Learning Motion Plans and User Preferences for Robot Autonomy

Abstract

This talk will discuss the deployment of autonomous robots to perform long-term tasks in unknown and partially known environments. We will consider two different problems in this domain. The first is in improving robot performance over repeated executions of a task. This is achieved by iteratively improving a robot motion policy as the robot discovers more information about the underlying structure and traversability patterns in the environment. The second is in learning user preferences for desired robot behaviour. This is done by actively querying a user with different robot behaviours to elicit their preferences. For both these problems this talk will describe solution frameworks that combine learning, control and optimization to improve robot capabilities.

Bio

Stephen L. Smith is an Associate Professor in the Department of Electrical and Computer Engineering at the University of Waterloo, Canada, where he holds a Canada Research Chair in Autonomous Systems. He is also a faculty affiliate with the Vector Institute, in Toronto, Canada. He received his BSc degree from Queen's University, his MASc degree the University of Toronto, and his PhD degree from the University of California, Santa Barbara. He was previously a postdoc in the Computer Science and Artificial Intelligence Lab (CSAIL) at MIT.

Prof. Smith has received several awards including the Early Researcher Award from the Ontario Ministry of Research and Innovation in 2016, the NSERC Discovery Accelerator Supplement Award in 2015, and two Outstanding Performance Awards from the University of Waterloo. He is an associate editor of the IEEE Transactions on Control of Networks Systems and the IEEE Transactions on Robotics, and was a General Chair of the 2021 IEEE International Conference on Robot and Human Interactive Communication (RO-MAN). His main research interests lie in control and optimization for autonomous systems, with a particular emphasis on robotic motion planning and coordination.