

boxLCD: A Simple Testbed for Learned Simulator Research



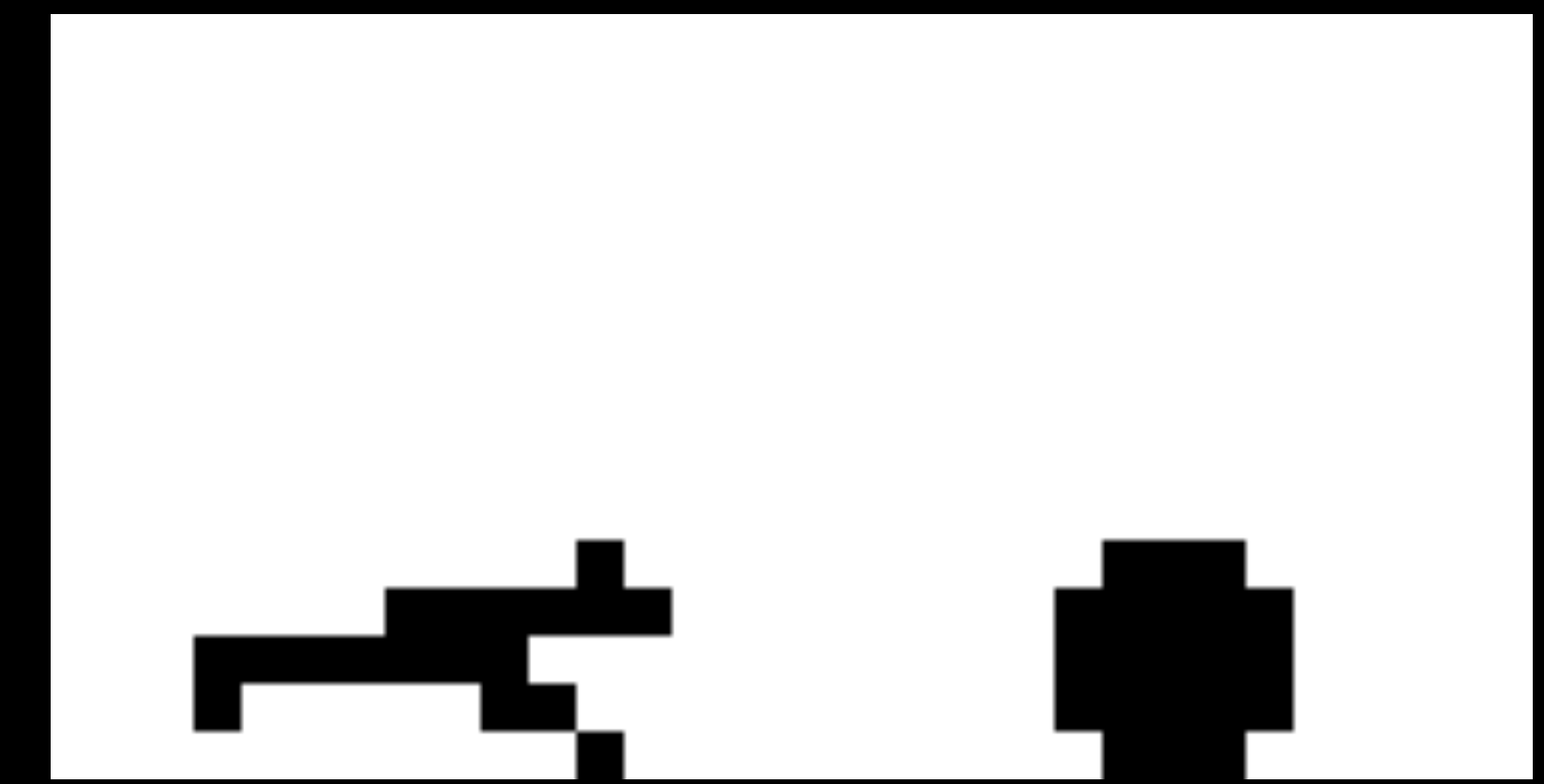
Matthew Wilson

github.com/matwilso/boxLCD



ICLR 2021 Workshop

Deep Learning for Simulation (simDL)



