RoboCane: A Co-Robotic Navigation Aid for the Visually Impaired

Tuesday, 3/28/17 | 11:00-12:00pm | West Hall, W105

Speaker: Dr. Cang Ye
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Abstract: Assistive robots will play an important role in future healthcare. As these robots are small-sized and must collaborate with the human users in task accomplishment, resource-limited autonomy and effective human-robot interface become the challenges that must be overcome before the robots can be developed and deployed in healthcare applications. In this talk, I will present our recent research in the RoboCane—a portable co-robot wayfinding system for the visually impaired. The RoboCane combines a robotic guide dog and a white cane in a single device. By processing the image and range data of a 3D camera, it locates itself in an indoor environment and guides the user to the destination. It also detects objects along the way to allow the user to make more informed navigational decisions. Using a human-robot interface, the RoboCane and the user communicate their intents one another, making collaborative wayfinding possible. I will discuss pose estimation, wayfinding, object detection and their real-time realizations in the context of the RoboCane, as well as the human-centered design of the interface for natural human-robot interaction. At the end of this talk, I will give a brief introduction on a few other ongoing co-robot projects including a quadrupedal robot and a smart rollator for people with mobility impairment.

Biography: Cang Ye received the B. Eng. and M. Eng. degrees from the University of Science and Technology of China (Hefei, China) in 1988 and 1991, respectively, and the Ph.D. degree from the University of Hong Kong in 1999. From 1999 to 2001, he was a Research Fellow at the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore. He was also a Research Fellow from 2001 to 2003, and a Research Faculty from 2003 to 2005 with the Department of Mechanical Engineering, University of Michigan (Ann Arbor). He has been a faculty member of the University of Arkansas at Little Rock (UALR) since 2005 and is currently a Professor with the Department of Systems Engineering of UALR. His research interests include vision-based navigation of autonomous systems, assistive/rehabilitation robotics, human-robot interaction, reinforcement learning for robot navigation and control, and embedded systems. Dr. Ye is a senior member of IEEE and a member of the Technical Committee on Robotics and Intelligent Sensing of the IEEE SMC Society. He serves as an Editorial Advisory Board member and Associate/Guest Editor of numerous international journals in robotics and control.