Plenary Speakers



Robot-on-Demand: Design Issues and Challenges

Abstract

For future robots to be useful in various domestic and service applications, it is desirable for the robot to provide required services right on the spot and at the right time. Such an application scenario is termed *robot on demand*. To meet this requirement, a robot must be aware of the situation and try to assist people in an adaptive manner. Design of location aware and context sensitive mobile robots are required. In this talk, I will first discuss about robot autonomous behaviors, which integrates location-aware, humane detection and the autonomous navigation system of the mobile robot. In order to provide assistance to people, a grasping behavior is provided to locate and grasp a target object. Using both image and depth information acquired from Kinect camera, the robot can recognize and locate 3D position of the target object and construct a 3D potential field for motion planning. Next, for tele-presence and remote control, a user interface is designed for a smart phone/tablet. A shared controller determines the human as well as autonomy control gains by computing user’s confidence factor. The robot assists a user to manipulate its motion from a remote site by compensating local insufficiency of human remote control. A dual-arm omnidirectional mobile robot can thus have potential use for future home service tasks. Several interesting experiments will be presented in this talk.

**Short Biography**

**Kai-Tai Song** received his Ph.D. degree in mechanical engineering from Catholic University of Leuven, Belgium in 1989. Since 1989 he has been on the faculty and is currently a Professor in the Department of Electrical and Computer Engineering and Institute of Electrical Control Engineering, National Chiao Tung University(NCTU), Taiwan. He is also currently the Associate Dean of Academic Affairs of NCTU. He served as Associate Dean of the Office of Research & Development of NCTU from 2007 to 2009 and Director of Institute of Electrical Control Engineering from 2009 to 2011. Since 2012, he has been a steering committee member of Asian Control Association(ACA) and currently the VP for publication of ACA. He is a directorate and VP of Chinese Automatic Control Society (CACS); and a directorate of Robotics Society of Taiwan (RST), Taiwan Association of System Science and Engineering(TASSE) and Taiwan Automation Intelligence and Robotics Association(TAIROA). He served as the chairman of the Society of IEEE Robotics and Automation, Taipei Chapter in 1999 and the Program Chair of the 8th Asian Control Conference (ASCC 2011). He received the best paper in automation award of IEEE ICAL 2012 and best paper in application awards in 2013 and 2014 of CACS International Automatic Control Conference. He received the 2011 Engineering Paper Award, Chinese Institute of Engineers. He received the Distinguished Award in Automatic Control Engineering of Chinese Automatic Control Society(CACS) in 2009 and became a Fellow of CACS in 2010. His current research interests include mobile robots, image processing, visual tracking, mobile manipulation, embedded systems, and mechatronics.

**Short biography:**

**Kenji Hashimoto** is an Assistant Professor of the Research Institute for Science and Engineering, Waseda University, Japan. He received the B.E.and M.E. degrees in Mechanical Engineering from Waseda University, Japan, in 2004 and 2006, respectively. He received the Ph.D. degree in Integrative Bioscience and Biomedical Engineering from Waseda University, Japan, in 2009. While a Ph.D. candidate, he was funded by the Japan Society for the Promotion Science as a Research Fellow. He was a Postdoctoral Researcher at the Laboratoire de Physiologie de la Perception et de l'Action in UMR 7152 College de France-CNRS, France from 2012 to 2013. His research interests include walking systems, biped robots, and humanoid robots. He is a member of the IEEE, Robotics Society of Japan (RSJ), Japanese Society of Mechanical Engineers (JSME) and Society of Instrument and Control Engineers (SICE). He received the IEEE Robotics and Automation Society Japan Chapter Young Award in 2006, and the JSME Fellow Award for Outstanding Young Engineers in 2008.