"Motion Planning in Dynamic Environments"

Steven M. LaValle
University of Illinois

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0900-1700
Rooms 10-11 - St. Paul River Centre

Abstract: This all-day tutorial introduces the audience to motion planning algorithms and associated mathematical concepts. Prior experience in this area is not assumed. The morning part starts from the basics of collision-free path planning by introducing geometric representations, transformations, configuration spaces, sampling-based motion planning, and combinatorial motion planning. The afternoon part covers methods that address many concerns which arise in practice when the robot's environment is changing or is incompletely specified. This falls under the heading of planning in dynamic environments. Fundamental limitations of planning in this context are discussed, followed by a survey of several successful approaches from specific contexts, such as planning for humanoids, autonomous vehicles, and virtual agents.

Bio: Steven M. LaValle is a Professor in the Department of Computer Science at the University of Illinois. He received his Ph.D. in Electrical Engineering from the University of Illinois in 1995. From 1995-1997 he was a postdoctoral researcher and lecturer in the Department of Computer Science at Stanford University. From 1997-2001 he was an Assistant Professor in the Department of Computer Science at Iowa State University. His research interests include robotics, sensing, planning algorithms, computational geometry, and control theory. He is known for the introduction of the Rapidly exploring Random Tree (RRT) algorithm. He authored the book Planning Algorithms, Cambridge University Press, 2006 (which is available on line at http://planning.cs.uiuc.edu/) and a monograph, Sensing and Filtering, Now Publishers, 2012. He co-authored the chapter on Planning in the Springer Handbook on Robotics, and in 2001 he authored a two-part tutorial on Motion Planning in the Robotics and Automation Society Magazine.