

The Department of Mechanical Engineering/College of Engineering and Applied Sciences
Stony Brook University

Mechanical Engineering Seminar



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SUNY Buffalo**

Lecture Title: Cooperative Payload Transport by Robot Collectives

Friday, December 3, 2010, 11AM, Room 173 Light Engineering

Abstract

Cooperative material-handling by a fleet of decentralized manipulation agents has many applications ranging from hazardous waste removal, material handling on the shop floor, to robot work crews for planetary colonization. Our long-term goal is the development of a theoretical and operational framework to model, analyze, implement and validate cooperative payload transport capabilities in such distributed robot collectives. Our particular focus is on creation, control and active reconfiguration of marching formations of wheeled mobile robots for cooperative payload transportation tasks. The selection of the underlying physical/informational infrastructure, system architecture, and mechanisms of cooperation creates many alternatives. A systematic framework is critical for evaluation/selection of suitable implementations with quantifiable cooperative-performance benefits. In particular, we will present our efforts to develop methodologies for design and optimization of formations for apriori known tasks, adaptation of formations for changing tasks and scalable schemes for control under the common theoretical but computationally tractable framework. Time permitting, I will also provide a brief overview of the other related research initiatives ranging from: (a) uneven terrain locomotion systems; (b) human-computer interfaces for mediated teleoperation; (c) haptic user-interface design and (d) distributed real-time simulation and control of systems. See <http://mechatronics.eng.buffalo.edu> for further details.

Biography

Prof. Venkat Krovi received his Bachelor's degree from the Indian Institute of Technology Madras and his Masters and Ph.D. degrees in Mechanical Engineering from the University of Pennsylvania. He is currently an Associate Professor in the Mechanical and Aerospace Engineering Department at the State University of New York at Buffalo where he directs the Automation Robotics and Mechatronics (ARM) Lab (<http://mechatronics.eng.buffalo.edu>). In his research, Prof. Krovi focuses on the complete lifecycle treatment (design, modeling, analysis, control, implementation and verification) of mechanical and mechatronic systems. The rich theory of kinematics, dynamics and control of constrained articulated mechanical systems forms the theoretical basis of this research while the enabling technologies of mechatronics and computer-aided engineering facilitate the experimental validation of the prototyped systems. These aspects are highlighted in the various research initiatives ranging from multi-robot collaboration; human-computer interfaces for mediated teleoperation; haptic user-interface design; and distributed real-time simulation and control of systems. Prof. Krovi has actively involved with various service positions. He was the past Chair of the Robotics Technical Committee in the ASME Dynamic Systems and Control Division and currently serves as the Secretary of the Mechanisms & Robotics Technical Committee of the ASME Design Division. He has served as the Mechanisms and Robotics Conference Chair at the IDETC2010, the Finance Chair for ICRA 2010, CASE 2010 and ICRA 2012. He currently also serves as an Associate Editor for the ASME Journal of Dynamic Systems Measurement and Control, the IEEE/ASME Transactions on Mechatronics and on several Conference Editorial Boards.

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Check <http://me.eng.sunysb.edu> for any changes to location or time.



Refreshments will be served