

SDS 383C

Statistical Modeling I

Fall 2016

Professor
Office Hours
Location
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Syllabus

Course Description

This course provides an introduction to Statistical modeling from mostly a classical aspect. For the first part, we will work on parametric models, whereas the second half will deal with non-parametric models and inference methods. If time permits we will work a bit on semi-parametric models as well. Here is a rough list of topics we would cover.

1. Recap
 - Convergence of random variables
 - The awesomeness and limitations of MLE
2. Parametric models
 - Linear models
 - Model selection
 - Naive Bayes and Logistic regression
 - Mixture models, Missing data
 - Models for cluster analysis
 - Over dispersion, robust estimators
 - Hypothesis tests
 - Bayesian inference and MCMC
3. Non-parametric models

- Density estimation
- Kernel regression

Prerequisites Students are expected to have a good familiarity with basic probability and statistics. If you are familiar with chapters 1-4 and 8-9 of Bertsekas and Tsitsiklis, and/or have taken Math 408M (Multivariate calculus), Math 341 (Linear Algebra) you should be fine. If not, please come see the instructor.

Textbook

The instructor will follow a collection of sources.

- Main—Elements of Statistical Learning by Trevor Hastie, Robert Tibshirani and Jerome Friedman (available online)
- All of Statistics and All of non-parametric Statistics by Larry Wasserman

Course website

Slides, homework problems and any additional material will be posted at www.cs.cmu.edu/~psarkar.

Grades will be posted at canvas.utexas.edu.

Evaluation

Your grade will be assigned in the following way:

| | |
|---------------|-----|
| Scribe notes | 5% |
| Homework | 30% |
| Midterm | 30% |
| Final project | 35% |

Homework will be assigned (approximately) bi-weekly, as described in the schedule below. There will be 5-7 homework assignments in total. Homework is to be done on an individual basis; group submissions are not accepted. Homeworks need to be turned in class when they are due. Late homeworks will not be accepted.

Every homework will have a mixture of theoretical problems and data analysis problems. You will be expected to write code in R/matlab. R is freely available online. Matlab is better for matrix computations.

Requests for Regrade

Clerical requests will be corrected without hassle. Other regrading requests must be submitted in writing within one week (7 days) of the exam's return. Be aware that the entire exam will be subject to regrading, and grades may go up or down.

Students with Disabilities

Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259, <http://www.utexas.edu/diversity/ddce/ssd/>.

Religious Holy Days

By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Scholastic Honesty

We expect students to behave with integrity. Students found Cheating on exams or homework will receive a score of zero for that exam or assignment, and may be subject to additional disciplinary action. For more information on the University of Texas scholastic dishonesty policy, see the 2006-2007 General Information Catalog, Appendix C.

Campus Safety

Please note the following recommendations regarding emergency evacuation from the Office of Campus Safety and Security, 512-471-5767, <http://www.utexas.edu/safety/>:

- Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.
- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
- Students requiring assistance in evacuation should inform the instructor in writing during the first week of class.
- In the event of an evacuation, follow the instruction of faculty or class instructors.
- Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.
- Behavior Concerns Advice Line (BCAL): 512-232-5050
- Further information regarding emergency evacuation routes and emergency procedures can be found at: <http://www.utexas.edu/emergency>.