



SIMULATION OF INVERTED PENDULUM SWING UP PROBLEM WITH ROS AND GAZEBO USING DEEP REINFORCEMENT LEARNING

Gabriel A.B. Arias, Projetos, Materiais e Manufatura, gabrielbermudez@usp.br

Arthur J.V. Porto, Projetos, Materiais e Manufatura, ajvporto@sc.usp.br

Abstract

Reinforcement Learning (RL) algorithms rely on learning from experience by trial and error, which requires acquiring a large amount of data. Although there is a gap between simulation and real environments, simulation environments offer the advantages of being totally safe and allowing for continuous data collection without human intervention. In this work, we propose an approach to run deep RL experiments in a simulated environment for an inverted pendulum swing up classic problem using Robot Operating System (ROS) and Gazebo robotics simulator. Furthermore, we develop the learning environment using the robo-gym framework to interface between the controller and the simulation environment using an OpenAI Gym interface. We use the Deep Deterministic Policy Gradient (DDPG) and the Soft Actor Critic (SAC) deep RL algorithms to train the controller.

Keywords: *Simulation. Reinforcement learning control. Robot Operating System.*