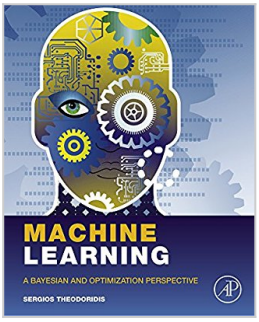

Machine Learning: A Bayesian and Optimization Perspective (Net Developers)

By Sergios Theodoridis

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This tutorial text gives a unifying perspective on machine learning by covering both probabilistic and deterministic approaches -which are based on optimization techniques – together with the Bayesian inference approach, whose essence lies in the use of a hierarchy of probabilistic models. The book presents the major machine learning methods as they have been developed in different disciplines, such as statistics, statistical and adaptive signal processing and computer science. Focusing on the physical reasoning behind the mathematics, all the various methods and techniques are explained in depth, supported by examples and problems, giving an invaluable resource to the student and researcher for understanding and applying machine learning concepts.

The book builds carefully from the basic classical methods to the most recent trends, with chapters written to be as self-contained as possible, making the text suitable for different courses: pattern recognition, statistical/adaptive signal processing, statistical/Bayesian learning, as well as short courses on sparse modeling, deep learning, and probabilistic graphical models.

- All major classical techniques: Mean/Least-Squares regression and filtering, Kalman filtering, stochastic approximation and online learning, Bayesian classification, decision trees, logistic regression and boosting methods.
- The latest trends: Sparsity, convex analysis and optimization, online distributed algorithms, learning in RKH spaces, Bayesian inference, graphical and hidden Markov models, particle filtering, deep learning, dictionary learning and latent variables modeling.
- Case studies - protein folding prediction, optical character recognition, text authorship identification, fMRI data analysis, change point detection, hyperspectral image unmixing, target localization, channel equalization and echo cancellation, show how the theory can be applied.
- MATLAB code for all the main algorithms are available on an accompanying website, enabling the reader to experiment with the code.

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Editorial Review

Review

"Overall, this text is well organized and full of details suitable for advanced graduate and postgraduate courses, as well as scholars…" --**Computing Reviews**

"Machine Learning: A Bayesian and Optimization Perspective", Academic Press, 2105, by Sergios Theodoridis is a wonderful book, up to date and rich in detail. It covers a broad selection of topics ranging from classical regression and classification techniques to more recent ones including sparse modeling, convex optimization, Bayesian learning, graphical models and neural networks, giving it a very modern feel and making it highly relevant in the deep learning era. While other widely used machine learning textbooks tend to sacrifice clarity for elegance, Professor Theodoridis provides you with enough detail and insights to understand the "fine print". This makes the book indispensable for the active machine learner." --Prof. Lars Kai Hansen, DTU Compute - Dept. Applied Mathematics and Computer Science Technical University of Denmark

From the Back Cover

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Key Features Include:

- An introductory chapter on related mathematical tools
- All major classical techniques: Mean/Least-Squares regression and filtering, Kalman filtering, stochastic approximation and online learning, Bayesian classification, decision trees, logistic regression and boosting methods
- A presentation of the physical reasoning, mathematical modeling and algorithmic implementation of each method
- The latest trends: Sparsity, convex analysis and optimization, online distributed algorithms, learning in RKH spaces, Bayesian inference, graphical and hidden Markov models, particle filtering, deep learning, dictionary learning and latent modeling
- Case studies - protein folding prediction, optical character recognition, text authorship identification,

fMRI data analysis, change point detection, hyperspectral image unmixing, target localization, channel equalization and echo cancellation, show how the theory can be applied
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About the Author
Sergios Theodoridis is Professor of Signal Processing and Machine Learning in the Department of Informatics and Telecommunications of the University of Athens.

He is the co-author of the bestselling book, Pattern Recognition, and the co-author of Introduction to Pattern Recognition: A MATLAB Approach.

He serves as Editor-in-Chief for the IEEE Transactions on Signal Processing, and he is the co-Editor in Chief with Rama Chellapa for the Academic

Press Library in Signal Processing.

He has received a number of awards including the 2014 IEEE Signal Processing Magazine Best Paper Award, the 2009 IEEE Computational Intelligence Society Transactions on Neural Networks Outstanding Paper Award, the 2014 IEEE Signal Processing Society Education Award, the EURASIP 2014 Meritorious Service Award, and he has served as a Distinguished Lecturer for the IEEE Signal Processing Society and the IEEE Circuits and Systems Society. He is a Fellow of EURASIP and a Fellow of IEEE.

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