
Awesome NVIDIA Isaac Gym

Collect some related resources of NVIDIA Isaac Gym

News

- PhysX 5: NVIDIA PhysX 5 SDK
- [02/07/2022] Isaac Gym Preview 4 (1.3.0) is available
- [23/03/2022] GTC2022: Isaac Gym: The Next Generation — High-performance Reinforcement Learning in Omniverse
- [29/10/2021] Isaac Gym Preview 3 is available
- NVIDIA Isaac Sim on Omniverse Now Available in Open Beta 21/06/2021
- Isaac Gym
- Isaac Gym: End-to-End GPU-Accelerated Reinforcement Learning

Official resource

- OmnisaacGymEnvs
- Isaac Gym
- Isaac SDK
- Isaac gym forum
- Isaac Sim GTC 2021, sim-to-real
- Isaac Sim video toturials
- Training Your JetBot in NVIDIA Isaac Sim
- Training Your NVIDIA JetBot to Avoid Collisions Using NVIDIA Isaac Sim
- Introducing NVIDIA Isaac Gym: End-to-End Reinforcement Learning for Robotics
- Accelerating Robotics Simulation with NVIDIA Omniverse Isaac Sim
- Developing Robotics Applications in Python with NVIDIA Isaac SDK
- Building an Intelligent Robot Dog with the NVIDIA Isaac SDK
- youtube video NVIDIAOmniverse

GTC

- Isaac Gym and Omniverse: High Performance Reinforcement Learning Evolved [A31118]
- Learning Challenging Tasks For Quadrupedal Robots: From Simulation To Reality [A31308]
- Sim-to-Real in Isaac Sim
- Isaac Gym: End-to-End GPU-Accelerated Reinforcement Learning
- Bridging Sim2Real Gap: Simulation Tuning for Training Deep Learning Robotic Perception Models
- Reinforcement Learning and Intralogistics: Soft Actor Critic for Maples Navigation in Warehouses
- Building Robotics Applications Using NVIDIA Isaac SDK
- NVIDIA Isaac SIM — Amazing Robot Models and Tasks Simulated in Isaac Sim 2020.1
- Building Robotics Applications Using NVIDIA Isaac SDK
- Sim-to-Real in Isaac Sim
- Omniverse View 2021.2 - Application Tour
- ISAAC SIM Introduction and Live Demo
- NVIDIA on-demand ISAAC SIM

Papers

Manipulation

- RLAfford: Official Implementation of “RLAfford: End-to-end Affordance Learning with Reinforcement Learning” ICRA 2023.
- mvp: Masked Visual Pre-training for Robotics
- [RSS2022] Factory: Fast contact for robotic assembly: paper, project, code
- [SIGGRAPH2022] ASE: Large-scale Reusable Adversarial Skill Embeddings for Physically Simulated Characters: paper, project, code
- [arxiv2021] Data-Driven Operational Space Control for Adaptive and Robust Robot Manipulation: project, paper, code
- [RSS2021@DO-Sim] DO-Sim: Workshop on Deformable Object Simulation in Robotics: link

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- [ICRA2021] Causal Reasoning in Simulation for Structure and Transfer Learning of Robot Manipulation Policies: paper, project
 - [RSS2021 DO-Sim workshop] DefGraspSim: Simulation-based grasping of 3D deformable objects: paper, project, video, **code**
 - [arxiv2021] Search-Based Task Planning with Learned Skill Effect Models for Lifelong Robotic Manipulation: paper, project
 - [2021] Deformation-Aware Data-Driven Grasp Synthesis: paper
 - [2021] Transferring Dexterous Manipulation from GPU Simulation to a Remote Real-World TriFinger: project, paper, **code**
 - [ICRA2021] In-Hand Object Pose Tracking via Contact Feedback and GPU-Accelerated Robotic Simulation: paper, project
 - [IROS2021] Reactive Long Horizon Task Execution via Visual Skill and Precondition Models: paper, video
 - [CoRL2021] STORM: An Integrated Framework for Fast Joint-Space Model-Predictive Control for Reactive Manipulation: paper, project, **code**
 - [ICRA2021] Sim-to-Real for Robotic Tactile Sensing via Physics-Based Simulation and Learned Latent Projections: paper
 - [2021] DeformerNet: A Deep Learning Approach to 3D Deformable Object Manipulation: paper
 - [RSS2021_VLRR] A Simple Method for Complex In-Hand Manipulation: paper, project

Localization

- [CoRL2021] Learning to Walk in Minutes Using Massively Parallel Deep Reinforcement Learning: paper, openreview, **code**, project
- [ICRA2021] Dynamics Randomization Revisited: A Case Study for Quadrupedal Locomotion: project, paper, video
- [2021] GLiDE: Generalizable Quadrupedal Locomotion in Diverse Environments with a Centroidal Model: project, paper
- [CoRL2020] Learning a Contact-Adaptive Controller for Robust, Efficient Legged Locomotion: paper, video, project, blog
- [RAL2021] Learning a State Representation and Navigation in Cluttered and Dynamic Environments: paper

