Reproducible research report

In this assignment, you will study a paper from the list below and report on the major claims by the paper and the supporting evidence.

Two tutorial sessions can be used to work on the assignment. The TA's will be available to answer questions and give you suggestions and feedback. The assignment workload assumes you work on the lab outside of the sessions as well.

Due date

We will accept submissions until October 24th, 12:00. We recommend finishing the assignment by the original deadline on October 21st, 13:00, to avoid work on the assignment overlapping with exam preparations.

Submission

Hand in your report on Canvas as pdf file. One submission per group is required. Pre-pend "PaperX" to the name of your file, where X is a number from 1 to 4 corresponding to the paper number in the list at the bottom of these instructions.

Teams

Like the other assignments, the assignment can be done in teams of 2.

Steps and timeline

1. Choose one of the papers below.
2. Carefully read the paper. Be sure you understand the main claims and the experimental evidence presented.
3. Write a short report on the paper (roughly 2 pages). Consider the following points:
   (a) Give a short summary of the paper. Include at least the problem the paper is trying to address and the main research questions, hypotheses, and claims made by the paper. How does the paper propose to answer these questions / evaluate these hypotheses / address these challenges?
   (b) Describe the experiments performed by the paper (see points below).
   (c) Draw your conclusion: do the experiments provide enough information to answer the research questions or support the claims? Consider the suggestions in 'Deep Reinforcement Learning that Matters' [3], that will be discussed in class.

4. Some points you should pay attention to when evaluating the experiments:
   (a) Which and how many environment(s) are the techniques tested on?
   (b) What methods is the proposed technique compared to?
   (c) How are hyperparameters set? Does this result in a fair comparison?
   (d) Which quantities are measured?
   (e) Is it clear which experimental procedure was followed? (e.g. number of runs, ...)
   (f) Are models trained on multiple seeds? Is it clear what the spread is between such runs?
   (g) Are results presented clear and interpretable way?

Evaluation criteria

We will evaluate the assignment based on the following criteria.

- **Presentation (20%).** Is the final report clear, and legible? Is the report properly structured with design elements (e.g. headings) used effectively?
- **Paper summary (30%).** Do the research problem and claims/research questions become clear? Is it clear what the proposed solution is?
- **Evaluation of the experiments (35%).** Does the report cover the mentioned points about experimental evaluation?
- **Conclusions (15%).** Does the report connect the results from the evaluation back to the claims/research questions in an appropriate manner?

Papers

Choose a paper to work on from the following list. Note that some of them have extended appendixes. You can consult/scan these appendices for details, but it's not necessary to read them in detail.

1. Randomized Ensembled Double Q-Learning: Learning Fast Without a Model [1]
2. Improving stochastic policy gradients in continuous control with deep reinforcement learning using the beta distribution [2]
3. A generalist agent [5]
4. AdaRL: What, Where, and How to Adapt in Transfer Reinforcement Learning [4]

References

[1] Xinyue Chen et al. "Randomized Ensembled Double Q-Learning: Learning Fast Without a Model". In: *International Conference on Learning Representations*. 2020.

[2] Po-Wei Chou, Daniel Maturana, and Sebastian Scherer. "Improving stochastic policy gradients in continuous control with deep reinforcement learning using the beta distribution". In: *International conference on machine learning*. PMLR. 2017, pp. 834–843.

[3] Peter Henderson et al. "Deep Reinforcement Learning that Matters". In: *AAAI National Conference on Artificial Intelligence (AAAI)*. 2018.

[4] Biwei Huang et al. "AdaRL: What, Where, and How to Adapt in Transfer Reinforcement Learning". In: *International Conference on Learning Representations*. 2021.

[5] Scott Reed et al. "A generalist agent". In: *arXiv preprint arXiv:2205.06175* (2022).