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MATH 751
SPRING 2021

STATISTICAL MACHINE LEARNING

Tuesday, Thursday, 5:00-6:15

This course will cover the basics of machine learning and statistical learning theory. Techniques in these areas are now widely used in engineering, statistics, computational biology and neuroscience, as well as many related areas.

We will cover a variety of topics including support vector machines, kernel methods, neural networks, data mining, boosting, graphical models, and high dimensional problems. Applications of these methods will also be discussed.

Much of the material involves developments in the field of machine and statistical learning from just the past decade or so. And many topics are from areas still under active development. The goal of the course is to both serve as an introduction to the underlying problems and principles and key methodologies in this field and to develop an improved facility for quickly and efficiently navigating the mix of analytical and computational aspects necessary for 'getting up to speed' on approaches in this area.

Additional topics will include supervised and unsupervised machine learning, regression and classification methods, spline and kernel methods, and regularized basis methods.

Text: T. Hastie, R. Tibshirani, and J. Friedman. Elements of Statistical Learning: Data Mining, Inference, and Prediction (Second Edition). Springer; New York. 2009.

Suggested prerequisites: Knowledge of probability theory (MA 581), linear algebra, and regression and linear models (e.g. MA 575), or consent of the instructor.

For further information, contact

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