Probabilistic Machine Learning
An Introduction

Kevin P. Murphy

A comprehensive undergraduate-level introduction integrating classical machine learning with deep learning

Kevin Murphy’s landmark work on probabilistic machine learning and Bayesian decision theory has been updated for the deep learning era. The first of two volumes, this book makes machine learning accessible for advanced undergraduate courses.

Highlights:

- Background material on linear algebra, optimization, probability, and statistics
- A focus on supervised learning using various model types (linear, nonlinear/deep, nonparametric) with some coverage of unsupervised learning
- Python code to reproduce all figures in the book, using scikit-learn, JAX, Tensorflow, and Pytorch
- End-of-chapter exercises offer practical complement to the theoretical topics

Order your digital exam copy:
Visit mitpress.mit.edu/PML and click Request Exam/Desk Copy

For questions or to share your thoughts: mitpress_textbooks@mit.edu

Probabilistic Machine Learning: An Introduction
By Kevin P. Murphy
March 1, 2022
Hardcover | $110.00 | 864 pp. | 8 in x 9 in
444 illustrations | ISBN: 9780262046824
Adopters of *Machine Learning: A Probabilistic Perspective* transitioning to Murphy's new book will find eight new chapters, a revamped organization to best reflect high level relationships between topics, many new references, and completely new software.


**Introduction**

I Foundations
2 Probability: univariate models
3 Probability: multivariate models
4 Statistics
5 Decision theory
6 Information theory
7 Linear algebra **NEW!**
8 Optimization **NEW!**

II Linear models
9 Linear discriminant analysis
10 Logistic regression
11 Linear regression
12 Generalized linear models

III Deep neural networks
13 Neural networks for structured data **NEW!**
14 Neural networks for images **NEW!**
15 Neural networks for sequences **NEW!**

IV Nonparametric models
16 Exemplar-based methods
17 Kernel methods
18 Trees, forests, bagging and boosting

V Beyond supervised learning
19 Learning with fewer labeled examples **NEW!**
20 Dimensionality reduction
21 Clustering
22 Recommender systems **NEW!**
23 Graph embeddings **NEW!**

**COMING SOON:** a deep dive into probabilistic modeling and inference

**Probabilistic Machine Learning**

Advanced Topics
FORTHCOMING 2023

An advanced book for researchers and graduate students working in machine learning and statistics that reflects the influence of deep learning

Features contributions from top researchers and scientists from places such as Google, Deepmind, Amazon, Purdue, NYU, and the University of Washington covering topics including deep generative modeling, graphical models, Bayesian inference, reinforcement learning, and causality.