Project instructions
APPM 7400 Spr 2020 Theoretical ML

Instructor: Prof. Becker

Because of the coronavirus in Spring 2020, the final exam is canceled. Instead of the final exam, and replacing the last few homeworks, we will have a project instead.

Instructions The topic of the project can be

- a traditional class-project, where you investigate an idea, and/or run simulations or do derivations or proofs, and/or connect several different ideas (e.g., create new ideas, though the originality/impact obviously does not have to rise to the level of a journal publication);
- a "book-report style" analysis of a paper, critical evaluating it (think of it as a peer-review for an article);
- reproduce the results of a relevant paper;
- other ideas as appropriate (with instructor permission). When in doubt, please talk to me!

Details

- **Collaboration** You may work alone, or in groups of 2. No larger groups allowed.
- **Form of deliverable** The project consists of a 4 page extended abstract *and* a 10 minute talk *and* slides for the talk; alternatively, you may write a longer paper (e.g., 8 to 10 pages) and not give the talk. Paper lengths are a guideline, as I'm aware you can add figures, code, adjust white space and font to make it longer/shorter. If you don't give the talk, the paper should contain a lot of detail.
- **Presentation schedule** Presentations will occur via zoom during our normally scheduled class time (1–1:50 PM, MWF) during the last three classes (Friday April 24; Monday April 27; Wednesday April 29). By Wednesday April 22, you must email me with your group info, so I know how many groups there are. By Thursday April 23, I will create a schedule of who presents when. **Important:** on the day you are scheduled to speak, you must attend the zoom meeting and listen to all other presentations, otherwise you lose 10% of your project grade. On days you are not scheduled to speak, you are welcome to listen to presentations but not required to. For these three class days, we will have two lectures worth of pre-recorded lecture.
- **Report** Your written report should be typed (LaTeX is suggested but not required), and turned in via Canvas.
- **Rubric** Because the type of report is a bit open-ended, the rubric below is necessarily a bit vague:
  - Valid/interesting project (25%), and point of project is clear. For example, for an independent investigation, the problem you are trying to solve is explained and motivated and non-trivial. For a book-report style project, presenting on a paper, you need some kind of thesis (e.g., "This paper shows the power of this approach...") and not just a summary, and explain why you chose that paper. For reproducing the results of a paper (computationally or analytically by going through a proof in extra detail), explain why you chose the paper, and why you are interested in their results (are they amazing results? do you distrust them? do they nicely illustrate concepts from class)?

- Relate the project to a concept from class (25%). Your project **must include a paragraph describing how it involves concepts learned in class**. Specifically, it should relate to one or more of the topics mentioned on our in-depth day-by-day syllabus: github.com/stephenbeckr/ML-theory-class/blob/master/Lectures.md.
- Insightful discussion (25%). You should discuss/analyze your results, and/or validate a conclusion. For a paper review, you should discuss the strengths and weaknesses of the paper. For a project that involves generating your own results, the quality of the actual *work* is included in this category.
- Professional communication (25%) of the written document and the oral presentation (and the slides). Well-organized and precise communication, grammatically correct writing, nicely formatted documents and figures. Figures should be labeled appropriately.