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Probabilistic inference methods for control and relational planning in Robotics

(March Toussaint)

Abstract

Recently there have been a series of papers that show how the problem of planning and control can be reduced to the problem of probabilistic inference. In this talk I will summarize this work and focus on two areas that are particularly relevant in Robotics: stochastic optimal control and planning in stochastic relational domains. The latter is concerned with planning in noisy environments described on a symbolic level in terms of objects and their relations. On both domains the probabilistic inference approach leads to competitive solvers. I will also mention how we integrate these methods in a coherent robotic system to solve typical sequential manipulation problems.

Bio

Marc Toussaint is leading the Emmy Noether research group on “Machine Learning and Robotics” at the Berlin University of Technology since 2007. Before this, he spend two years as a post-doc at the University of Edinburgh with Prof. Chris Williams and Prof. Sethu Vijayakumar, and received his PhD in 2004 at the Ruhr-University Bochum. His recent focus of research is in Machine Learning methods, in particular Bayesian inference methods, and their application in the context of behavior organization, sequential planning problems (Markov Decision Processes), and robotics. The methods he developed provide a new perspective on how control and reasoning on structured representations can be realized and how such representations may be acquired.

