Seminar

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TOPIC: Cooperative Control for Multiple-Robot and Human-Robot Systems

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ABSTRACT:
Controlling multiple autonomous robots and human-robot systems in coordination is a challenging research topic, especially for mobile robotic systems without explicit inter-robot communication. In this talk, two robotic systems, MR Helper (Mobile Robot Helper) and DR Helpers (Distributed Robot Helpers), will be introduced. In these systems, each robot is controlled as if it had a specified impedance dynamics, and a leader-follower type control algorithm is incorporated for estimating the desired motion of the human/leader robot based on the intentional force/moment applied by the human and the information of the environment. The application of these technologies to healthcare will also be introduced. In particular, Passive RT Walking Helper and Wearable Walking Helper are developed for elderly and disabled as a dynamical walking assistant without explicit motion identification. MS DanceR (Mobile Smart Dance Robot) dancing the waltz as a female dance partner with a male dancer is developed for investigating smart mechanisms to understand human intention with physical interaction with its human partner. These examples show possible applications of human-robot interaction in near future.

SHORT BIO:
ZhiDong Wang received his B.S. degree from Beijing University of Aeronautics and Astronautics, China in 1987, and M.Sc and Ph.D degrees in Engineering from Tohoku University, Japan in 1992 and 1995 respectively. In 1995, he joined the Advanced Robotics Laboratory at Tohoku University. From 2000 to 2001, he was a visiting scholar of the GRASP Lab., University Pennsylvania, USA. In 2001, he joined the Intelligent Robotics Lab. at Tohoku University and was an associate professor in the Department of Bioengineering and Robotics at the Tohoku University. Currently, he is a professor in the Department of Advanced Robotics, Chiba Institute of Technology, Japan.

Dr. Wang and his colleague received the Best Paper Award of DARS in 2002, the Best Paper in Robotics Award of ROBIO in 2004, the JSME Award for best paper from the Japan Society of Mechanical Engineers in 2005, and the Robotics and Mechatronics Award from Robotics and Mechatronics Division, Japan Society of Mechanical Engineers in 2005. He served several academic meetings and was the Program Chair of the ICMA2006 Conference. His main research interests are distributed robotics, autonomous mobile robot, and the application of intelligent robot technologies for the disabled.