

# The Dependence of Effective Planning Horizon on Model Accuracy

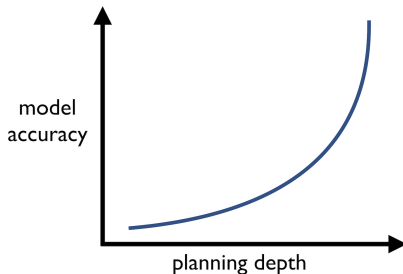
David Abel   Enrique Areyan  
Kavosh Asadi   David Hershkowitz

December 15, 2015

- ① What is the point?
- ② Value Iteration Story
- ③ Value Iteration Results
- ④ UCT Story
- ⑤ UCT Results

# What is the Point?

Planning depth should be determined proportionally to model accuracy

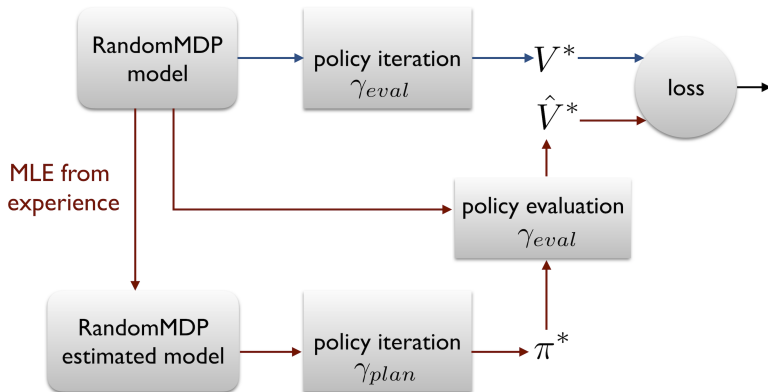


# Value Iteration Story

The evaluation is performed on a MDP designed by the authors, called RandomMDP, specified as:

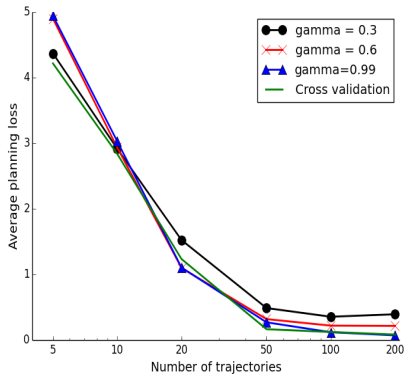
- 1 10 states, 2 actions
- 2 For each state-action pair, the agent can transition to 5 possible next states chosen uniformly. The transition probability assigned to each next state  $\sim \text{uniform}(0, 1)$ .
- 3 Rewards  $\sim \text{uniform}(0, 1)$ , sample rewards have additive Gaussian noise
- 4  $\gamma_{eval} = 0.99$  and  $\gamma_{plan} = 0.3, 0.66$ , and  $0.99$

# Value Iteration Evaluation approach

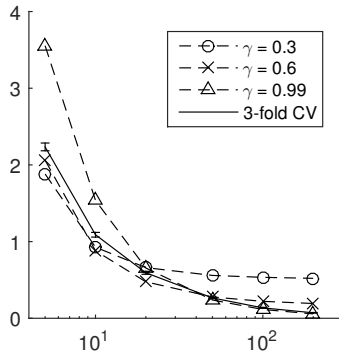


# Value Iteration Results

our results



their results



# Value Iteration Reproducibility Discussion

- Definition of RandomMDP
- Loss function
- Plot readability

UCT:

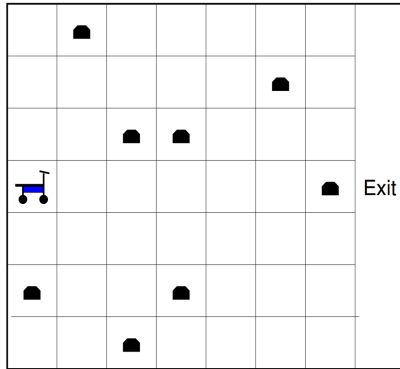
- UCB
- Monte Carlo Planning

Experiments:

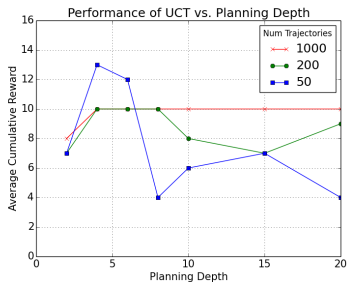
- Rock Sample Domain
- Comparing UCT performance with different planning depths.



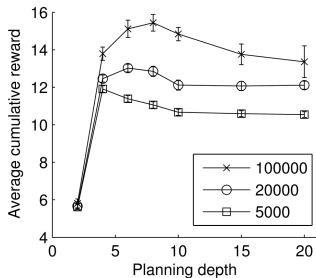
# Rock Sample Domain



# UCT Results



(a) Our results



(b) Their results

# UCT Reproducibility Discussion

- Ambiguities of UCT
- Ambiguities of Rock Sample
- Computational Limitations