

Learning, Inference, and Control for Robotics and Sustainable Energy

J. Zico Kolter

Computer Science and Artificial Intelligence Laboratory at MIT

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Abstract

Learning and inference methods offer the opportunity to transform how we control and model complex dynamical systems, ranging from robotic platforms to power systems in a building. In this talk, I will first discuss my work in applying learning methods to robotic systems, namely a quadruped robot and an autonomous car. In both cases, I will show how learning approaches are able to obtain impressive performance on dynamic tasks. Looking forward, I will highlight another domain where these data-driven approaches can have a profound impact: energy and sustainability. In particular, I will look at the task of analyzing aggregate energy consumption in a building to discover and separate different appliances; I will discuss new probabilistic inference methods that enable far better performance than was previously possible. I will also discuss new Reinforcement Learning approaches to control a small physical wind turbine system, and demonstrate that these allow us to generate 30% more power than purely model-based control.

Bio

J. Zico Kolter is a postdoctoral fellow in the Computer Science and Artificial Intelligence Laboratory at MIT. He received his Ph.D. in Computer Science from Stanford University in 2010 and his B.S. from Georgetown University in 2005. He is the recipient of an NSF Computing Innovation Postdoctoral Fellowship, a former recipient of an NSF Graduate Research Fellowship, and has received best paper awards at the SIGKDD and AIAA Infotech@Aerospace conferences.

Faculty Host: Dimitris N. Metaxas