

INTELLIGENT SYSTEMS & ROBOTICS

FINAL PROJECT

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Objective

- Implementing, evaluating, and documenting a new, research-style idea in the field of deep reinforcement learning.

Submissions (1 Submission/Team)

- Final Report - Style of a research paper, preceded by a one-page extended abstract. The one-page extended abstract should summarize the main findings and accomplishments of your final project, while the main paper should describe and motivate the method in detail, and discuss the results, including any relevant figures or plots. The extended abstract is to be submitted as the first page of the full report (word document)
- Python Notebook or Collab Notebook with code and explainable results.

Project Requirements:

- Project should evaluate novel ideas that pertain to deep RL or its applications. The project must involve reinforcement learning algorithms, not just deep learning.
- You are expected to post final project materials to a Week 10 discussion board as well as to Assignments/Grades for grading. That way all students in the class will have a chance to learn from what you have done.
- Final Report Structure:
 - Abstract. An executive summary of the research.
 - Introduction. Why are you conducting this research?
 - Literature review. Who else has conducted research like this?
 - Methods. How are you conducting the research?
 - Results. What did you learn from the research?
 - Conclusions. So, what does it all mean?

Considerations:

It's a good idea to think early about the data (simulated or real) that you'll need to collect, and the computational resources you'll need. You are encouraged to use any research work as a project in this course, provided that this work relates to deep reinforcement learning.

Below are some examples of weak proposals and how to improve them.

- Weak: re-implement a recent paper on deep RL.
Strong: re-implement a recent paper and investigate an extension mentioned in the paper as potential future work.
- Weak: run a deep RL algorithm out of the box on a new application.
Strong: modify the algorithm to better suit the application.
- Weak: sweep hyper-parameters, do architecture search of some algorithm.
Strong: investigate the algorithm's robustness to more interesting tweaks (e.g. sparse rewards instead of dense) and pursue a solution.

Grading Guidelines

- Abstract (10 points)
- Review research design and modeling methods (30 points)
- Review results evaluate models (30 points)
- Implementation and programming (20 points)
- Exposition, problem description and management recommendations (10 points)