

## Neuro 140/240: Biological and Artificial Intelligence

### Project Timeline and Credits

Total points: 100

#### **Deliverable 1: Standard MNIST example + Declare Project**

- **Credit: 10 points**
- **Due date: Friday 02/11/2022, midnight ET**
- Approximate expected load: 10 hours
- Goal: Setting up the software + Understanding building blocks of a deep learning pipeline. Data loading, model files, training/inference, evaluation.
- To Do 1: 5 points
  - Set up github repository
  - Install Conda/PyTorch + other packages
  - Train a CNN on MNIST dataset.
- To Do 2: 5 points
  - Declare what project you will be working on. Submit project description. Length: 0.5 page.

For your help, we also provide an iPython notebook in the help repo which is annotated to set setup, with annotations walking you through the steps.

#### **Deliverable 2: Training on a different dataset**

- **Credit: 5 points**
- **Due date: Friday 02/18/2022, midnight ET**
- Approximate expected load: 5 hours
- Goal: Train on another dataset (To be provided during class).

#### **Deliverable 3: Mid term report**

- **Credit: 20 points**
- **Due date: Friday 03/11/2022, noon ET**
- Goal: Ensuring students have: (1) Literature review, (2) a clear list of experiments they plan to conduct, (3) Initial progress on project
- To Dos:
  - Project Proposal
  - Suggested length: 3 pages (not a hard requirement, just a guideline).
  - Suggested structure for midterm report:
    - What is the hypothesis? Or What is the question your project asks?
    - Literature review. How have people addressed this question? Why is this question important? A good rule of thumb is to have at least 10-15 papers which are closely related.

- Break down your project into steps. Explain what experiments you will be running. A diagram, flowchart, or a list of questions your project involves is great here.
- For each experiment: (1) what is the dataset. Do you have it? Is it public? What is the model you will train? Will you be building on any code from Github? What code-base will you be using? How will you measure your result? What evaluation metric will you use? Are these metrics standard? Do you have code for them, or do you plan to implement them?
- What are the 1-2 key papers that you will be relying on?
- Do you foresee any challenges or stumbling blocks and how do you plan to address them? **Identify early so we can help you!**
- Preliminary progress: What have you trained so far and what do the results look like? Please note, that downloading the data, or code is NOT sufficient for the mid term report. You must have trained some models, and report their accuracy.
- What do you expect to observe and how would you interpret the results you have so far?

#### **Deliverable 4: Check-in 1**

- **Credit: 15 points**
- **Due: 04/13/2022, noon, ET**
- Goal: Ensuring progress is made on previous identified steps from above. Identifying pitfalls in experimental design early on are paramount for a successful project. So, the goal is to see progress, to answer questions, and help students move along with their projects.
- ToDo:
  - Submit video of a 5 min presentation on progress from mid-term proposal.
  - Demonstrate what has been done, show code and figures
  - What issues have you identified?
  - What remains to be done?
  - What is the plan for the next couple weeks?

#### **Deliverable 6: Final project report and presentation**

- Credit: 50 points
- **Due: 05/05/2022, noon, ET**
- Final Deliverables:
  - Project report + link to code (e.g., github repository)
  - Suggested length: 6-8 pages + 5 min video walking through the project.
  - Extra Credit: Demos?
  - We will have an extra session on how to write a good report and will go over below steps.
  - Suggested structure for the final report
    - Hypothesis/Question
    - Literature review.

- Methods and steps taken with links to code. Describe which code YOU wrote, and which code was taken from other sources (include citations). Describe datasets that you have collected and which ones were taken from other sources (include citations). Cite key papers that your work relies on.
- Describe your results. The results should include figures documenting the observations, performance, challenges, etc.
- Discuss the results and their implications