Motivation

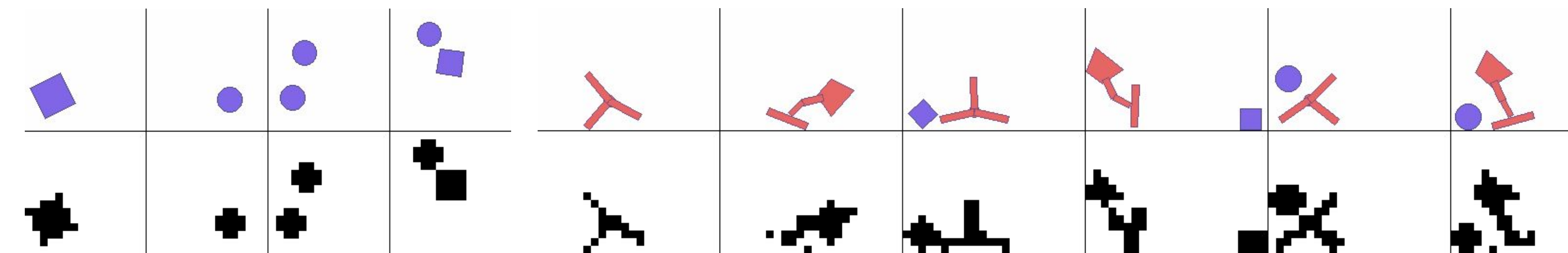
- Robotics simulators are widely used, but inflexible and inaccurate
- Data-driven / **learned simulation** is a promising way forward
 - for debugging, evaluation, training (sim2real)



How else to handle things like paint, fire + smoke, microwaves, light switches, and shrimp curry?

boxLCD Environments

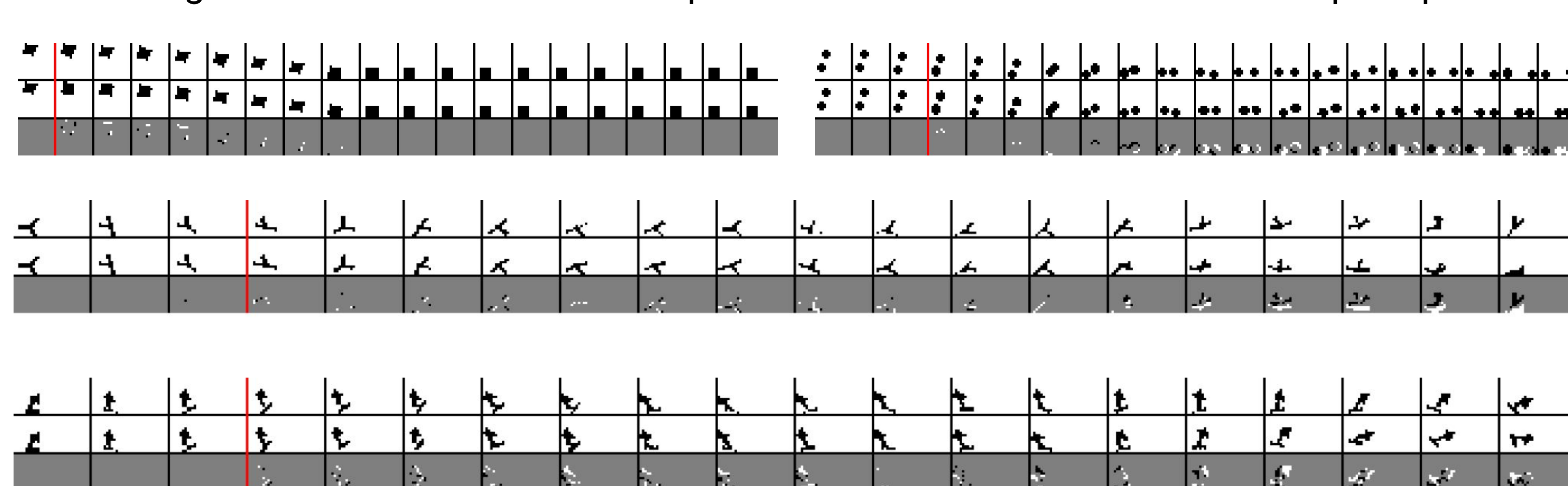
Simple 2D physics w/ low-res binary images to enable **quick iteration**



