CS 189 at UC Berkeley

Syllabus

Technology

Piazza

We will use Piazza as the 'one-stop shop' throughout the semester: for a Q&A forum and for official announcements. Enrollment in Piazza is mandatory. If you have questions about anything related to the course, please post them on Piazza rather than emailing the instructor or TAs. Please do not post anything resembling a solution to a homework problem before it's due. If in doubt, you should make your post private (visible to instructors only). We always welcome any feedback on what we could be doing better. See the Piazza Etiquette section for more on using Piazza. To join the class on Piazza, follow this link piazza.com/berkeley/spring2018/compsci189289a.

Gradescope

All homework will be submitted through Gradescope, and all homework and exam grades will be given back through Gradescope. To join the class on Gradescope, go to gradescope.com and enter this code: 9BPXV7

Instructional Servers

CS189 does not make use of instructional accounts, but to get a computer account for this course, go to http://inst.eecs.berkeley.edu/webacct, or click 'WebAcct' on http://inst.eecs.berkeley.edu.

Note that no electronics is permitted at lecture except by explicit permission from the instructor.

Exams

Midterm is on Wednesday, February 28, time TBA.

Self Grading

To complete self-grades, look for the self-grade form in that week's solutions file. After filling out the form, click 'download JSON' and submit that JSON to Gradescope. When filling out self-grade form, use the following guidelines:

- 0 = Didn't attempt or very very wrong,
- 2 = Got started and made some progress, but went off in the wrong direction or with no clear direction,
- 5 = Right direction and got half-way there,
- 8 = Mostly right but a minor thing missing or wrong,
- 10 = 100% correct.

At the end of the semester, all self-grades are re-calibrated. Note that everyone in the class will introduce noise when self-grading, and we'll have this distribution;we don't expect perfect self-grades. if you are not *deliberately* mis-grading, then you will be fine.

Topics

- 0: Least Squares Framework
- 1: Features, Regularization, Hyperparameters and Cross-Validation
- 2: Maximum-likelihood, Interpretation of Ordinary Least Squares, MAP interpretation of regularization, and the bias/variance tradeoff understanding of overfitting.
- 3: Weighted least squares and non-white noise, total least-squares and eigenmethods for optimization
- 4: Total least squares, Principal component analysis
- 5: canonical correlation analysis, nonlinear least squares, and gradient descent
- 6: Neural nets and stochastic gradient descent
- 7: Regression approaches to classification: generative models like LDA/QDA and discriminative models including neural nets and logistic regression
- 8: Choosing loss functions, hinge-loss and SVMs
- 9: Kernel methods and nearest neighbor techniques
- 10: Spring Break
- 11: Decision trees, boosting, bagging, and ensemble methods
- 12: Convolutional neural nets and regularization revisited
- 13: Unsupervised Learning: Nearest Neighbors
- 14: Sparsity and Decision Trees
- 15: Clustering and Generative Adversarial Networks
- 16: Supervised feature discovery by metric learning and contrastive loss

Materials

All materials can be found on the front page.

Notes

There is no textbook for this class. Instead, there is a set of fairly comprehensive lecture notes. Make sure you revisit the notes after lecture. Each note may be covered in one or more lectures.

Discussions

Release Schedule: Discussion worksheets for the Tuesday discussions are released the day before at 10 p.m. Discussion solutions **may be** published Tuesday evening. We will do our best but cannot guarantee discussion solutions.

The discussion sections may cover new material and will give you additional practice solving problems. You can attend any discussion section you like.

Homeworks

Release Schedule: Every Friday at 10 p.m. (with some exceptions in case of HW extensions), homework for the coming week is released. Homework is then due on Gradescope the following Friday at 10 p.m.; the solutions for that homework will be released 2 hours after the deadline. You are expected to self-grade your homework and submit your self-grades by the following Tuesday. Reader-graded subsets of the homework are returned to you, graded, approximately one week after the deadline.

All homeworks are graded for accuracy and it is highly recommended that you do them. You are expected to show your work and justify all of your answers. Your lowest homework score will be dropped, but this drop should be reserved for emergencies. See the self_grade form (instructions on form).

Extra Credit

We will award extra credit for the following. Please submit such materials through this Google Form:

- Discussion Solutions (before official solutions are released)
- Lecture Scribe Notes (LaTeX'ed. If we can't read it, it doesn't count!)
- Memes or Poems (post on Piazza too)

Cheating

Ethical behavior is an important part of being an engineer. It is a part of our responsibility to act ethically and honestly, and moreover, ethical behavior is what helps you learn best. Cheating is fundamentally dishonest and antisocial behavior. We have a zero-tolerance policy for cheating. First-time offenses will result in negative points for the corresponding assignment and a meeting with the professors and/or head TAs. Second-time offenses will see more serious consequences, possibly a failing grade and definitely a referral to the Center for Student Conduct.

Please note that online communication mediums outside of Piazza should not be used to discuss assignment content. In general, use Piazza to discuss content. The only limited exceptions to this are online communication mediums between you and the collaborating individuals explicitly listed on your homework assignment. Looking at online solutions from previous semesters or other students is forbidden, as is sharing of your solutions with others. Furthermore, students all have an affirmative duty to report possible cases of cheating or unauthorized communication to the course staff, immediately. Acknowledgement of and failure to report cheating implicates the bystander since this is academic misconduct. Cheating hurts us all and engineering ethics requires us to point out wrongdoing when we are aware of it.

Submit cheating incident reports via this form.

Collaboration

You are encouraged to work on homework problems in study groups of two to four people (collaboration at HW party is an exception to this limitation); however, you must **always write up the solutions on your own**. You are not permitted to look at the final written solution even for members of your own study group. Similarly, you may use books or online resources (not solutions from previous terms, etc.) to help solve homework problems, but you must **always credit all such sources in your writeup and you must never copy material verbatim**. We believe that most students can distinguish between helping other students and cheating. Explaining the meaning of a question, discussing a way of approaching a solution, or collaboratively exploring how to solve a problem within your group is an interaction that we strongly encourage. But you should write your homework solution strictly by yourself so that your hands and eyes can help you internalize this material. You must explicitly acknowledge everyone whom you have worked with or who has given you any significant ideas about the homework. Not only is this good scholarly

conduct, it also protects you from accusations of being a jerk or free-rider regarding your colleagues' ideas.

Warning: Your attention is drawn to the Department's Policy on Academic Dishonesty. In particular, you should be aware that copying or sharing solutions, in whole or in part, from other students in the class or any other source without acknowledgment constitutes cheating. Any student found to be cheating risks automatically failing the class and being referred to the Office of Student Conduct.

However, we are very fair. No student will be accused of cheating without a human being looking over their case. And nobody will be sent to Student Conduct without at least the head TA and professor concurring that this is warranted and makes sense. Algorithms help us focus our attention, but decisions are made by compassionate human beings.

Grading

CS189

- Homework: 30%
- Midterm: 30%
- Final: 40%

CS289

- Homework: 30%
- Midterm: 25%
- Project: 10%
- Final: 35%