6.867: Fall 2017: Calendar and Course Information

Stellar and Piazza We will use Stellar for posting class material and distributing grades.
`http://stellar.mit.edu/S/course/6/fa17/6.867/`
We will use Piazza for making announcements, and managing discussions. *Be sure you are enrolled*:
`http://piazza.com/mit/fall2017/6867/home`.

Books

- **[B]** *Pattern Recognition and Machine Learning*, Bishop; Springer, 2007.
- **[EH]** *Computer Age Statistical Inference*, Efron and Hastie; Cambridge University Press, 2016.
- **[JWHT]** *An Introduction to Statistical Learning:* , James, Witten, Hastie, Tibshirani; Springer, 2013. Easy read, very pragmatic.

Calendar

Date	Topic	Reading	Assign
9/7	Introduction, Overview, Basics	[B, 1.1–1.5]	HW0 Out
9/12	Regression: Risk Min., Max likelihood	[B, 3.1]	
9/14	Linear Regression: Shrinkage, Bias-Variance	[B, 3.2]	HW0 Due; HW1 Out
9/19	Linear Regression: Bayesian	[B, 3.3]	
9/21	Classification: Discrim analysis; perceptron	[B, 4.1]	
9/26	Classification: Logistic reg	[B, 4.3]	Proj: Milestone 0
9/28	Classification: Support vector machines	[B, 7.1]	HW1 Due
10/3	Kernels	[B, 6.1–6.2]	HW1 Rev Due; HW2 Out
10/5	K-Nearest neighbors, Nadaraya-Watson	[B, 2.5, 6.3]	Proj: Milestone 1
10/10	*Holiday*		
10/12	Neural nets: basics, back-propagation	[EH, 18.1–18.2]	Proj: Milestone 2
10/17	Neural nets: regularization, CNNs, auto-encoders	[EH, 18.3–18.5]	
10/19	**Exam 1 7:30 - 9:30 PM**		
10/24	Neural nets: recursive neural networks, LSTM	*TBD*	HW2 due; Proj: Milestone 3
10/26	Neural nets: attention, memory, domain adaptation	*TBD*	HW3 out
10/31	Tree-models, Bagging, Random Forest	[EH, 17.1], [JWHT, 8.1–8.2]	HW2 rev due
11/2	Mixture models: EM, K-means	[B, 9.4][B, 9.1][B, 9.3.2]	
11/7	Hidden Markov models: Learning and Inference	[B, 13.1–13.2]	Proj: Milestone 4
11/9	Topic models	*TBD*	
11/14	Deep generative models	*TBD*	HW3 Due
11/16	Sampling method: Why, MCMC, Gibbs	[B, 11.2–11.3]	HW3 rev
11/21	Matrix data: principal component analysis	[B, 12.1]	Proj: Milestone 5
11/23	*Holiday*		
11/28	Matrix data: recommendation systems	*TBD*	
11/30	**Exam 2 7:30 - 9:30**		
12/5	Matrix data: non-neg factor, PMI/Word2Vec	*TBD*	
12/7	Reinforcement Learning – Part I	*TBD*	
12/12	Reinforcement Learning – Part II	*TBD*	Proj: Milestone 6

Recitations. In recitations, we will work through examples and answer questions. **Your recitation assignment should be visible in Stellar.**

- If you are assigned a recitation in Stellar, please attend your assigned recitation, or move yourself, *in Stellar*, to a recitation that has room in it.
- If you are not assigned a recitation in Stellar, you may attend any recitation on 9/8. Please email `6867-staff-17@mit.edu` so we can straighten out your registration.

Grading. We will have two types of homework: exercises and major homework. Exercises will not be graded nor will they factor directly into your final grade. However, they are critical for learning the material and if you don't do them you will almost certainly do very poorly on the exams. There will be three major homework assignments that are more like mini-projects, requiring implementation and/or experimentation. We will ask you to turn in a coherent paper with graphs and analysis. We will do "peer review" of the homework assignments. Each student will be randomly assigned three other students' assignments (anonymously) and asked to write a short (one or two paragraph) evaluation of each one. These evaluations will both factor into the grade assigned to the assignment being evaluated and factor into the grade assigned to the student doing the evaluation.

There are two exams; the second one covers the material from the whole course.

The breakdown for final grades will be:

3 major homeworks:	30%	Project	20%
Exam 1	25%	Exam 2	25%

Homeworks can be done individually or in groups of 2.

Project. Projects are expected to be done in groups of size 3 (exceptions may be allowed for size of 2). For projects, we will follow strict milestones. There are seven of them with project grade distribution:

0. Grade 5%. Decide on *Team* of size 3.
1. Grade 5%. Decide on *Data Set* and *Goals* associated with it.
2. Grade 5%. Decide on *Methods* to use for data processing to achieve defined goals.
3. Grade 5%. Decide on *Implementation / Algorithmic* environment (packages, etc.) that will be utilized.
4. Grade 5%. Produce Initial Results.
5. Grade 5%. Reason about results, interpret and iterate till goals are met.
6. Grade 70%. Project report of length 2 pages.

Each project team will be assigned a TA and an Instructor. It is each team's responsibility to receive approval from their assigned TA for each of the milestones in accordance with the deadlines and desired input.

There will be no extensions for homeworks or project milestones of except in case of illness or personal problems as verified by the deans. The penalty for turning homeworks or project milestones in late is 20% per day.

Office hours. Office hours will be posted on Piazza.

Programming. There will be implementation assignments that are written with the assumption that you can use Python (e.g. Numpy/Scipy, Scikit learn, Tensor Flow) or MATLAB. You can use any language or system that you want to, but the TAs will only help students working with Python or MATLAB.

Instructors.
Devavrat Shah devavrat@mit.edu
David Sontag dsontag@mit.edu
Suvrit Sra suvrit@mit.edu

TAs.
Nirav Bhan niravb@mit.edu
Hongge Chen chenhg@mit.edu
Hyunghoon Cho hhcho@mit.edu
Michael S Fleder mfleder@mit.edu
Curtis George Northcutt cgn@mit.edu
Ardavan Saeedi ardavans@mit.edu
Lawrence J Sun sunl@mit.edu
Zhi Xu zhixu@mit.edu
Chengkai Zhang ckzhang@mit.edu
Liang Zhou zhoul@mit.edu

Staff mailing list 6867-staff-17@mit.edu