

Reinforcement Learning in Robotics using NVIDIA Isaac Sim

Context:

The EPFL Xplore Research Pole has the objective of building a legged robot. The robot is designed to autonomously navigate through challenging terrain using its on-board sensors. This semester project focuses on the application of reinforcement learning techniques in the context of Robotics, specifically using NVIDIA Isaac Sim.

Project description:

The primary aim is to explore and implement reinforcement learning algorithms within the simulation environment provided by Isaac Sim. The project involves a blend of theoretical understanding, practical implementation, and experimentation to develop and optimize reinforcement learning models for robotic control applications. The goal would be to achieve parkour-like movement for specific tasks.

Furthermore, the student will be an integral part of the Xplore Legged Robot Team, actively participating in its weekly meetings and working sessions. This collaboration will facilitate close interaction with other team members, and the student is expected to share their findings and progress with the team regularly.

Tasks:

The project involves a series of tasks, outlined below (note that this list is not exhaustive):

- Isaac Sim familiarization
- Reinforcement learning algorithms
- Integration and Environment Setup
- Model Training and Optimization
- Real-World Application

Expected Outcomes:

- Proficiency in utilizing NVIDIA Isaac Sim for robotic simulations.
- Successful implementation of reinforcement learning algorithms within the Isaac Sim environment.
- Optimized reinforcement learning model for effective robotic control.
- Practical application of the trained model in real-world or simulated robotic scenarios.

References:

https://robot-parkour.github.io/resources/Robot_Parkour_Learning.pdf

<https://arxiv.org/pdf/2109.11978.pdf>

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