

Summer 2020

CS 675-850: Introduction to Machine Learning

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CS 675: Introduction to Machine learning

Summer 2020

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Textbooks:

Introduction to Machine Learning by Ethem Alpaydin (Not required but strongly recommended)

Learning with kernels by Scholkopf and Smola (Recommended)

Foundations of Machine Learning by Rostamizadeh, Talwalkar, and Mohri (Recommended)

Grading: 20% mid-term, 30% final exam, 20% course projects, 30% programming assignments

[Grading instructions](#)

Course Overview: This course is a hands-on introduction to machine learning and contains both theory and application. We will cover classification and regression algorithms in supervised learning such as naive Bayes, nearest neighbor, decision trees, random forests, linear regression, logistic regression, neural networks, and support vector machines. We will also cover dimensionality reduction, unsupervised learning (clustering), feature selection, kernel methods, hidden Markov models, gradient descent, big data methods, and representation learning. We will apply algorithms to solve problems on real data such as digit recognition, text document classification, and prediction of cancer and molecular activity.

Course plan:

Topic	Date	Notes
Introduction, Bayesian learning, and Python	01/22/20	Introduction Background <ul style="list-style-type: none">• Basic statistics• More basic probability and statistics• Applied statistics• Linear algebra background• More linear algebra Unix and login to NJIT machines <ul style="list-style-type: none">• Basic Unix command sheet• Instructions for AFS login Textbook reading: All of chapter 1, 2.1, 2.4, 2.5, 2.6, 2.7
Bayesian learning		Bayesian learning Bayesian decision theory example problem Textbook reading: 4.1 to 4.5, 5.1, 5.2, 5.4, 5.5
Python		Python More on Python Python cheat sheet Python practice problems

	Python example 1 Python example 2 Python example 3
Nearest means and naive-bayes	Nearest mean algorithm Naive Bayes algorithm Assignment 1 Predicted labels for naive bayes on breast cancer trainlabels.0 mean initialized to 0.01