

Date: January 30, 2023

Speaker: Prof. Erez Karpas, Faculty of Industrial Engineering and Management, Technion

Title: Situated Planning

Abstract:

In domains where planning is slow compared to the evolution of the environment, it can be important to take into account the time taken by the planning process itself. For one example, plans involving taking a certain bus are of no use if planning finishes after the bus departs. For another, replanning how to repair a broken fuse box might need to finish while the currently burning match still provides light. We call this setting situated planning and we define it as a variant of temporal planning with timed initial literals. We present a forward state-space search approach to the problem, in which search nodes expire at possibly uncertain times. To guide search, we first formalize the underlying metareasoning problem as an MDP and then derive both optimal algorithms for special cases and general greedy schemes. Finally, we present a situated planner that uses greedy metareasoning to guide its search. Our experimental evaluation suggests that using metareasoning significantly improves the performance of situated planners. This work broadens the scope of planning to include situations in which the world refuses to wait.

Joint work with: Shahaf Shperberg, Solomon Eyal Shimony, Wheeler Ruml, Andrew Coles, Daniele Magazzeni, Bence Cserna, and Michael Cashmore,

Bio:

Dr. Erez Karpas is an Associate Professor at the Faculty of Industrial Engineering and Management, Technion – Israel Institute of Technology. Previously, he was a postdoctoral associate at the Model-based Embedded and Robotics Systems Group at MIT, under the supervision of Prof. Brian Williams. Before that, he was a research fellow and the research coordinator of the Technion-Microsoft Electronic-Commerce Research Center, under Prof. Moshe Tennenholtz. He completed his Ph.D. under the supervision of Prof. Carmel Domshlak and Prof. Shaul Markovitch at the Faculty of Industrial Engineering and Management at the Technion – Israel Institute of Technology in 2012. Before that, he received his M.Sc. (2005) and B.Sc., (2001) both from the department of computer science at Ben Gurion University. His main research interests are artificial intelligence (specifically, automated planning) and robotics. He is an associate editor of the Journal of Artificial Intelligence Research (JAIR), a member of the International Conference on Automated Planning and Scheduling executive council, and chairperson of the Israeli Association for Artificial Intelligence.