Machine Learning and Computational Physics
Fall 2021

Project

Due: Dec. 3$^{\text{d}}$ 2021, 11:59:59 PM PDT

1 End of Term Project Deliverables (75% of project grade)

1.1 Final Report (everyone to submit; 40% of project grade)

This is the final report for the project and should be restricted to six pages, 11-point font including all figures. The list of references is not included in this count. The report should include the following:

1. **Title.** Title of the project and the names of the team members.

2. **Motivation.** In a paragraph describe why this is an important problem to solve.

3. **Objective.** In a paragraph describe the main objective of the project.

4. **Deliverable.** Describe the main deliverable of the project in a paragraph. This statement will read like "We deliver a code that will ...."

5. Under a section titled "Research Plan", please provide the following subsections:

   - **Brief description of the algorithm.** Think of the algorithm as something that maps the input to the output. Briefly describe the input and the output.
   - **Architecture.** Using a schematic diagram briefly describe the proposed architecture of the network that will implement your algorithm.
   - **Loss function.** Using a formula describe the loss function.
   - **Training.** Describe the training process including the source of training data.
   - **Validation.** Describe the hyperparameters of your network, and how you will determine them.
   - **Testing.** Describe how you will test the performance of the fully trained algorithm.

6. **Results and Discussion.** Describe the main results of your project. Use graphs and images to highlight the important findings. Also discuss the relevance of each result you present.

7. **Conclusions and Future Work.** In one paragraph write the main conclusions of your project. In a separate paragraph describe directions for future work.

8. **References.** List of references cited in your work. This will not be counted towards the six page limit.

1.2 Final Slides and Presentation (everyone to submit ; 30% of project grade)

Upload a pdf or ppt version of no more than 6 slides (excluding the title) that describe your project. A good strategy in planning these slides is to follow the format of the *Project Report*, with a greater focus on *Results and Discussion* section. In the title slide be sure to include the name of the group members and a link to the video presentation that describes your project (see below).

Create a video presentation (no more than 5 minutes) where your group uses the slides to describe the main features of your project. An easy way to create this would be to set up and record a zoom meeting where your team presents the slides described above.

1.3 Project Code (only one member per team ; 5 % of project grade)

Please share the code that goes along with your project with the TA (Harisankar Ramaswamy). Only one person from each group needs to share this code. Please ensure that this codes and runs, and produces the desired output. We will run it on our end to make sure that it does so. For submitting this code follow the guidelines you have been using for your HW. Also make sure that the first text line of the code includes the list of all members in your group.