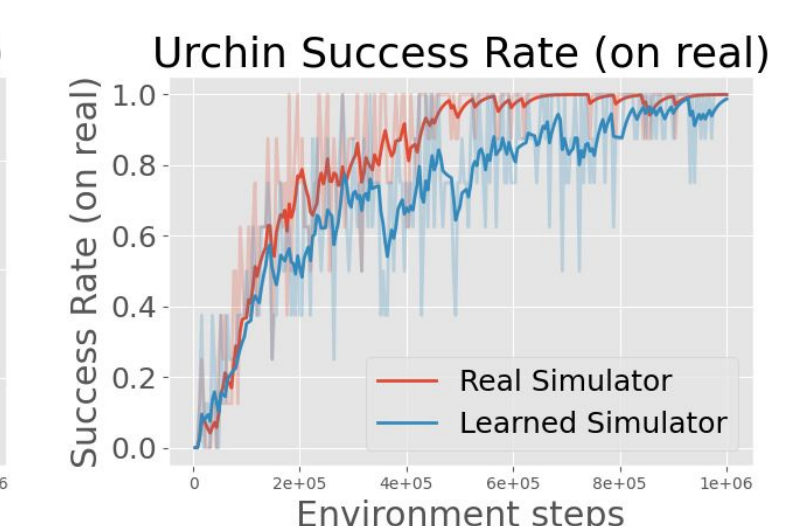
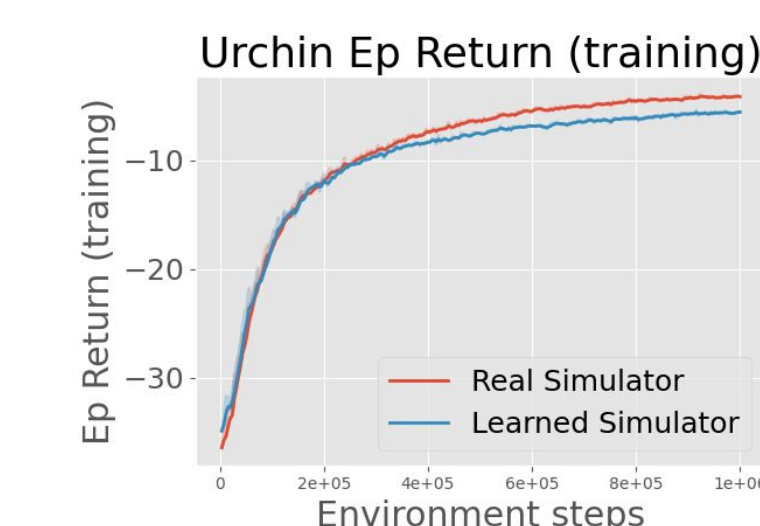
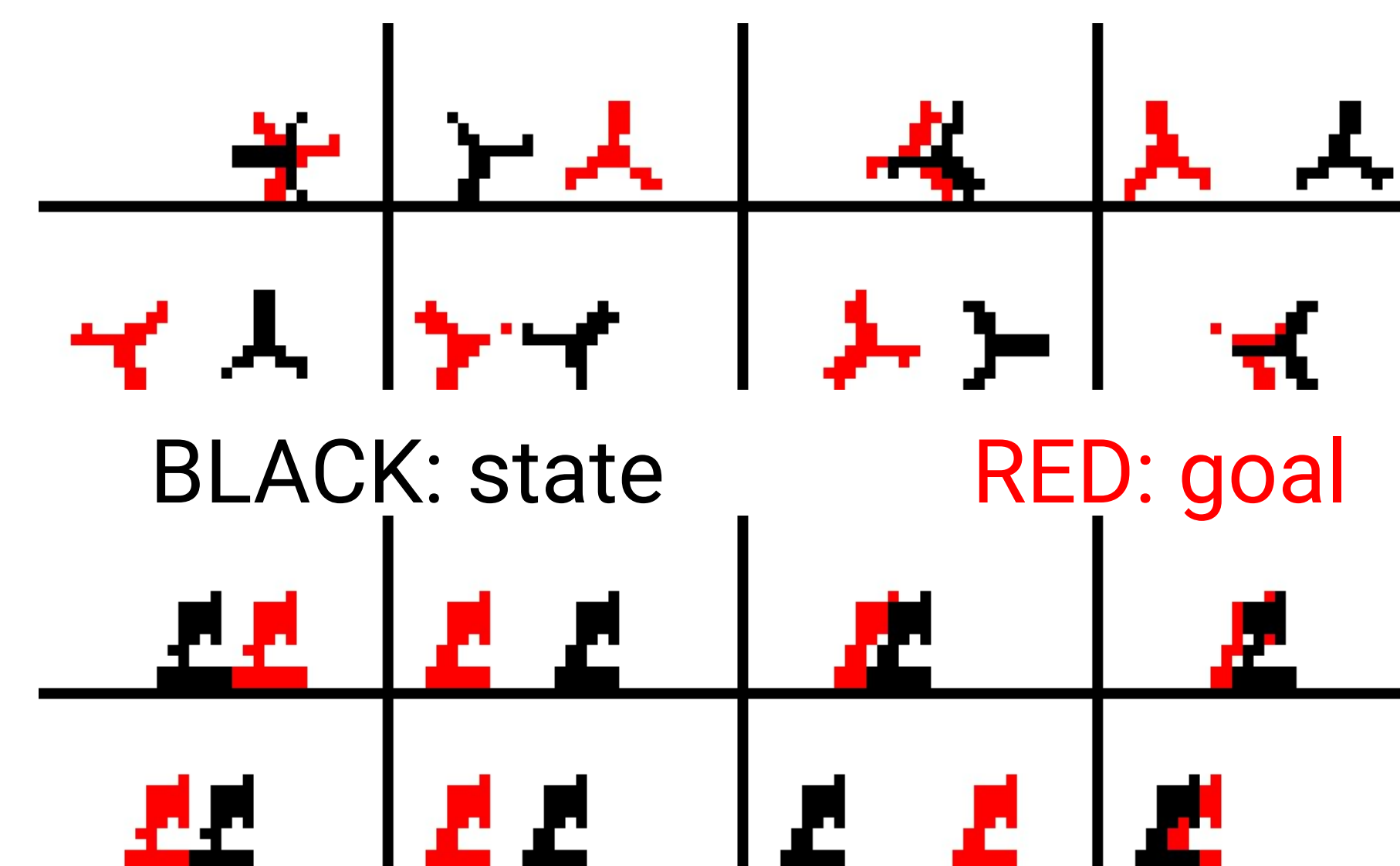
Experiments

