9.520/6.860: Statistical Learning Theory and Applications

- Class: Tue, Thu 11:00 am - 12:30 pm, 46-3002
- Office Hours: Wednesday 2:00 pm – 3:00 pm (in person), Friday 1:00 pm - 2:00 pm (Zoom link available on Canvas)
- Web: https://cbmm.mit.edu/9-520
- Contact: 9.520@mit.edu
- 9.520/6.860 will use Canvas: https://canvas.mit.edu/courses/11298
- Also check Canvas announcements for updates
- This year’s course will be in-person until MIT policy changes.
- Please fill out this registration form at https://forms.gle/UQQvNPPrNeHpxLtH6
Material

Slides— will be posted (for most lectures) on the website and Canvas

Videos— Recordings of lectures will be made available on Canvas

Notes—

L. Rosasco and T. Poggio, *Machine Learning: a Regularization Approach*, MIT-9.520 Lectures Notes, Manuscript, (will be provided)

For feedback on book (typos, errors, ...)
https://goo.gl/forms/pQcewnsAV3lCNoyr1
Faces

Instructors:
Faces

• Instructors:
  • Lorenzo Rosasco
Faces

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  • Lorenzo Rosasco
  • Tomaso Poggio
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  • Akshay Rangamani (head TA 1)
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  • Tomaso Poggio
  • Akshay Rangamani (also head TA 1)
  • Andy Banburski (also head TA 2)
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  • Akshay Rangamani (also head TA 1?)
  • Andy Banburski (also head TA 2?)

• TAs:
  • Michael Lee
Faces

• Instructors:
  • Lorenzo Rosasco
  • Tomaso Poggio
  • Akshay Rangamani (also head TA 1?)
  • Andy Banburski (also head TA 2?)

• TAs:
  • Michael Lee
  • Suleman Zaidi
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<td>The Course at a Glance</td>
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<td>Statistical Learning Setting</td>
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<td>Class 03</td>
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<td>Implicit Regularization with linear networks</td>
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<td>Approximation and Estimation Error</td>
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<td>Stability of Ridgeless Regression</td>
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<td>Class 12</td>
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<td>Introduction to Deep Networks</td>
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<td>Deep Learning Theory: Approximation</td>
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<td>Deep Learning: Optimization and Dynamics</td>
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<td>Group Invariants in Vision</td>
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<td>Invariance, Neurons, Synaptic Plasticity, Development</td>
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<td>TP + Thomas Serre + Gabriel Kreiman</td>
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<td>Graph networks</td>
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<td>Class 22</td>
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<td>Statistical inference from dependent samples</td>
<td>Costis Daskalakis</td>
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<td>Neural Assemblies</td>
<td>Christos Papadiimitriou + Santosh Vempala</td>
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<td>Tue Dec 07</td>
<td>Adversarial examples</td>
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<td>Class 25</td>
<td>Thu Dec 09</td>
<td>Sample and computational complexity of deep networks</td>
<td>Eran Malach</td>
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Grading policies

Problem sets (0.45)
- 3 problem sets (0.15 each)
  - 3 - 4 questions (exercises and/or MATLAB)
  - Due in 10 days (out on a Thursday, and due on Sunday)
  - Late policy on next slide
- typeset in LaTeX (template will be provided)
- Online submission on Canvas by due date

Project (0.45)
- See later

Class Participation (0.10)
- Attending class lectures is required!
- Discussions during class - ask questions!
- Discussions on Canvas
Problem sets

- Problem sets (0.45)
  - 3 problem sets (0.15 each)
    - 3 - 4 questions (demonstrations/exercises + short MATLAB)
    - 10 days due!
  - typeset in LaTeX (template provided)
  - online submission on Canvas by due date

Late policy

- All students have 6 free late days (to be used on psets and project proposal)
- You may use them as you see fit
- Beyond this, we will not accept assignments

Dates (due times are 11:59 pm). Submission online (on Canvas).

- Problem Set 1, out: Tue. Sep. 21, due: Sun. Oct. 3
- Problem Set 2, out: Tue. Oct. 12, due: Sun., Oct. 24
- Problem Set 3, out: Tue. Nov. 2, due: Sun., Nov. 14

Collaboration policy: You may discuss with others but need to work out your own solution.
This is not a data science course, so we will not consider data preparation as contributing to the grade.

Final Evaluation: project report (5 pages for individuals, 8 pages for teams, NeurIPS style)

Dates
- Abstract and title: Oct. 28
- Feedback and approval: Nov. 4
- Final Report due: Dec. 9