Course Project, COMP / ELEC / STAT 502
Neural Machine Learning I.

A Project will be done over an approximately four-week period in the second half of the semester. Approximate dates are given below. All pertinent final dates will be posted in the Course Schedule at www.ece.rice.edu/~erzsebet/ANNcourse.html, in a timely manner.

Students will form groups by self-organization. Group sizes will typically be 3 – 4. Each group will submit a project proposal in early March. It is anticipated that by that time the major ANN paradigms will have been discussed in class and students will be able to identify a project topic, either from a list provided by me (including data), or devise their own. I encourage addressing a problem that is related to your graduate research if you are working on a specific problem.
I will review and approve each proposal (or suggest necessary modifications) in the order they are submitted. It will be the students' responsibility to schedule project reviews with me. Projects can start as soon as I approve them. We will have one or two project presentation sessions depending on the number of groups, on the last week of classes. Project reports will be due on the last day of classes, exact time TBA. An electronic copy of both presentation and project report will have to be submitted to Canvas. Exact scheduling and other details will be discussed in class in a timely manner.

Characteristics of a Successful Project

1. It will be an implementation, or analysis of the behavior, of some particular neural network algorithm, or will show the application of an ANN algorithm or group of algorithms on a problem of realistic significance.
2. It will be demonstrated as working, via printouts, tabulated results, listing of code, description and discussion of results, etc.
3. It will be written up in a concise (approx. 10-page) report that shows professional level of technical thoroughness, writing style, grammar and neatness.
4. It will be presented in a brief, approximately 10-minute, talk.

Project Proposals

The project proposals will have the following format:

- Statement of Problem: a brief one-paragraph statement indicating what the problem is that you propose to implement or demonstrate, and why (what is the significance of it).
- Objectives: a brief statement of what you expect to achieve in relation to the Statement of Problem, e.g., a working algorithm, a demonstrated classification of data, model fitting, information discovery, performance comparison, etc.
- Data Description: a detailed description and demonstration of complete understanding of the data that you plan to use. Sufficient specific information will be required to evaluate the feasibility of your approach to solving your stated problem using the proposed data.
- Technical Approach: a brief outline of the methods and techniques that you will employ to achieve the Objectives.

The Project Proposal should be short, no more than a couple of pages.

Project Report

The Project Report should have the following components:

- Statement of Problem – as in the Project Proposal.
- Objectives – as in the Project Proposal.
- Data Description – as in the Project Proposal, possibly expanded to reflect any particular challenges you learned during your experimentation.
- Technical Approach – as in the Project Proposal, but expanded as necessary to provide enough details to understand the actual processing steps and performance evaluation, and judge the merits (soundness, correctness).
- Results – Provide a discussion of the results achieved, in comparison to the initial objectives. Discuss your success or failure.
- Appendices – Any pertinent material to demonstrate your work, e.g., listing of code; data; proofs of equations; extra graphs, plots, web links, etc., if necessary.

The length of the Project Report should be whatever is *necessary* to fully and professionally document your effort. However, the suggested length is 10 pages, not counting appendices, and it should not exceed 12 pages (single line spacing, 12pt font size, 1" margins) under any circumstance. Appendices will not be used for grading. Your report must stand on its own without any Appendix.

Project Presentation

Projects will be presented to the class in approximately 10– to 12-minute time slots. PowerPoint or Beamer slides (or equivalents, anything that produces nicely formatted pdf output for submission) can be used.

Deliverables

An electronic copy of both the Project Presentation and Project Report will have to be submitted to Canvas. Each will be a single file in a commonly used format (Word, pdf, ppt). Appendices may be submitted in a separate file or files (as appropriate for codes or demos, for example) but no more than one appendix for all codes, and an additional one for a demo if you so wish. Appendices and demos are not required, will not be graded, and should not be needed for complete understanding and evaluation of your project.

Project Grade

The project grade will be determined as follows: A project will have a maximum score of 100 x <the number of students in the group>. The front page of the project report must contain a statement, signed by each team member, indicating how much of the total percent of work was performed by each student. The total score earned by the project will be apportioned over the students according to the stated percentages. The score will be composed of the technical merit of the work, the quality of the presentation, and of the quality of the written report. Details will be explained at project proposal time.

The more challenging and creative the project, the better the chance of receiving a high score. Thus, it may be better to partially fail at a challenging goal (and be able to analyze and explain the reasons) than to succeed at a trivial one.

I encourage you to ***start thinking about potential projects and data sources right at the beginning of the course***, and feel free to discuss with me any questions.