1. Learn a Model of the Environment

TOP: ground truth. MIDDLE: model prediction. BOTTOM: error. RED LINE: prompt



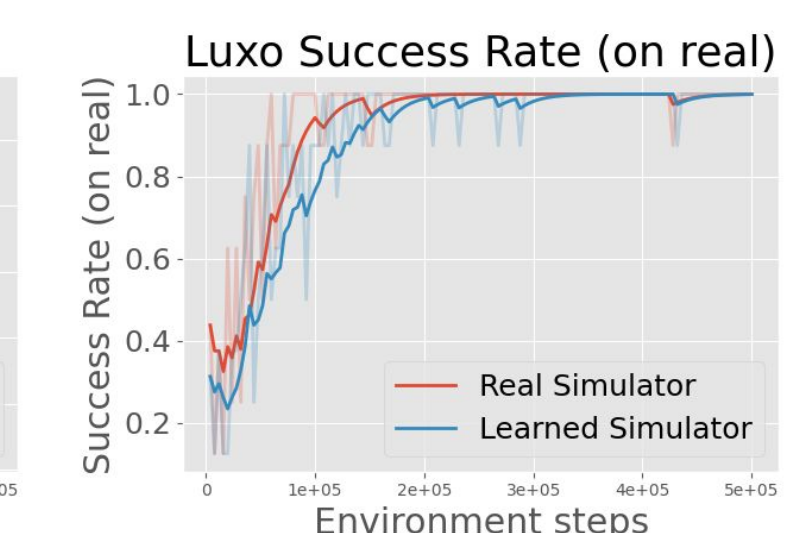
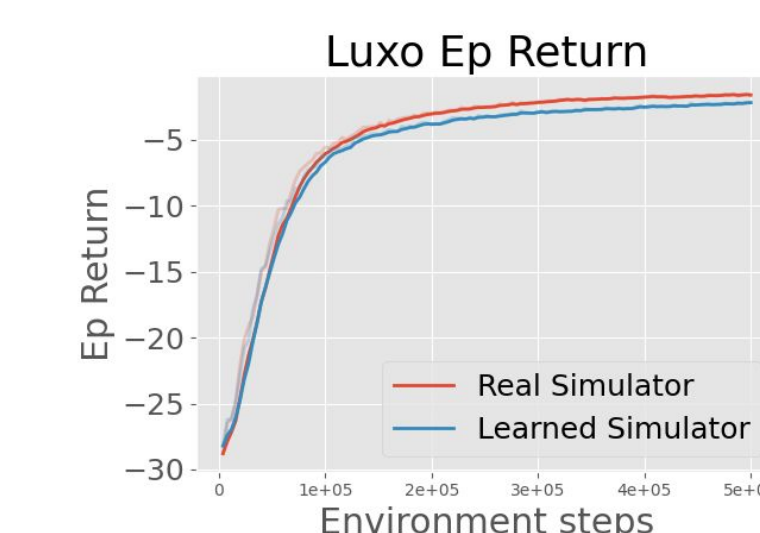
2. Use that Model as a Learned Simulator for RL



And it works nearly as well as training in the base simulator

Success rates (n=1000, on real):

Urchin Real: 0.998
Urchin Lenv: 0.955



Luxo Real: 0.999
Luxo Lenv: 0.988