Project Guideline

Introduction

The project in this course is to provide a hands-on opportunity to develop a deep learning application in an area of your own choosing. It also provides the chance to do a full engineering project that is much closer to real-world engineering and research than most course assignments you have done so far. While the project has some structure, you will be required to deal with the ambiguity and significant decision making that make up the life of a real engineering practitioner. Completing an open-ended project comes with significant benefits:

- The only way to really become an engineer is to do what real engineers do, which includes understanding the difficulties of open-ended goals and projects. Even if it does not go well, and you spend time reflecting on why that was so, you will be taking an important step towards becoming a professional engineer.
- You will have an opportunity to practice the ever-crucial oral and written communication skills that an engineer needs to operate successfully. You might not think that communication is important, but if so, you're wrong!
- When you are interviewed for full-time jobs, internships, and for graduate school, the most important question you will be asked is to discuss a major project you did, and the challenges faced. This is such a project.
- If you were to have a video of yourself presenting your project, and you think that video has sufficient quality, you can put a link to it on your personal LinkedIn page. LinkedIn has taken the place of a personal CV or resume, and such a video would be a compelling statement of what you are capable of. Rather than the usual simple listings of skills and previous jobs, it brings who you are to life. This is also true if you make a well-structured easy-to-follow GitHub repository of your project, document all the dependencies, and make it publicly available.

Project Rules

- Projects must be done in **groups of 4**.
- The project must make use of deep learning, as taught in this course, and the training, validation, and testing of a deep learning system should form an important part of the project.
- There are several suggested project topics that you can choose from, or you can pick a custom project. The project does not have to be unique within the class, but the approach taken will need to differ from other groups.
- There should be some data collection or cleaning that is a meaningful part of the training process. You can repurpose a data set, combine data sets, or collect your own data.
- University of Toronto rules on plagiarism apply. We are aware that there are many deep learning projects already posted on the internet, and these will be checked for plagiarism.

Team Formation

Once you have formed a team, you should brainstorm ideas for what your project topic should be or select/modify one of the suggested projects. Make sure you enroll in the same group with your team members on Quercus Group page by the Team Formation deadline (the earlier the better).

Deliverable format

All the project-related deliverables such as proposal, progress report and final report should be written using Latex based on the course template. For all documents a 9-page limit (ICLR conference standard) for the main text and unlimited references is applied. If any submissions exceed to 10 pages, a 20% penalty will be applied. We do not accept any submission longer than 10 pages (100% penalty would be applied).

Project Difficulty

- You are expected to design and train a deep model in PyTorch based on the knowledge that you gain throughout the course. You can take advantage of pretrained models and PyTorch scripts that you find online (with proper citation) as some minor parts in your project, but the significant portion of your project should be your design.
- The difficulty of the project is expected to be more than what you do in your labs and tutorials. For example, if we design a CNN classifier to classify different flowers in our tutorials, using the same architecture and script to train a model to classify different cars would not be an acceptable project. However, your contribution can be collecting new data or using available data in a new way. In such cases using simpler models can be justified.

Project Proposal

The purpose of the project proposal is to demonstrate that your team:

- knows what the goals and motivations for your project are.
- knows what dataset you will use to train your model.
- has a rough idea of the type of neural network(s) you will use.
- has a rough idea of the related work that you can build on.
- has a reasonable idea of how you will measure the success of your model/project.
- has a clear idea of how you will work together, and how to distribute work fairly.

Progress Report

The project progress report is a check-in to show that you are on track to complete your project. By the project progress date, you should have collected all the data, produced a baseline model, and produced at least one result from training your neural network model.

Project Presentation

The team will make a final video presentation describing the project goals, the deep learning model, and a live demonstration of the models' results. This video should be at most 7 minutes. If the duration of video is between 7:01 to 7:59, 20% penalty would be applied. We do not accept longer videos (for 8:00 a 100% penalty would be applied).

Project Report

Each group will submit a final project report. Along with the final report, every group member will be required to provide an addendum that describes their personal contribution to the project. Specific details will be provided in the final report rubric. **We highly encourage every group to document their own accomplishments throughout the semester whenever it is possible**.