

2012 Robotics Seminar (7) / Japan Council of IFToMM

Date/Time: Tuesday, December 3rd, 2012, 13:30-15:00

Place: University of Tokyo, Hongo Campus,
Engineering Building #2, 3F, Room 232

Host: Prof. Yoshihiko Nakamura (nakamura@ynl.t.u-tokyo.ac.jp)

Mens et Manus : The Intelligent Body of the Human Hand and its Artificial Counterpart

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Abstract:

In this talk I will report on current research work considering the hand - in the broad meaning of the cognitive organ of active touch in relation to its embodiment. The general idea is to study how the embodied characteristics of the human hand and its sensors, the sensorimotor transformations, and the very constraints they impose, affect and determine the learning and control strategies we use for such fundamental cognitive functions as exploring, grasping and manipulating. The ultimate goal is to learn from human data and hypotheses-driven simulations how to devise improved system architectures for the "hand" as a cognitive organ, and eventually how to better design and control robot hands and haptic interfaces. The described research hinges about the conceptual structure and the geometry of such enabling constraints, or synergies: correlations in redundant hand mobility (motor synergies), correlations in redundant cutaneous and kinaesthetic receptors readings (multi-cue integration), and overall sensorimotor system synergies. I will also hint at how these might turn into key ideas for advancing the state of the art in artificial systems for robotic manipulation and haptic and neuroprosthetic interfaces.

Biography:

Antonio Bicchi received the "Laurea" degree in Mechanical Engineering from the University of Pisa in 1984, and the Doctoral degree from the University of Bologna in 1989. After a post-doctoral fellowship at the Artificial Intelligence lab , Massachusetts Institute of Technology, he joined the Faculty of Engineering in the University of Pisa in 1990. He is Professor of Systems Theory and Robotics in the Department of Electrical Systems and Automation (DSEA) of the University of Pisa and the Director of the Interdepartmental Research Center "E. Piaggio" of the University of Pisa , where he has been leading the Automation and Robotics group since 1990. Antonio Bicchi is collaborating with IIT as Senior Scientist in the Advanced Robotics Division since 2009. His main research interests are in, (1) Dynamics, kinematics and control of complex mechanical systems, including robots, autonomous vehicles, and automotive systems, (2) Haptics and Dexterous manipulation, (3) Theory and control of nonlinear systems, in particular hybrid (logic/dynamic, symbol/signal) systems. He has published more than 200 papers on international journals, books, and refereed conferences. Antonio Bicchi is a Fellow of IEEE , and elected *Chair* of the Conference Editorial Board of IEEE Robotics and Automation Society .