Universität Stuttgart

Intelligent Object Sorting using Deep Reinforcement Learning
Robot & Computer Vision

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Robotics Lab, Winter Term 2021-22
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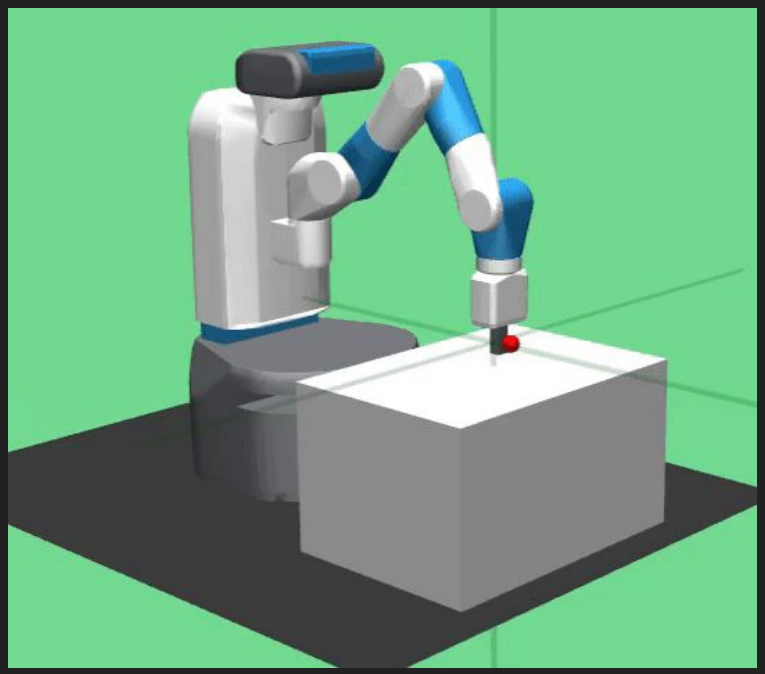
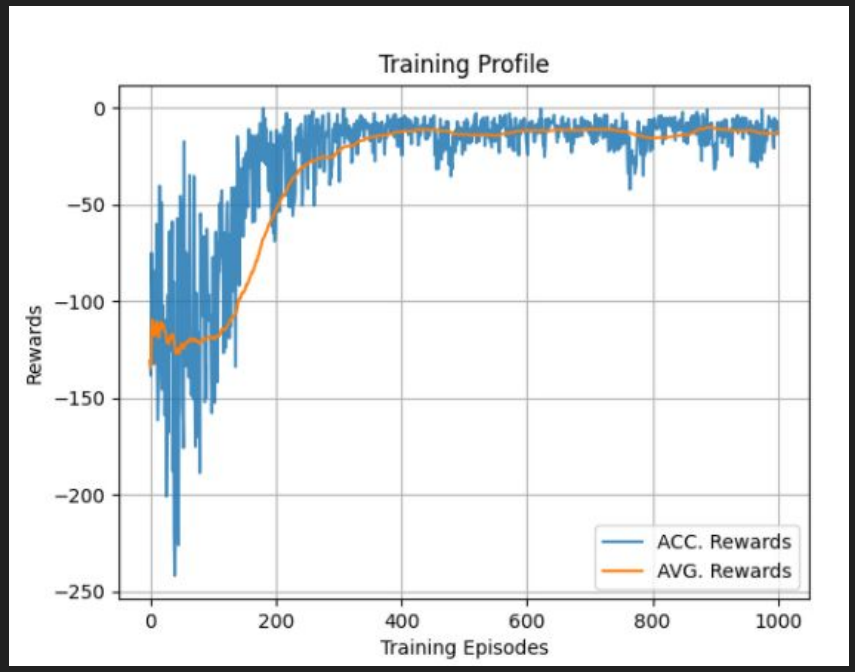
We let Artificial Intelligence take control of the robot!

