CS Seminar

CANCELLED

Zoom Research Seminar

Informative Planning of Autonomous Robots for Spatiotemporal Environmental Monitoring

Professor Lantao Liu
Indiana University

Aug 26, 2020
Wednesday
(GMT+8)

Zoom meeting link:
https://hku.zoom.us/j/99484141050
Meeting ID: 994 8414 1050

Abstract:
Adaptive sampling and planning in robotic environmental monitoring are challenging when the target environmental process varies over space and time. I will discuss a Monte Carlo tree search method which enables the robot to not only plan for environment exploration and exploitation in space, but also catch up to the environmental changes that are related to time. This is achieved by incorporating multi-objective optimization and a look-ahead model-predictive rewarding mechanism. The method produces optimized decision solutions for the robot based on its knowledge (estimation) of the environment model, leading to better adaptation to environmental dynamics. Then I will discuss robot decision-making in uncertain and unstructured environments, such as in the scenario when strong winds and water flows cause robot stochastic behaviors. We explore the time-varying stochasticity of robot motion and the robot states' reachability, based on which we develop an efficient iterative method that offers a good trade-off between solution optimality and time complexity.

About the Speaker:
Lantao Liu is an assistant professor in the Luddy School of Informatics, Computing, and Engineering at Indiana University Bloomington. He has been working on planning, learning, and coordination techniques for autonomous systems involving single or multiple robots with potential applications in environmental monitoring, surveillance and security, search and rescue, as well as smart transportation. Before joining Indiana University, he was a Research Associate in the Department of Computer Science at University of Southern California during 2015 - 2017. He also worked as a Postdoctoral Fellow in the Robotics Institute at Carnegie Mellon University during 2013 - 2015. He received his Ph.D. from the Department of Computer Science and Engineering at Texas A&M University in 2013, and his Bachelor degree from the Department of Automatic Control at Beijing Institute of Technology in 2007.

All are welcome!
For enquiries, please call 2859 2180 or email enquiry@cs.hku.hk
Department of Computer Science
The University of Hong Kong