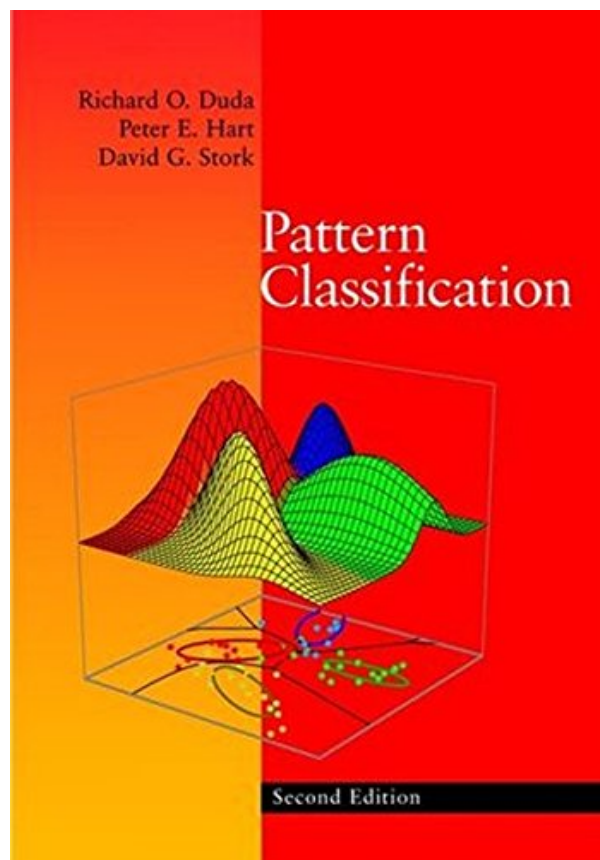# PATTERN CLASSIFICATION (PT.1) BY RICHARD O. DUDA, PETER E. HART, DAVID G. STORK
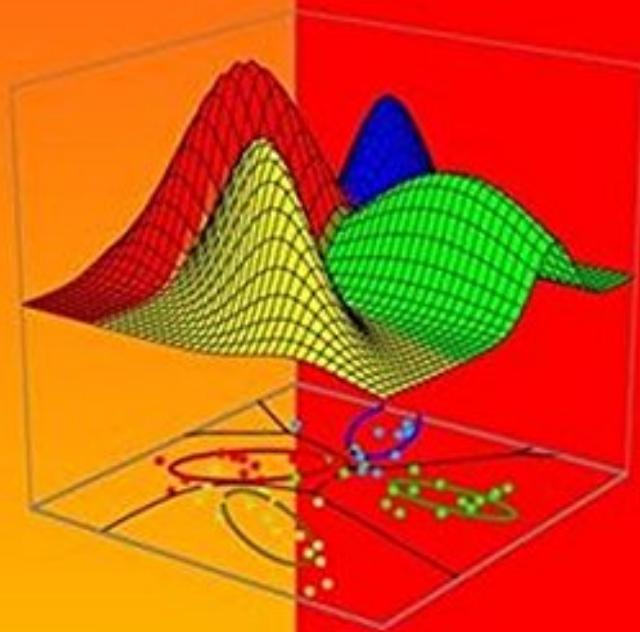

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An Instructor's Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department.

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- Number of items: 1
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35 of 35 people found the following review helpful.
excellent revision of a classical text on statistical pattern recognition
By Michael R. Chernick
The 1973 book by Duda and Hart was a classic. It surveyed the literature on pattern classification and scene analysis and provided the practitioner with wonderful insight and exposition of the subject. In the intervening 28 years the field has exploded and there has been an enormous increase in technical approaches and applications.
With this in mind the authors and their new coauthor David Stork go about the task of providing a revision. True to the goals of the original the authors undertake to describe pattern recognition under a variety of topics and with several available methods to cover each topic. Important new areas are covered and old but now deemed less significant are dropped. Advances in statistical computing and computing in general also dictate the topics. So although the authors are the same and the title is almost the same (note that scene analysis is dropped from the title) it is more like an entirely new book on the subject rthan a revision of the old. For a revision, I would expect to see mostly the same chapters with the same titles and only a few new chapters along with expansion of old chapters.

Although I view this as a new book, that is not necessarily bad. In fact it may be viewed as a strength of the book. It maintains the style and clarity of the original that we all loved but represents the state-of-the-art in pattern recognition at the beginning of the 21st Century.

The original had some very nice pictures. I liked some of them so much that I used them with permission in the section on classification error rate estimation in my bootstrap book. This edition goes much further with beautiful graphics including many nice three-dimensional color pictures like the one on the cover page.

The standard classical material is covered in the first five chapters with new material included (e.g. the EM algorithm and hidden markov models in Chapter 3). Chapter 6 covers multilayer neural networks (a totally new area). Nonmetric methods including decision trees and the CART methodology are covered in Chapter 8. Each chapter has a large number of relevant references and many homework exercises and computer exercises.

Chapter 9 is "Algorithm-Independent Machine Learning" and it includes the wonderful "No Free Lunch" theorem (Theorem 9.1), a discussion of the minimum desciption length principle, overfitting issues and Occam's razor, bias - variance tradeoffs,resampling method for estimation and classifier evaluation, and ideas about combining classifiers.

Chapter 10 is on unsurpervised learning and clustering. In addition to the traditional techniques covered in the first edition the authors include the many advances in mixture models.

I was particularly interested in that part of Chapter 9. There is good coverage of the topics and they provide a number of good references. However, I was a bit disappointed with the cursory treatment of bootstrap estimation of classification accuracy (section 9.6.3 on pages 485 - 486). I particularly disagree with the simplistic statement "In practice, the high computational complexity of bootstrap estimation of classifier accuracy is rarely worth possible improvements in that estimate (Section 9.5.1)". On the other hand, the book is one of the first to cover the newer and also promising resampling approaches called "Bagging" and "Boosting" that these authors seem to favor.

Davison and Hinkley's bootstrap text is mentioned for its practical applications and guidance for bootstrapping. The authors overlook Shao and Tu which offers more in the way of guidance. Also my book provides some guidance for error rate estimation but is overlooked.

My book also illustrate the limitations of the bootstrap. Phil Good's book provides guidance and is mentioned by the authors. But his book is very superficial and overgeneralized with respect to guiding practitioners. For these reasons I held back my enthusiasm and only gave this text four stars.

0 of 0 people found the following review helpful.
Great quality!
By Amazon Customer
The book seems to be bearly used at all. Great quality. Arrived on time as well. No complaints at all

29 of 34 people found the following review helpful.
A Very Bad Sequel
By Book Runner
I have now used this book 3 times for a class. While the 1st edition did a nice job of covering the material in its time, the additions to in the 2nd addition are a disaster. What the book has going for it is that it at least lists the necessary material for such a course in the table of contents. However, all the additional material is poorly explained at best. The problem sets are too few and the ones that are included are generally weak.

I have tried to use this book, but after constant student complaints and my own difficulty with the text, I have finally concluded that the problem lies with the text and not with the users.

I think an indicator of problems was the large number of errors in the first printing; large here is an understatement. Even in later additions, the 4th, the size of the errata is huge. I think this is indicative of the authors' attention to detail and seriousness in preparation. I have found similar errors and ambiguities in the associate Computer Manual.

The bottom line is that this book has seen its final appearance in our curriculum. I would use any other text, even an older one.

There is simply not enough room or time to point out all the problems with this text. Do yourself a favor if considering this text for a class. Don't bother.

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