Reinforcement Learning 2021
Practical Assignment 3: Open Project

1 Introduction

In the previous assignments, you had to implement specific techniques for specific environments. Both the techniques and environments were determined by us. In this assignment, however, you are completely free to choose your own environment and techniques to investigate. This is the place where you can show your creativity and experiment with wild ideas in the field of reinforcement learning!

A potential aim of your project could be simply to achieve the highest possible score in your problem, and to try out various cool techniques along the way.

While you are completely free to select your own problem, below you can find some suggestions for environments.

2 Environments

Perhaps you find these environments interesting.

- Sokoban
- Highway
- SlimeVolley

But, as mentioned before, feel free to select your own problem!

3 Techniques

You can for example use any of the techniques mentioned from the stable baselines. However, you are not allowed to use the stable baselines implementations (although you can use them for inspiration)! In short, **you should implement the RL techniques you investigate yourselves**! You are of course allowed to use neural network libraries such as TensorFlow or PyTorch. Please do not feel limited to the algorithms (DQN, PPO, DDPG, ...) offered by the stable baselines or the environments included in Gym (feel free to try out others).

4 Submission

Make sure to nicely document everything that you do. Your final submission consists of:

- Source code with instructions (e.g., README) that allows us to **easily** (single command per experiment / sub task) rerun your experiments on a university machine booted into Linux (DSLab or computer lab).
- A self-contained scientific pdf report of at least 6 to 8 pages if not even more with figures etc. This report contains an explanation of the techniques, your experimental design (with of course the chosen environment), results (performance statistics, other measurements,...), and overall conclusions, in

which you briefly summarize the goal of your experiments, what you have done, and what you have observed/learned.

If you have any questions about this assignment, please visit our lab sessions on Friday where we can help you out. In case you cannot make it, you can post questions about the contents of the course on the Brightspace discussion forums, where other students can also read and reply to your questions. Personal questions (not about the content of the course!) can be sent to our email address: rl@liacs.leidenuniv.nl.

The deadline for this assignment is the **7th of May 2021 at 23:59 CET**. For each full 24 hours late, one full point will be deducted (e.g., if your work is graded with a 7, but you are two days too late, you get a 5).

Good luck and have fun! :-)