

Computer Science Seminar Series, 2012

National Capital Region

Planning Robot Motions to Accomplish High-Level Tasks

Speaker: Prof. Erion Plaku

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1:00PM- 2:00PM, NVC 325

Abstract

As robots are deployed into less and less structured environments, it becomes increasingly important to enhance their ability to complete high-level tasks with little or no human intervention. Whether the task is to search, inspect, manipulate objects, navigate to target destinations, or assist in surgical treatments, it generally involves abstractions into discrete, logical actions, where each discrete action often requires substantial continuous motion planning to carry out. These settings pose significant challenges as they demand that robots reason and plan at multiple levels of discrete and continuous abstractions.

This talk proposes to unify planning at multiple levels of discrete and continuous abstractions through a novel framework that couples motion planning in continuous spaces with action planning in discrete spaces. In distinction from other approaches, the framework takes into account high-level specifications given by Finite State Machines, Linear Temporal Logic, and Planning-Domain Definition Languages, which make it possible to specify complex tasks that frequently arise in navigation, manipulation, robotic-assisted surgery, and search-and-rescue missions. The coupling of discrete action planning and continuous motion planning increases the ability of robots to plan and act on their own and so promises to enhance automation in search-and-rescue, navigation, and medical robotics.

Biography

Erion Plaku is an Assistant Professor in the Department of Electrical Engineering and Computer Science at Catholic University of America. He received his B.S. degree from State University of New York, Fredonia, NY in 2002 and Ph.D. degree from Rice University in 2008. He was a Postdoctoral Fellow at Johns Hopkins University during 2008-2010. His research focuses on motion planning and enhancing automation in human-machine cooperative tasks in complex domains, such as robotic-assisted surgery, mobile robotics, manipulation robotics, and hybrid systems.