Introduction to Pattern Recognition and Machine Learning - Spring 2016 - Project #2

Project Due: 10:50am Thursday, May 5, 2016

In project 2, you will design a system of algorithms for unsupervised hyperspectral image segmentation in python. You may use any available python packages. However, you will be expected to fully understand all of the methods you use and will be tested accordingly.

Contest: There will be a contest! Your goal is to obtain the largest Rand index score when compared to provided "ground reference" map. The data set we will use is the Indian Pines data set. It can be found here: `http://www.ehu.eus/ccwintco/index.php?title=Hyperspectral_Remote_Sensing_Scenes`

If your method is random at all, be sure to set a random seed. For your score to be verified, I must get the same Rand index score when I re-run your code on my machine.

Please have your code output an image that shows a cluster label for each pixel as well as a rand index. Comment your code thouroughly and carefully for grading. Place code and report in your group GitHub Project2 Repository. Set it up here: `https://classroom.github.com/group-assignment-invitations/a0f10fc01bbf220ede0e6974cae089d6`

Presentation: In class, you will present your approach in a 8 minute presentation. You will be graded on how effectively/clearly you describe your approach as well as your presentation skills (good presentation materials/eye contact/speaking clearly/etc). Everyone in your group should speak during the presentation.

Project Report: You should write a report that includes the sections listed below. Your report should follow the IEEE transactions format. Focus your report on your training strategies for the contest and any unique implementations. Templates for the IEEE transactions format can be found here:
http://www.ieee.org/publications_standards/publications/authors/author_templates.html

The maximum number of pages for the report is 3. If there are any pages beyond page 3, 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.
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. How will you use the SVM to do multi-class classification? How will you identify faces that were not in the training data?
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.
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: May 5 at 10:50am turn in your project and your code on GitHub. Be sure your code is well documented and has a very clear README file that includes step-by-step instructions (and doesnt require a user to guess at how to run your code! provide examples!) In class on May 5, you will share your approach in a presentation. The top 2 groups with the best rand index score will get extra credit.

Grade Details: Your grade will be determined using the following breakdown: 40% implementation and RAND score on the data set, 30% presentation and 30% project report.