DS 4440: Project Requirements

Fall 2020

The culmination of this course is a final project which you will implement a non-trivial neural network. This project should be done alone, and ideally will build upon your mid-term topic survey. My hope is that this provides you an opportunity to take what we learn in this class and work on a project of interest to you, that you can then show off as part of your portfolio. Here are some example projects for inspiration (this is intended to be illustrative, absolutely not exhaustive!)

- Re-implement (from scratch!) a state-of-the-art model — or a stripped down version of it — that you reported on in your final project, and reproduce reported results.¹
- Analyze an existing model in a novel way, for example critically assessing datasets or metrics.
- Extend ‘minitorch’ (from earlier assignments) to implement a more advanced module or particular architecture.

You are expected to consult with me (and/or Dave, our TA) on the project to ensure appropriate and realistic scope; please reach out!

Proposal

You are to submit a one-page project proposal by 11/12, end of day. This will describe the following: (1) General project idea; (2) Dataset(s) to be used; (3) Metrics for evaluation; (4) Hypotheses concerning outcomes; (5) Anticipated difficulties/obstacles.

¹Note that if you selected a ‘task’ from paperswithcode.com you will need to be explicit in distinguishing your implementation from the reference open-source version; in particular, if the reimplementation itself is a major part of your project we will reference your implementation against the open-source variant — you must be able to explain yours! If your project is mostly about extending or analyzing an existing model, however, starting from an open-source implementation is completely fine. When in doubt, discuss with us.
Project Write-Up

By 12/11, end of day, you are to turn in a final write-up (as a PDF file, via Canvas) describing your project and accompanying results. This should roughly be structured as follows: (1) Abstract, (2) Introduction/motivation, (3) Experimental setup; (4) Results/discussion; (5) Conclusions/future work. There is no hard page minimum; the document should be sufficiently long to communicate your work.

Code

All code you write is to be submitted a single zipped repository. I strongly encourage you to also post your code to GitHub, but this is not strictly required. A Jupyter notebook that produces the main analysis/results must be included.

Presentation

You will present your projects to your peers (and me) on the last day of class. This will include a short talk (time limits TBD) outlining the project and findings, and then a walk through of your implementation/findings.

Grading

Projects will graded under the following general set of criteria.

- Project ambition/creativity (20%)
- Execution/implementation (30%)
- Final write-up (30%)
- In-class project presentation (20%)

Execution and implementation will be assessed both indirectly (via the artifacts produced and reported upon in the final report) and directly (via the code).