Proof of Concept





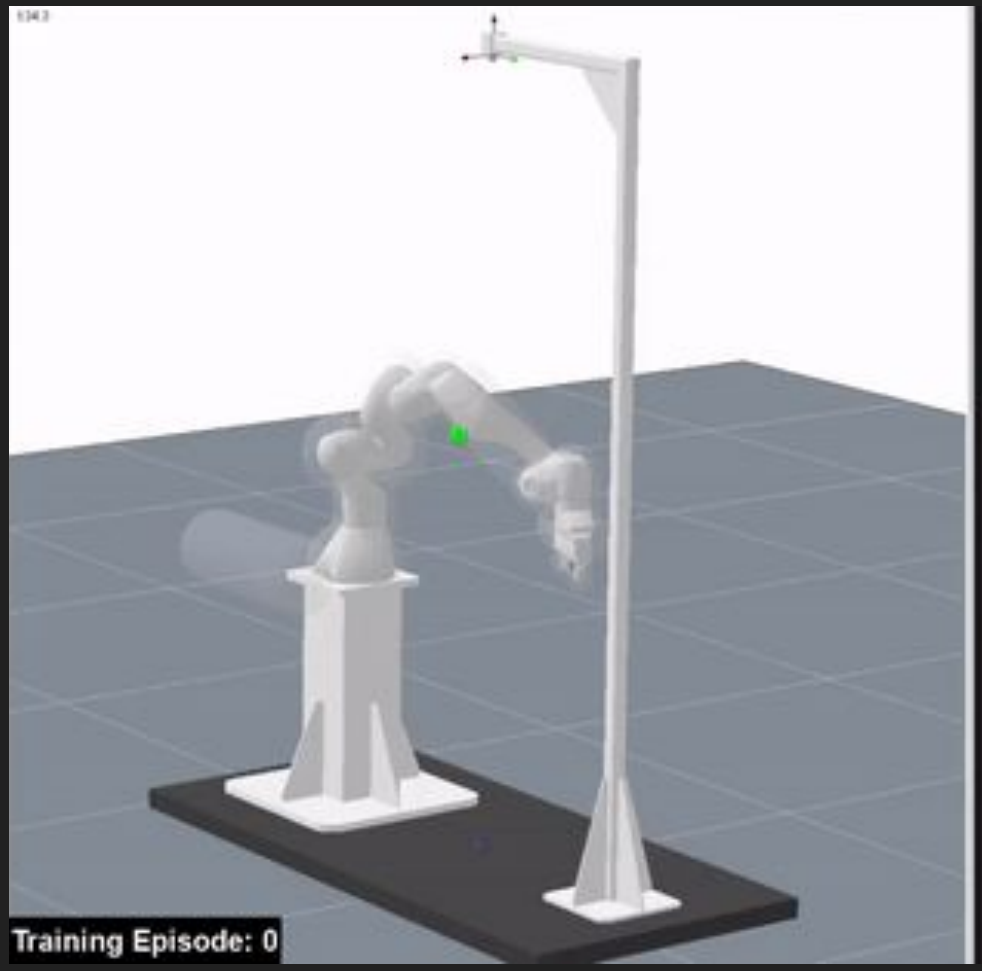
1. We test many deep reinforcement learning algorithm.
2. Benchmarked DDPG, TD3 and PPO on ‘FetchReach-v1’ environment.

Making DDPG Learn Faster!

