Introduction to Machine Learning - Spring 2019 - Project Report

Project Due: 1:55pm, April 23, 2019

In this project, you will develop a method to classify ASL signed letters from the alphabet. You can implement this yourselves or using a package/library. If you use a package/library, you must know what you are running and be able to explain it in detail.

Project Report: You should write a report that includes the sections listed below. Your report should follow the IEEE transactions format (single spaced, double column). Focus your report on your training and testing strategies for the contest and any unique implementations. Templates for the IEEE transactions format can be found here:
https://journals.ieeeauthorcenter.ieee.org/create-your-ieee-article/authoring-tools-and-templates/ieee-article-templates/templates-for-transactions/

The maximum number of pages for the report is 8. If there are any pages beyond page 8, they will discarded and not read or graded. It should be written with correct English grammar and spelling. Be precise - use pseudo-code or equations to be precise.

Abstract A summary description of the contents of the report and your findings
Introduction Overview of your experiment and a literature review. For the literature review, include any references to any relevant papers for your experiment. So, whatever you decide to do, search the ACM and IEEE (or other) literature for relevant papers to read and refer to.
Implementation Describe and outline any specific implementation details for your project. A reader should be able to recreate your implementation and experiments from your project report. Be detailed. You will lose points if any thing is not clear or if it is difficult to read. It is not acceptable to cut and paste code for this portion. See IEEE or ACM papers for examples of how to write this section.
Experiments Carefully describe your experiments with the training dataset and any other small toy data sets you constructed. Include a description of what the goal each individual experiment is and what your findings are. This is the bulk of what you will be graded on - if your experimental design is not sound or your experiments do not make sense, you will lose points. Be sure to evaluate if your method is robust and stable and explain how you are showing that.
Conclusions Describe any conclusions or things you learned from the project. Your conclusions must follow from what you did. Do not copy something out of a paper or say something that has no experimental support in the Experiments section.
References Listing of all references in IEEE bibliography format.

Submission Details: Turn in your project and your code on GitHub. Be sure your code contains the following files: train.py (includes a *function* that will run your training code on an input data set X and desired output vector Y. Any parameter settings must be easy to find and modify.), test.py (includes a *function* that will run your testing code on an input data set X. Note: Your test.py code should already be trained! Any parameter settings must be easy to find and modify. It should return a vector with the class label associated with each input data point X) and a concise README.txt file that clearly illustrates how to run your code. Your report should be turned in on Canvas.

Grade Details: Your grade will be determined using the following breakdown:

- 25% Implementation
  - Turn in code that runs correctly and easily on my machine. This requires a very clear README and easy to modify parameter settings. This also requires clearly listing what packages/libraries are needed to run your code - and checking with me before the due date to ensure I have those libraries.
  - Turn in code that follows the submission requirements described above
- 25% Accuracy on "easy" blind test data set
  - The "easy" test set is composed of hand-written 'a' and 'f' signs.
  - Full points on this component will be obtained if you correctly classify 90% of the blind test data or have a classification accuracy rate greater than the average classification accuracy rate of the class (whichever is lower).
- 50% Project report.
  - This component will be graded based on the requirements outlined above. If you plagiarize any section of your report, you will receive a zero for the assignment.

Extra Credit Contest The teams with the best evaluation score on the full data set will get extra credit.
Place code in your group GitHub Project Repository.