Fall 2021 CS 747 Deep Learning
Final Project

Project Proposal Due Date: October 15, 2021, 11:59:59 pm
Project Progress Report Due Date: November 17, 2021, 11:59:59 pm
Final Project Due Date: December 8, 2021, 11:59:59 pm

For the project you need to choose a topic which is related to the topics covered in the class, explore it in great detail. It involves additional reading and implementation of the chosen methods and demonstrate it in action.

The project can be done in groups of **up to three people**. Project formats include, but are not limited to, the following:

- **Implementation or demo**: Find a research paper related to the topics covered in class and implement their method. You may want to follow the spirit of recent reproducibility challenges on ICLR [1] and NeurIPS [2]. In addition, try to apply exsiting methods to new datasets, compare and contrast several methods, adapt or modify them. If feasible, create a demo that can be shown in class.

- **Kaggle competition**: Find a competition on Kaggle and implement a deep learning system to enter in it. Here are some options of deep learning competitions [3].

- **Paper**: Write a survey or tutorial paper on the topic of your lecture (or a different topic if you insist). Here is some examples of survey paper on Variational Autoencoder [4] and an tutorial on Generative Adversarial Networks [5]. If the topic you have chosen already has a good recent tutorial like the two above, this would probably not be the best choice (unless you feel you can write a significantly different tutorial that can offer independent value). The paper should be at least 10 pages in length (single-spaced, single column, 11pt font, 1 inch margins) and typeset in LaTeX.

[1] https://reproducibility-challenge.github.io/iclr_2019/
[2] https://reproducibility-challenge.github.io/neurips2019/
[3] https://www.kaggle.com/getting-started/16221
[4] https://arxiv.org/abs/1606.05908
[5] https://arxiv.org/abs/1606.05908

Project Deliverables (submissions on GMU Blackboard Portal)

- **Proposal**: One page project proposal should be uploaded to GMU Blackboard Portal in PDF format by one group member. Here is a template [6]. You will receive feedback on your proposal but not a formal grade. However, failure to turn in the proposal on time will result in a penalty on the overall project grade. The due date is October 15.
- **Project Progress Report:** A summary of your current efforts, with notes on any modifications to your original project goals. If you are writing a tutorial or survey paper, you should provide a rough draft with a comprehensive list of references. If you are doing an implementation project, at the very least, you should show evidence of successfully running baseline code (e.g., training an off-the-shelf model) on your target data. **The target length is a three-pages PDF document**. As with the proposal, you will receive feedback, but not a formal grade, and failure to turn in the update on time will result in a penalty on the overall project grade. The due date is November 17.
- **Final Project Report**: Either an implementation report with results, or the completed paper. The due date is December 8.

Format for Implementation Report

The final report should be submitted in PDF format by one designated group member on GMU Blackboard Portal. It should be (the equivalent of) **at least six pages** (single-spaced, 11 point font, 1 inch margins, excluding Cover page, Statement of individual contribution and References) and mimic the style of a research paper. Here is the outline to follow for the report:

- **Cover page**: executive summary: List title and authors. Briefly summarize your problem, line of attack, and most interesting/surprising findings. Be sure to include at least one diagram or example result figure. This is not counted in the six-page minimum.
- **Introduction**: Define and motivate the problem, discuss background material or related work, and briefly summarize your approach.
- **Details of the approach**: Include any formulas, pseudocode, diagrams – anything that is necessary to clearly explain your system and what you have done. If possible, illustrate the intermediate stages of your approach with results images.
- **Results**: Clearly describe your experimental protocols and identify any external code and datasets used. Present your quantitative evaluation (if any) and show some example outputs.

[6] `https://docs.google.com/document/d/1VfLnP8xxGjO4w3UXzUZK1Dj2wZOW5aAiqxPLDyseR-8/edit?usp=sharing`

- **Discussion and conclusions**: Summarize the main insights drawn from your analysis and experiments. You can get a good project grade with mostly negative results, as long as you show evidence of extensive exploration, thoughtfully analyze the causes of your negative results, and discuss potential solutions.
- **Statement of individual contribution**: Required if there is more than one group member. This is not counted in the six-page minimum.
- **References**: including URLs for any external code or data used. This is not counted in the six-page minimum.

Grading

You have to submit your source code (if any) for documentation, but grading will be be based primarily on the quality of the report (strength of idea, clarity, thoroughness, extent of analysis, etc.). **More will be expected of larger groups**. You can still get a good grade if your ideas do not work out, as long as your report shows evidence of extensive analysis and exploration, and provides thoughtful explanations of the observed outcomes.