STATS 202A: Statistical Programming

Fall 2015

Instructor: Ying Nian Wu, MS8971, office hour: TR 2-3pm.

Special reader: Levon Demirdjian

The purpose of this course is to teach the art of statistical programming in R, Python, and C/C++, by writing computer code to implement the following core algorithms in statistical computing.

* Least squares regression, sweep operator, QR decomposition
* Eigen computation, Principal Component Analysis
* Logistic regression, Newton-Raphson
* Lasso, coordinate descent, boosting, solution path
* Feed-forward neural network, back-propagation
* EM algorithm, Gaussian mixture, factor analysis
* Random number generators, Monte Carlo integration
* Metropolis algorithm, Gibbs sampling, Bayesian posterior sampling

When going through the above topics, the focus will be on algorithms and especially programming, instead of theories of learning, inference and computing.

We shall also touch on important issues such as data sets, graphics, packages, related languages, etc.

The coursework consists of attendance (5%), weekly homework assignment (65%) and final exam (30%).

There are no required textbooks. Lecture notes, handouts and other resources will be posted along the way.

The goal is that you will become a skilled programmer in R and Python, and build a treasurable collection of useful code and documentations for your future career.