Final Project

ECE210A

Due: Last week of class (week of 6/5/2018)

The final class project is intended to give you experience implementing some algorithms you learned about in class, including:

- Stochastic gradient/subgradient descent
- Batched gradient/subgradient descent
- Maximum-likelihood estimation
- Optimal MMSE estimation and Classical Regression
- Support Vector Machines
- K-means and Nearest Neighbor Rule

Please pick a problem you wish to tackle as a group of 2-3 people, and inform me regarding it. I will evaluate if it is challenging enough and give you the go-head. Individual projects are also permitted. Do not feel limited to the use of algorithms learned in class. You may explore new algorithms as well. However, pick your problem based on the time left in class to do the project.

Project requirements:

- The project must demonstrate clear understanding of the algorithms learned in class. It is also encouraged to implement or study algorithms not covered in class.
- When implementing an algorithm you learned in class, you may not use a package to solve it. You may *compare* your implementation to a package implementation, however.
- The use of the theory we learned in class (e.g., setting of step-sizes, regularization, etc) must be demonstrated.
- There must be comparisons and contrasts between different algorithm settings and/or different algorithms entirely.
- A Powerpoint presentation (20 min including question time) will be done in class during the last lectures.
- You must submit your project idea by 5/15 to get approval through: https://goo.gl/forms/eKTO4J9NobQMwDzT2

Suggested problem types:

- Pick a dataset from the UCI machine learning repository (http://archive.ics.uci.edu/ml/index.php) or Kaggle and evaluate several of appropriate algorithms you learned on it.
- Pick a challenge from the BigData Cup Challenges (http://cci.drexel.edu/bigdata/bigdata2018) or www.kaggle.com and run some of the algorithms you learned (or learned outside of class) on it.
- Theoretically analyze an algorithm not covered in class, but is of interest to you.
- Implement a collection of adaptive-filters (see Prof. Sayed's *Adaptive Filters* book) on a problem of interest.

Submission:

In addition to giving an in-class presentation, please submit the presentation and code online through the class website. The code-base should be complete and should include a README file that provides instructions on how I can deploy/run your code.