Safe Deep Reinforcement Learning for Multi-Agent System

Dimitrios Gkouletsos
first1.last1@xxxxx.com

Nyquist
first2.last2@xxxxx.com

Bode
first2.last2@xxxxx.com

Kalman
first2.last2@xxxxx.com

December 4, 2020

I. Idea

In this project, we propose a Deep Reinforcement Learning algorithm along with safety margins based on [1]. Our goal is to extend the single-agent application, presented in [1], into a multi-agent enviroment.

II. Methods

we use the Deep Deterministic Policy Gradient (DDPG) [2]. The constraint is addressed through a linear approximation that utilizes a neural network as well.

III. Datasets

The proposed approach takes advantage of the Open AI gym multi-agent particle environment [3] in order to apply a set of experiments and test the model.

IV. Baseline

V. Goals

VI. Literature Overview

References

[1] Gal Dalal, Krishnamurthy Dvijotham, Matej Vecerik, Todd Hester, Cosmin Paduraru, and Yuval Tassa. Safe exploration in continuous action spaces. *arXiv preprint arXiv:1801.08757*, 2018.

[2] Timothy P Lillicrap, Jonathan J Hunt, Alexander Pritzel, Nicolas Heess, Tom Erez, Yuval Tassa, David Silver, and Daan Wierstra. Continuous control with deep reinforcement learning. *arXiv preprint arXiv:1509.02971*, 2015.

[3] Igor Mordatch and Pieter Abbeel. Emergence of grounded compositional language in multi-agent populations. *arXiv preprint arXiv:1703.04908*, 2017.