

ISTRC conference grant request

Conference report – ICRA 2024

ICRA is a top-tier conference on Artificial Intelligence (AI), Robotics, and Automation. A large body of the papers presented at the conference were around incorporating Neural Networks into robotics and automation domains. These papers commonly present novel Neural Network architectures to solve various problems. Many works in robotics have been simulated on real robots. Also, the safety aspect of robotics is gaining more and more attention. Accounting for safety translates to the agent as a constraint in addition to the autonomous maximization of its objective.

My research focuses on planning under uncertainty while considering maximal possible sources of stochasticity. Such a research area received the name Belief Space Planning (BSP). In BSP we model problems as Partially Observable Markov Decision Process (POMDP). POMDPs model problems that exhibit both outcome and state uncertainty. Outcome uncertainty describes uncertainty that may arise from imperfect actuation or environmental randomness such as randomly moving obstacles. The state uncertainty arises from imperfect information coming from the noisy sensors of the agent. Not many works in ICRA were in the POMDP setting. Commonly to allow an efficient solution the problems are modeled with perfect observability assumption or even entirely deterministic modeling, additionally assuming a deterministic motion.

The most relevant sessions for me were Planning Under Uncertainty 1, Planning Under Uncertainty 2, and Planning Under Uncertainty 3. In addition, papers related to Simultaneous Localization and Mapping (SLAM) are the subject of my interest and they were spread over all the sessions. I am also interested in constrained POMDP in the context of robotics applications such as safety and exploration. All the works I've seen that presented constrained POMDP were related to safety and not to the exploration as opposed to our presented paper.

To conclude, I think ICRA is a highly valued conference in Artificial Intelligence. It is also very large. Clearly, for me attending ICRA this year was highly beneficial in terms of seeing what the robotics community is focusing on and better understanding where to navigate in my own research directions.

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