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- [CoRL2020] Learning to Compose Hierarchical Object-Centric Controllers for Robotic Manipulation: paper, project

Others

- [arxiv2021] BayesSimIG: Scalable Parameter Inference for Adaptive Domain Randomization with Isaac Gym: paper, **code**
- [2021] Articulated Object Interaction in Unknown Scenes with Whole-Body Mobile Manipulation: paper, video, project
- [NeurIPS2021] Isaac Gym: High Performance GPU-Based Physics Simulation For Robot Learning: project, paper, openreview
- [RSS2020] Learning Active Task-Oriented Exploration Policies for Bridging the Sim-to-Real Gap: paper, project
- [ICRA2019] Closing the Sim-to-Real Loop: Adapting Simulation Randomization with Real World Experience: paper, video, project
- [CoRL2018] GPU-Accelerated Robotics Simulation for Distributed Reinforcement Learning: paper, project

RL library

These RL libraries can support the training with Isaac Gym.

- VRKitchen2.0-IndoorKit: Omniverse IndoorKit Extension
- rl_games: rl algorithms with isaac gym
- ElegantRL
- skrl, paper

Related GitHub Repos

- IsaacGymEnvs
- isaacgym_hammering
- isaacgym-utils: Developed by the CMU Intelligent Autonomous Manipulation Lab
- isaacgym_sandbox

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- thormang3-gogoro-PPO: Steering-based control of a two-wheeled vehicle using RL-PPO and NVIDIA Isaac Gym
 - dvrk_IssacGym, link
 - dvrk-shape_servoing
 - codebase_thesis
 - Bittle_URDF
 - SceneCollisionNet
 - TD3 applied to the Bittle robot in Isaac Sim
 - Isaac-ManipulaRL Deep Reinforcement Learning Framework for Manipulator based on NVIDIA's Isaac-gym, Additional add SAC2019 and Reinforcement Learning from Demonstration Algorithm.
 - legged_gym_isaac
 - minimal-isaac-gym
 - DexterousHands: This is a library that provides dual dexterous hand manipulation tasks through Isaac Gym.
 - Safe Multi-Agent Isaac Gym Benchmark: Safe Multi-Agent Isaac Gym benchmark for safe multi-agent reinforcement learning research.
 - Bez_IsaacGym: Isaac Gym Reinforcement Learning Environments for humanoid robot Bez
 - Bimanual_offlineRL
 - isaac_rover_mars_gym
 - isaac_rover_2.0
 - Rapid Locomotion
 - walk-these-ways: Go1 Sim-to-Real Locomotion Starter Kit
 - walk-these-ways: A1 Sim-to-Real Locomotion Starter Kit
 - shifu: Lightweight Isaac Gym Environment Builder for Any Robot
 - Dofbot Reacher: Dofbot Reacher Reinforcement Learning Sim2Real Environment for Omniverse Isaac Gym/Sim
 - UR10Reacher: UR10 Reacher Reinforcement Learning Sim2Real Environment for Omniverse Isaac Gym/Sim
 - minimal-isaac-gym: A Minimal Example of Isaac Gym with DQN and PPO.

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- TimeChamber: A Massively Parallel Large Scale Self-Play Framework.
 - Rofunc: The Full Process Python Package for Robot Learning from Demonstration.
 - rl-mpc-locomotion: Deep RL for MPC control of Quadruped Robot Locomotion.

Tutorials & Videos

RSS2021 Workshop (<https://sites.google.com/view/isaacgym/home>)

- Isaac Gym Part 1: Introduction and Getting Started
- Isaac Gym Part 2: Environments, Training, and Tips
- Isaac Gym Part 3A: Academic Labs - University of Toronto
- Isaac Gym Part 3B: Academic Labs - IMLab
- Isaac Gym Part 3C: Academic Labs - Stanford University)
- Isaac Gym Part 3D: Academic Labs - Soft-Body Simulation
- Isaac Gym Part 3E: Academic Labs - Eth Zurich
- Isaac Gym Part 4: New Frontiers in End-to-End GPU Accelerated Reinforcement Learning

Videos

- How to Import Your Robot Into Isaac Sim in NVIDIA Omniverse
- Youtube NVIDIA Omniverse
- Basic Demo of the NVIDIA Isaac Simulator (Part 1)
- Basic Demo of the NVIDIA Isaac Simulator (Part 2)
- Introduction and Live Demo in Isaac Sim - Community Stream
- From Point Clouds to Material Graphs: Explore the Latest in Omniverse Create 2021.3
- Robot Autonomy with the Digital Twin in Isaac Sim
- Can we simulate a real robot? A journey through trying to find a high quality physics simulator for a robot dog/quadruped (using the Peto Bittle in this case).
- Teaching Robots to Walk w/ Reinforcement Learning Robot sim adventure video part two, covering my attempts to get some reinforcement learning to work with the Bittle robot in the Isaac sim.
- Robot Dog Learns to Walk - Bittle Reinforcement Learning p.3 Further progress with using reinforcement learning to train robot dogs/quadrupeds to walk

Blogs

- A brief introduction to Nvidia Omniverse