

Experiential Learning for Robots



Experiential Learning for Robots: From Physics to Actions to Tasks, NSF NRI **1637949**

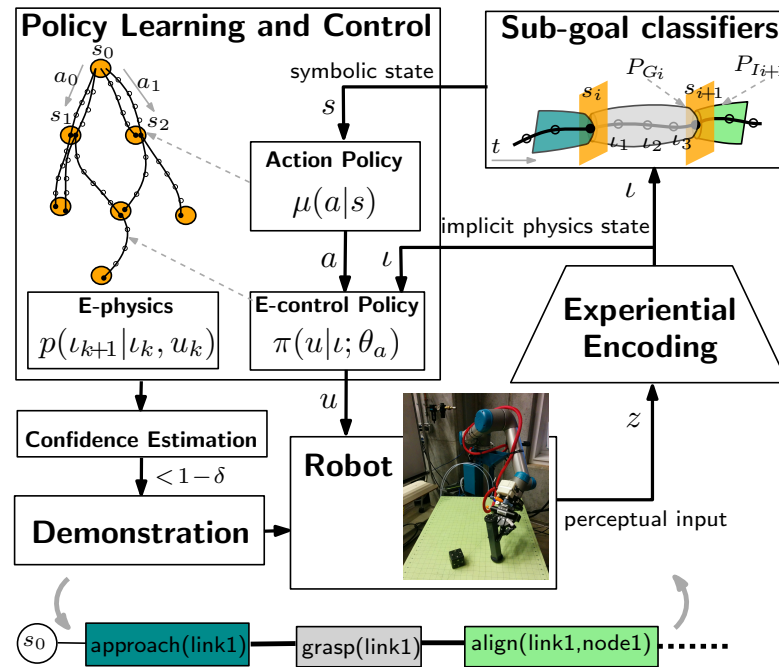
Dieter Fox, Ali Farhadi, University of Washington, Greg Hager, Marin Kobilarov, Johns Hopkins University

Challenge

Can we learn transferrable model from robot experience, and use those models for planning and control in new contexts?

Solution

- Develop machine learning methods that training simulation but which can be deployed in real-world situations
- Creates compositionality, sim-to-real transfer, and models for complex phenomena



Scientific Impact

- We are creating *compositional* approaches that combine data-driven learning of complex models with context-driven assembly of solutions

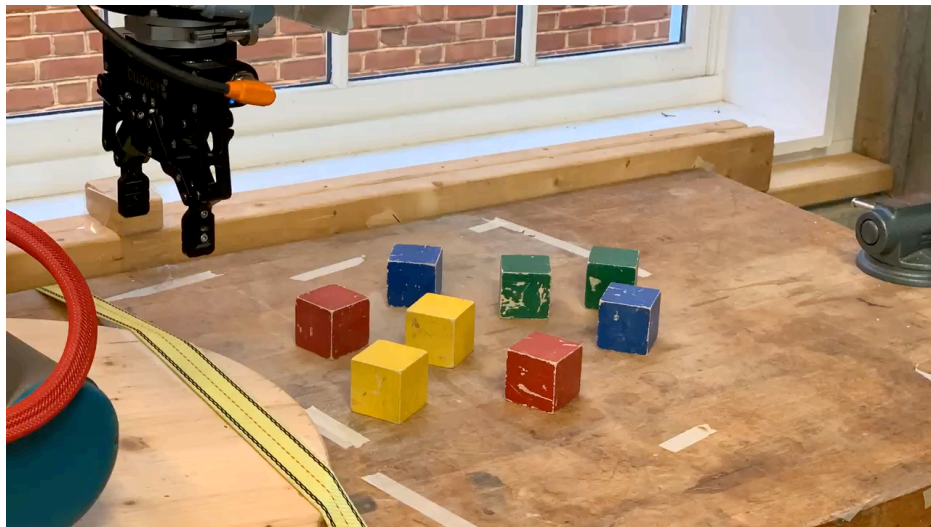
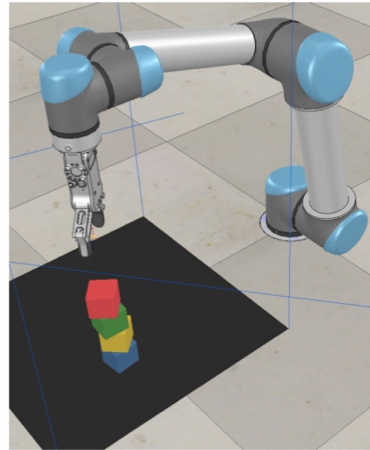
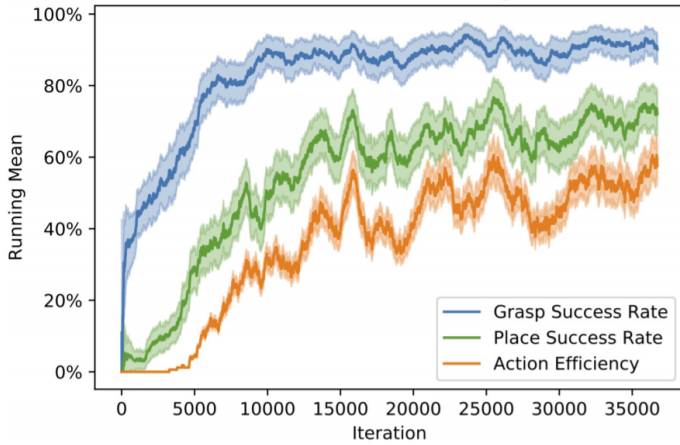
Broader Impact

- Solutions in manufacturing, mobility, and service robotics
- Results from this project are being incorporated into courses at our institutions.

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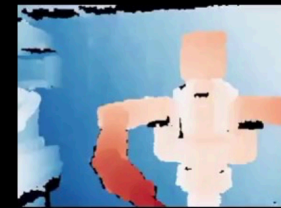


Stack 4 Blocks Training



Goal: Real-time, reactive control of a robot manipulator from raw RGBD data

Approach: Gradient based optimization in a low-dimensional "pose" space learned using  structured deep dynamics model



Initial scene

Control Baxter

Target scene

