



JOHNS HOPKINS

WHITING SCHOOL  
of ENGINEERING

# Final Projects

<https://self-supervised.cs.jhu.edu/sp2025/>

# Overview

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- 20% of your overall grade (proposal, midway presentation, final report and poster)
- The objective of the final project is to make use of **what you have learned** during this course.
- You get to pick your problem!
  - This is your chance to explore a problem with more freedom!
  - But we give you options.

# Group Work

- **Group work:** Students can work in groups (up to 4 people).
  - Being in a team is encouraged.
- If multi-person: Include a brief statement on the work of each teammate
  - In almost all cases, each team member gets the same score, but we reserve the right to differentiate in egregious cases.

# Using Existing Code

- It's okay (and encouraged) to use existing code/resources
  - Don't re-invent the wheel.
  - You must document it and give them credit .
  - You will be graded on your **value-add**.
- Use any language/framework for your project. Though we expect most will use PyTorch.

# Mentorship

- You have access to the mentorship of the course staff throughout!
- You will be aligned with at least one (possibly two) course staff.
  - I would love to talk to each team, alas there is only one of me ...
- It's your ☐ job to reach out to them to coordinate times, in case office hours do not fit your schedule.

# Project Tracks

1. **Default projects** consists of a few scoped goals.
  - Example: Reproducing an existing result with a smaller model or different dataset.
  - We will release these on Piazza by Thursday.
2. **Custom projects** you define your goal, if you feel ambitious!
  - I encourage most people to go with the “default projects” since they’re scoped.
  - Do “custom projects” only if you know have a clear target in mind!

# Custom Projects

- The topic of this project is **open-ended**.
- This project, for example, can focus on
  - demonstrating systemic limitations of prior work or
  - suggesting improvements on methods
  - ...
- Really, anything!
- Must substantively involve **human language** or **Transformers** or **pre-training**!

# Project Timeline (Tentative)

- Proposal deadline: April 4, via Gradescope
- Midway report: April 20, via Gradescope
- Final project posters: May 8 (2-5pm).
- Final project report: May 8 EOD, via Gradescope



# Project Proposals

- The project proposal should be a 2-page document..
- Outlining your intended plan for the project.

# Project Proposals

- Make sure that you follow the expected protocol for the proposal.

- The project proposal is a 2 page description of what you intend to do
  - motivation,
  - hypothesis,
  - experiments,
  - datasets,
  - methods,
  - expected outcome,
  - etc.

- If you're missing these details, we will not receive the "proposal" credits and we will ask you to redo it.

# Proposals: Be as Precise as You Can

*"we will first collect an extensive dataset from various sources such as Google News articles, Reddit discussions, and Twitter conversations."*

What data? What annotations?

*"the model will be trained to produce a sentiment indicator that ranges from -10 to 10 ..."*

What model?

Where did we get these labels?

You want to be as clear and as specific as possible.

# Proposal: An Example

**Success Metrics:** Evaluate and compare to accuracy of LLMs on standardized tests meant for human test-takers (Olympiad, Bar exam), compare size of ensemble model to LLM.<sup>5</sup>

## **Datasets:**

We think that StackExchange will be an extremely valuable dataset,<sup>6</sup> since it is a huge repository (24 million questions and 35 million answers) of labeled, carefully moderated question/answer pairs that are separated by topic. For domain specific knowledge, we can additionally refer to textbook/wikipedia materials (or other publicly available encyclopedic data) that are available online. The goal is to fit strongly to a specialized corpus (*forum*) for each distilled model, so any dataset with a large amount of truth will work. That is, our transfer set will be task-specific, rather than task-agnostic.

## **Halfway Milestone:**

In our halfway milestone, we hope to have a pipeline for a single downstream task complete that allows us to have a specialized distilled model on Math Olympiad questions. By having this pipeline complete, we can then generalize to other tasks with relative ease (where the only limiting factor will be training time) and focus on evaluation as well as ablation.

# Timeline: Midway Report

- This is a progress report — max 5 pages, via Gradescope.
- Describe the progress made thus far.
  - Should be more than halfway done! You're expected to have ***some experimental results*** to show by this date.
- The report should outline how you plan to spend the rest of your time.

# Final Report

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- The final report should summarize what you did and your findings (max 8 pages).
- Writeup quality is very important for your grade!
- See course page for an example of a strong report.

# Final Poster

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- All students will present their findings at a poster presentation during the final exam period.
- Then we will celebrate! 🎉
- Best Project Awards !
  - Selected by course staff
  - Popular vote by the class
  - Awards details are TBD