

BMES725 Neural Networks (Spring 2023)

Paper Presentation, Review, and Project Grading & Guidelines

Class participation (10%): A significant portion of the class will be based on reading and discussing the latest literature. Every student should read the assigned papers before class and should actively engage in paper discussions in class.

Paper review (20%): each team selects 2 or more other papers to review. The review concisely summarizes the key findings of the paper, highlight interesting ideas, weaknesses and potential extensions. No more than 5 pages. Format flexible, but this is with a minimum margin size of 1-inch minimum margins and a minimum font size of 11 points.

Paper presentation (30%): each team selects one or more of the suggested papers to present in detail to the class. Students presenting the same papers should work together to prepare for **around 40 minutes talk** on the papers. The talk should be self-contained: give background/motivation, intuition and the key results from the papers that you think are the most interesting. Do not need to cover everything; present derivations if they convey insights. Clarity will be the main evaluation criterion. All students are expected to read the assigned paper and participate in the discussions. The topic of the presentation can be in one of the following categories (**computational neuroscience, computational biology, medical imaging, electronic medical records and neural data analysis**). You are free to select your own topic and work in teams, but please check in with the instructor.

Final project (40%): This is the main component of the course; start early! This should be a research project that is related to the course material. You can even follow up with the topic of your paper presentation to further develop final project. The students will form teams of 2-3 and choose one or more datasets suggested or select their own project. Teams are expected to work on the research project throughout the second half of the quarter and produce final papers by following the format below (For details, see **Project Grading & Guidelines**). Each team will present the paper to the entire class at the end of the semester.

Where to find datasets:

In today's "Big Data" world, there are an abundance of high-quality, free datasets to enjoy and explore. In addition to the data sometimes supplied by the papers provided in the class, below is a short list of websites that are great resources for data:

- [Kaggle](#)
- [FiveThirtyEight](#)
- [Awesome Public Datasets](#)
- [Datalad](#)
- [Datasets from Awesome Deep Learning](#)

Project Grading & Guidelines

The project write-up should be no more than about 10-15 pages, but you will be penalized for not being selective about what information you include to only that essential for your analysis. This is with a minimum margin size of 1-inch minimum margins and a minimum font size of 11 points. Acceptable fonts are Helvetica, Arial, Times New Roman, Georgia, and Palatino (or similar). Pages should be numbered. Write-ups should be **single**-spaced. The page limit includes all figures, tables, and equations essential for the analysis. It does not include a cover page or table of contents (optional, but pages should be numbered regardless). Parameter tables or lists of equations are particularly long (i.e., they may be shifted to appendices). Also, any code or additional figures may be included in appendices, but in general anything in an Appendix may not be graded. There is no suggested format, but the use of section and sub-section headings (i.e., Problem Statement, Background, Experimental Design, Methods, Results, Discussion, Conclusion) should be used as appropriate. Note that there is no place in the grading for quality of grammar or presentation. But, for all these points to be graded, the project write-up and any results must be clearly presented and described so that key points may be understood. Any problem description must assume a limited level of expertise, and the problem / system should be clearly described so that the analysis can be as effective as possible. There is no requirement to use Python/Matlab or any particular programming environment, but any code written for simulations should be included in appendices, which may be included with your hand-in or submitted in a separate email. **All projects are due on 6:00 PM, 06/06/2023 by email - NO EXCEPTIONS** (including for technical difficulties, so please email your projects before the deadline). Please send ONE email per group (maximum of 3 per group) and cc your partner. All the student names in the same group must be written within the project. The student who sends the email will designate as the corresponding author. The Word file name should follow the naming convention as First Name_Last Name_Paper Title (Example: Hualou_Liang_Class_Project_Title.doc (.docx)).

The presentation of your projects will take place **on 06/06/2023**. Each group will have a maximum 30-min slot.

Project Grading Form

1. (5) Formatting (i.e., how well did you follow the instructions above; clarity of equations that you present, graphs that have an appropriate form, etc.)
2. (10) Problem identification: Clearly explain the problem you try to solve (e.g. classify bacterial and viral pneumonia on chest X-rays, predict movie ratings etc.), and why it's interesting.
3. (10) Dataset: Identify the data set(s) that you will be using. You should give a clear description of the characteristics of the data (how many examples, what kinds of features do we have for each example, are there issues with missing data or bad data, etc.).
4. (10) Methods: What methods do you use to solve the problem? Methods include data preprocessing, feature extraction, and the deep learning models you use.
5. (25) Implementation, results and interpretations: This is a major part of your project. You need to provide the implementation details, the results obtained and interpretations.

6. (15) Performance evaluation: How will you evaluate performance? In certain settings, you may want to try a few different performance measures and/or identify a few "baseline algorithms". Ideally, you will be able to report the performance of a couple baseline algorithms. The goal will be to beat the baseline, so if the baseline is already quite high, you will have a challenge.
7. (5) Description of follow-up experiments to improve the results
8. (20) 30-min presentation

Key Dates

- Deadline for choosing project groups, with tentative project title, for paper review and presentation: 6 pm, 04/18/2023
- Paper review due on the week (in the class 6pm) when the presentation will be given.
- Final Project deadline: 6 pm, 06/06/2023