

Machine Learning and Computational Statistics (DS-GA 1003)

David Rosenberg

New York University

January 27, 2016

- Class webpage: <https://davidrosenberg.github.io/ml2016>
 - Syllabus on the website

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- Class Times
 - Wednesdays “Lecture”: 7:10pm - 9pm (WWH 109)
 - Thursdays “Lab”: 7:10pm - 8pm (WWH 109)
 - **(Both are required.)**

Lab Sessions

- Some led by TA, some by me
- Most will be lecture format
- Sometimes we'll review homeworks or have test prep
- One-hour test during lab session
- Meetings with project advisors

Course Staff

- TA: Levent Sagun
- Graders:
 - Peter Li (Head Grader)
 - Lucy Wang
 - Jacqueline Gutman
 - Tian Wang
- Project Advisers:
 - Kurt Miller, Kush Varshney, Brian d'Alessandro, and more TBD.

Evaluation

- About 8 homeworks (40%)
- Two tests (40%)
 - One-Hour Test (15%) in Week 6
 - Two-Hour Test (25%) in Week 11
- Project (20%)
 - Poster session during exam week (Week 15)

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- Extra Credit Opportunities
 - Optional homework problems
 - Significant contributions to Piazza and in-class discussions
 - Primarily used to boost a borderline grade
 - At most, increases final grade by half a letter (e.g. B+ to A-)

Homework (40%)

- First assignment out Thursday – Due in one week.
- Submit with NYU Classes: <https://newclasses.nyu.edu>
- Homeworks should be **submitted as a PDF document**.
- Late homework: Accepted up to 48 hours late with 20% penalty

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- Collaboration is fine, but
 - Write up solutions and code on your own
 - List names of who you talked to about each problem

Projects (20%)

- Find some new data or new approach to old data
- Project philosophy the same as in these courses:
 - <http://cs.nyu.edu/~dsontag/courses/ml14/assignments/projects.html>
 - <http://web.stanford.edu/class/cs221/project.html>

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- Logistics:
 - 3 students per group
 - First meeting with advisors in March (date TBD)
 - Project proposal due around Spring Break (date TBD)

Prerequisites

- DS-GA 1001: Introduction to Data Science
- DS-GA 1002: Statistical and Mathematical Methods
- Math
 - Multivariate Calculus
 - Linear Algebra
 - Probability Theory
 - Statistics
- Python programming (numpy)

General Philosophy

- Mastery vs Performance
 - (understanding vs “getting the grade”)

Figure from <https://www.quora.com/Why-is-L1-regularization-supposed-to-lead-to-sparsity-than-L2>.



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- Mastery vs Performance
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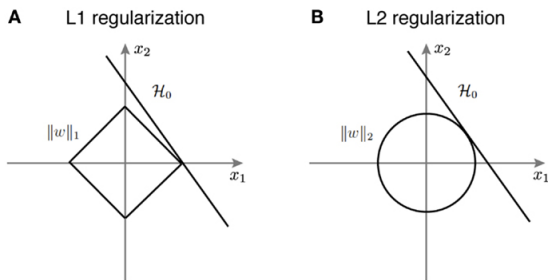


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 - ERM, regularization, SVM, kernels, ensemble methods

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- Misc. and Advanced Topics
 - dimensionality reduction, structured prediction

Questions?

- What are you looking to get out of the course?
- Questions for me?