

AIL 7024

Machine Learning

Sem 1, 2026-27

Lec 1: Introduction

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What Comes to Mind



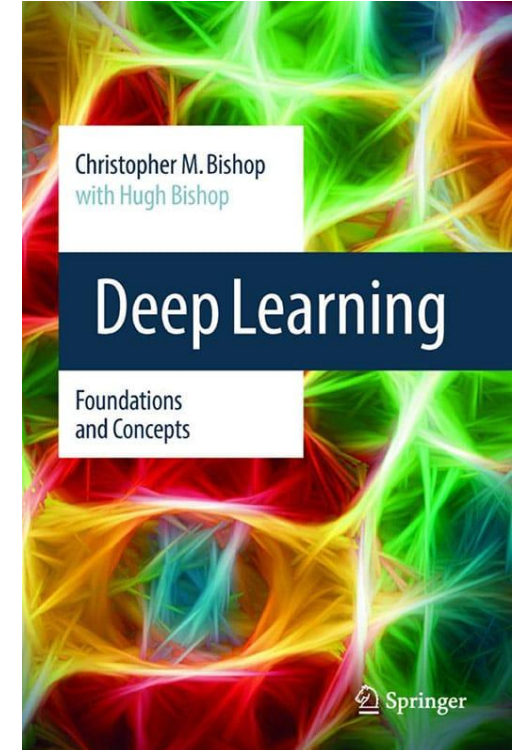
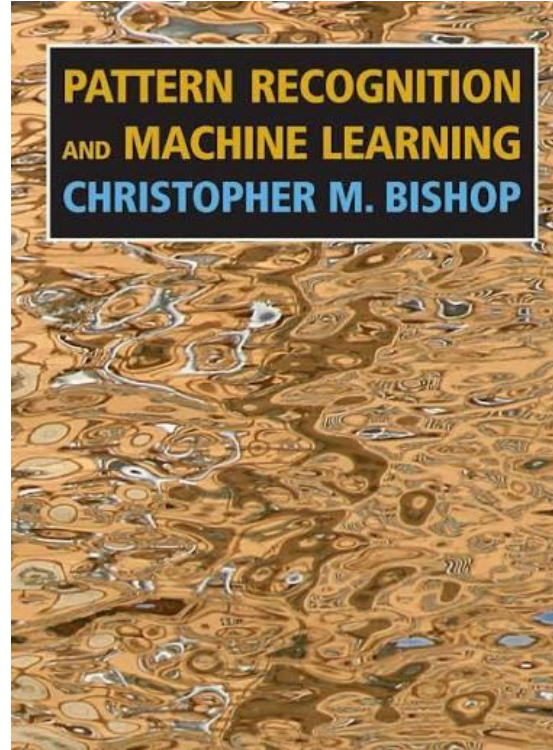
Course Contents

- Sampling from probability distributions
 - Univariate sampling
 - Rejection sampling
- Principles of model learning
 - Polynomial curve fitting
 - Max likelihood estimation
 - Decision theory
 - Bias-variance tradeoff
- Regression
 - Linear regression
 - Basis functions
 - Neural Networks

- Classification
 - Logistic Regression
 - Multiclass classification
 - Generative classifiers
- Autoregressive Generation
 - N-gram language models
 - Max likelihood training
- Latent variable models
 - Unobserved variables
 - Gaussian mixture models
 - Expectation maximization
 - Variational Autoencoder

Course Contents & Textbooks

- Diffusion models
 - Score-based models
 - Return to sampling: MCMC
 - Denoising
- Further topics (subset based on time)
 - Flow-based models
 - GANs
 - Autoencoders
 - Reinforcement learning
 - Influence functions



Other Logistics



- Components of work (weights)
 - Examinations (60 ± 10)
 - Minor and major
 - Potentially quizzes (TBD)
 - Assignments (40 ± 10)
 - Programming heavy
 - May include theory
 - How many? 3-5 (TBD)
- Forum and submission
 - Piazza
 - Moodle
- Compute
 - HPC (as needed)