

# 15-789 Project

Instructor: Aditi Raghunathan, raditi@cmu.edu

TA: Jacob Springer, jspringer@cmu.edu

Fall 2024

The class project is an opportunity to investigate and expand on the ideas discussed in class and in the papers we have read. Your project can be *empirical* or *theoretical*. The range of reasonable project topics is broad, but you should aim for your project to relate in some way to the focus of the class. You can choose to pursue a project from this non-exhaustive list:

1. Test an unbacked claim from any paper covered in the class,
2. Resolve a question or academic bet proposed during class,
3. Generalize the results of a paper we have covered,
4. Explore a hypothesis from your own research related to the topics of this class.

The project should aim to be somewhere around the scope of a workshop paper or, ideally, a conference paper.

## 1 Team

You may work in groups of 1-2. This can be indicated by submitting assignments as a group on Gradescope. If you need to change teams at any point during the semester, please email Aditi or Jacob.

## 2 Important Deadlines

- Project proposals (Due 11:59pm, Oct 21, 2024)
- Midway project status check (Due 11:59pm, Nov 15, 2024)
- Project reports in the style of a NeurIPS paper (Due 11:59pm, Dec 9, 2024)
- Project presentations (Week of Dec 2, during class)

## 3 Proposal

The proposal should be 1-2 pages long and include the following sections:

1. **Group.** Please include the names and Andrew IDs of everyone in your group.
2. **Motivation.** Explain why the problem you're addressing is interesting.
3. **Related work.** Review relevant literature.
4. **Problem Statement.** Formalize the problem.
5. **Approach.** Outline your experimental or theoretical design.
6. **Preliminary results.** (If any. This section is optional.)

The proposal will be graded on completion. If you would like to extend a paper not covered in class or propose a project only loosely related to the class topic, please email Aditi or Jacob.

## 4 Midway Report

The midway report should be 3-4 pages long and consist of the following sections:

1. **Problem Statement.** Provide a summary of the problem you are tackling and what you have learned from your experiments.
2. **Experiments/Theoretical Results.** Discuss the experiments you have conducted. You should include any experiment that did not support your hypothesis, as long as you learned something from it.
3. **Discussion.** Summarize what you learned from the experiments or theory.
4. **Future Plans.** Based on what worked and what didn't, what experiments or theory will you try next? Will you make any changes to the problem statement?

The midway report will be graded based on the **quality (not quantity)** of the experiments or theoretical work. How well do the experiments address the problem? How thorough are they (e.g., trying different architectures, averaging over multiple seeds, conducting a hyperparameter search)?

We will provide feedback on the project after the midway report.

## 5 Final Report

You will need to submit a NeurIPS-style report following the template found here: <https://www.overleaf.com/latex/templates/neurips-2022/kxymzbjpwsqx>. The report can be of variable length. It should roughly follow the structure of an introduction, literature review, experiments, discussion, and conclusion.

The final report will be graded based on the following criteria:

1. **Complete story.** A clearly formalized problem that is well-motivated, coupled with thoughtful, rigorous experiments that deepen our understanding of the problem.
2. **Contextualization.** Relevant works are cited.
3. **Clear, polished writing.**

## 6 Final Presentation

The length of the presentations will be determined after group assignments. Presentations will be graded based on the following criteria:

- Overview and contextualization: Important works are cited, and the problem is well-motivated.
- The experiments or theory presented are interesting and well-motivated.
- Presentation quality: Slides are clear and informative; the presentation follows a clear story and logical organization.