

Space Retrieval using Inverse Feedback Control **by Nikolay Jetchev and Marc Toussaint**

Learning complex skills by repeating and generalizing expert behavior is a fundamental problem in robotics.

A common approach is learning from demonstration: given examples of correct motions, learn a policy mapping state to action consistent with the training data. However, the usual approaches do not answer the question of what are appropriate representations to generate motions for specific tasks. Inspired by Inverse Optimal Control, we present a novel method to learn latent costs, imitate and generalize demonstrated behavior, and discover a task relevant motion representation: Task Space Retrieval Using Inverse Feedback Control (TRIC). We use the learned latent costs to create motion with a feedback controller.

We tested our method on robot grasping of objects, a challenging high-dimensional task. TRIC learns the important control dimensions for the grasping task from a few example movements and is able to robustly approach and grasp objects in new situations.