

Computer Science Seminar Series

National Capital Region

Enhancing the Autonomy of Robotic Systems Operating in Complex Domains

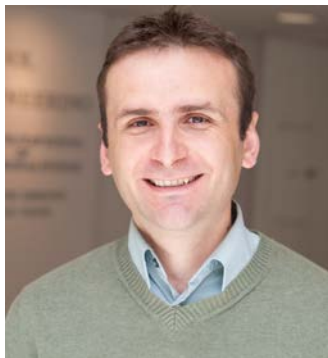
Speaker: Dr. Erion Plaku
Catholic University of America
Friday, December 5, 2014
1:00PM- 2:00PM, NVC 207

Abstract

As robots are deployed into less and less structured environments, it becomes increasingly important to enhance their ability to complete assigned tasks on their own. This talk will present a computational framework that seeks to free human operators from the burden of unnatural low-level commands and expert knowledge of a particular robotic platform and instead allow them to describe missions in a structured language that has the ability to express global and local objectives across time spans.

This research draws from advances in robotics, artificial intelligence, dynamics and control, and physics-based simulations. At its core is a holistic approach to planning as a hybrid, probabilistic, search over the continuous space of collision-free and dynamically-feasible robot motions and over discrete abstractions representing high-level descriptions of missions and desired behaviors. Probabilistic reasoning and motion controllers are employed to enhance the robustness of the framework. The framework leverages information gathered during planning and execution to refine the discrete abstractions and enhance exploration of new regions. Applications in mobile robotics with autonomous underwater vehicles will be highlighted.

Biography



Erion Plaku is an Assistant Professor in the Department of Electrical Engineering and Computer Science at Catholic University of America. He received his Ph.D. degree in Computer Science from Rice University in 2008. He was a Postdoctoral Fellow in the Laboratory for Computational Sensing and Robotics at Johns Hopkins University during 2008—2010. Plaku's research is in Robotics and Artificial Intelligence, focusing on enhancing automation in human-machine cooperative tasks in complex domains, such as mobile robotics, autonomous underwater vehicles, surgical robotics, manipulation robotics, and hybrid systems.