1. Replaced Uniform with Prioritized Experience Replay Buffer.

2. Used Parametric Noise for Exploration Instead of Adding Gaussian Noise for actions.

Training the Robot to Reach Targets

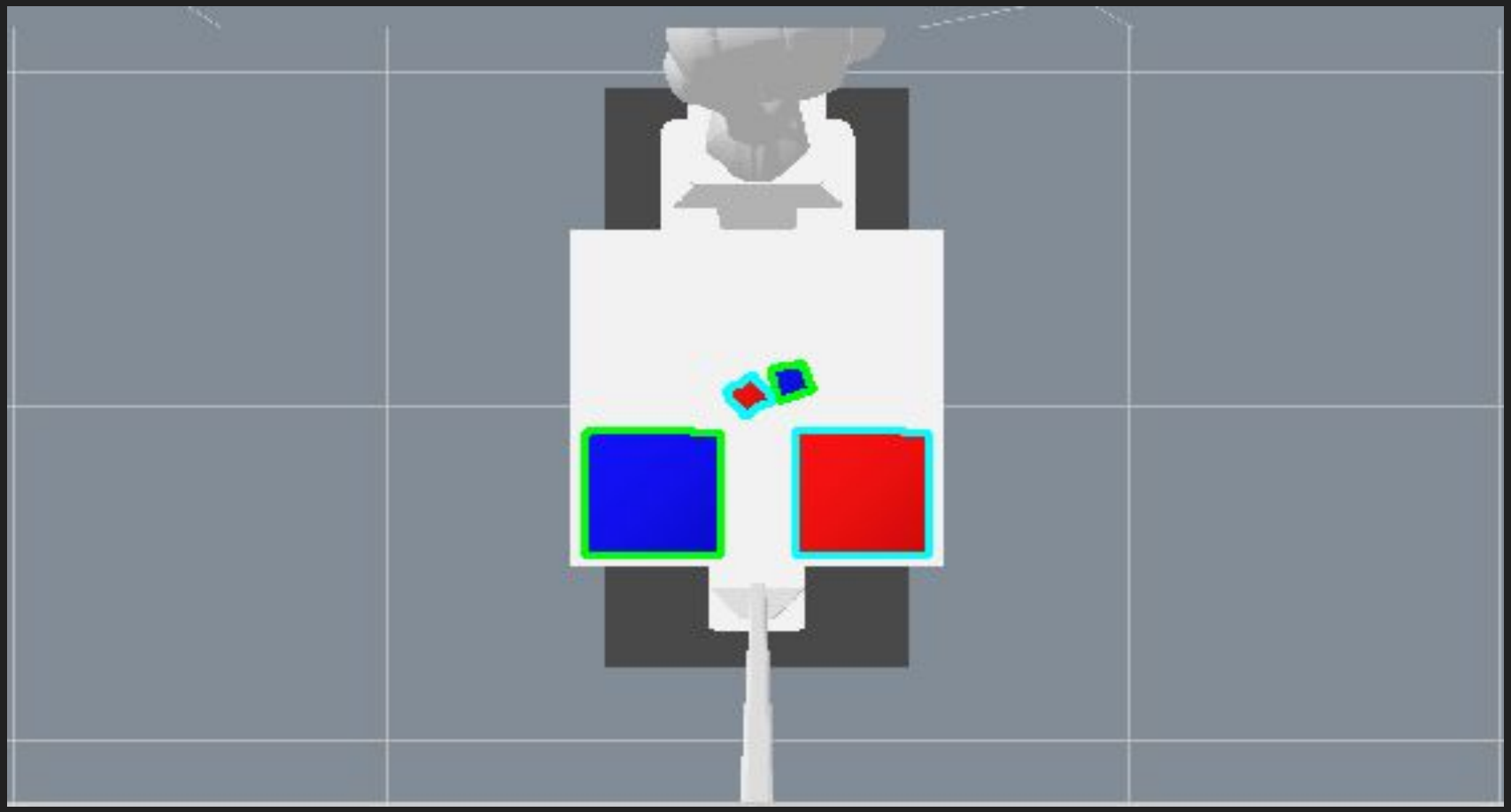



```
** INFO:util.cpp:InitCmdLine:402(1) ** real line arguments: 'rai-pybind -python'
** INFO:util.cpp:InitCmdLine:406(1) ** run path: '/home/kanishk/robotics-lab-project'
** INFO:graph.cpp:initParameters:1365(1) ** parsed parameters:
(python)

**ry-c++-log** ry.cpp:init_LogToPythonConsole:34(0) initializing ry log callback

** INFO:ry.cpp:init_LogToPythonConsole:34(0) initializing ry log callback
Episode:0       Acc. Rewards: -60.02    #Ws. Rewards: -60.02    Final Distance Error: 286.12    *** MODEL SAVED! ***
Episode:1       Acc. Rewards: -33.10    #Ws. Rewards: -47.10    Final Distance Error: 187.95    *** MODEL SAVED! ***
```

Added Perception for Object Detection



Completing the Robot Task Execution