. of Robotics Research, vol.23, no.4/5, pp.363-378, 2004.
- Y. Nakamura, K. Yamane, Y. Fujita, and I. Suzuki: "Somatosensory Computation for Man-Machine Interface from Motion Capture Data and Musculoskeletal Human Model," IEEE Trans. on Robotics, vol.21, no.1, pp.58-66, 2005.
- Y. Nakamura: "Creating the Robot Brains," Iwanami Lectures, The World of Physics, Iwanami, 2003 (in Japanese).

【Term of project】 FY2008- 2012

【Budget allocation】

156,200,000 yen (direct cost)

【Homepage address】

<http://www.ynl.t.u-tokyo.ac.jp/>