Séminaires ISIR

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Human Centric Robotics: from neuroscience to robot control for human-robot interactions

Abstract : Whenever two humans physically interact with each other, like during dancing Tango, their movements are determined by complex mechanical and control interplays between the motion and forces generated by each individual. Understanding these interplays are essential for the development of future robots in rehabilitation, biomedical devices and tele-operation systems so as to ensure that the interacting human is comfortable with the interacting robot, feels safe with them and benefits physically and psychologically from them. However, this is not a trivial task because human interactions change not only with individual body dynamics and control but change also with cognition, age and disease. The reason we feel comfortable when interacting with another human is because the other human can understand our behavior in all these aspects and respond accordingly - my research aims to develop similar abilities in future robots. Through integrated research in robotics, bio-mechanics, motor psychophysics, control and social neuroscience, I aim for a comprehensive understanding of human-robot interactions and develop human like interaction abilities in robots. In this talk I will introduce my work and present an example of a human interaction experiment to exhibit how mechanics, engineering, robotics and neuroscience can be combined together to understand human behavioral dynamics and in turn be utilized to develop better design and behavior in robots.

Short bio : Gowrishankar Ganesh received his Bachelor of Engineering (first-class, Hons.) degree from the Delhi College of Engineering, India, in 2002 and his Master of Engineering from the National University of Singapore, in 2005, both in Mechanical Engineering. He received his Ph.D. in Bioengineering from Imperial College London, U.K., in 2010. He worked as a Researcher in Human Motor Control in the Lab of Dr. Mitsuo Kawato at the Advanced Telecommunication Research (ATR), Kyoto, Japan, from 2004 and through his PhD. Following his PhD, he worked at the National Institute of Information and Communications Technology (NICT) as a Specialist Researcher in Motor Neuroscience and Robotics till December 2013. Since January 2014, he has joined as a CR1 Researcher at the Centre National de la Recherché Scientifique (CNRS), and is currently located at the CNRS-AIST joint robotics lab (JRL) in Tsukuba, Japan. He is a visiting researcher at the Centre for Information and Neural Networks (CINET) in Osaka, ATR in Kyoto and the Laboratoire d'Informatique, de Robotique et de Microélectronique de Montpellier (LIRMM) in Montpellier. His research interests include human sensori-motor control and learning, robot control, social neuroscience and robot-human interactions. His recent awards include the Best Robot Video award at IROS 2012, Best journal paper award in 2011 in IEEE Trans. on Robotics and the Best Cognitive Robotics Paper nominee at ICRA 2010.