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4 The Pattern Recognition Problem 4.1 A Simple Example; 4.2 Decision Rules; 4.3 Success Criterion; 4.4 The Best Classifier: Bayes Decision Rule; 4.5 Continuous Features and Densities; 4.6 Summary; 4.7 Appendix: Uncountably Many; 4.8 Questions; 4.9 References; 5 The Optimal Bayes Decision Rule; 5.1 Bayes Theorem; 5.2 Bayes Decision Rule; 5.3 Optimality and Some Comments; 5.4 An Example; 5.5 Bayes Theorem and Decision Rule with Densities; 5.6 Summary; 5.7 Appendix: Defining Conditional Probability; 5.8 Questions; 5.9 References; 6 Learning from Examples; 6.1 Lack of Knowledge of Distributions; 6.2 Training Data; 6.3 Assumptions on the Training Data; 6.4 A Brute Force Approach to Learning; 6.5 Curse of Dimensionality, Inductive Bias, and No Free Lunch; 6.6 Summary; 6.7 Appendix: What Sort of Learning?; 6.8 Questions; 6.9 References; 7 The Nearest Neighbor Rule; 7.1 The Nearest Neighbor Rule; 7.2 Performance of the Nearest Neighbor Rule; 7.3 Intuition and Proof Sketch of Performance; 7.4 Using more Neighbors; 7.5 Summary; 7.6 Appendix: When People use Nearest Neighbor Reasoning; 7.6.1 Who Is a Bachelor?; 7.6.2 Legal Reasoning; 7.6.3 Moral Reasoning; 7.7 Questions; 7.8 References; 8 Kernel Rules; 8.1 Motivation; 8.2 A Variation on Nearest Neighbor Rules; 8.3 Kernel Rules; 8.4 Universal Consistency of Kernel Rules; 8.5 Potential Functions; 8.6 More General Kernels; 8.7 Summary; 8.8 Appendix: Kernels, Similarity, and Features; 8.9 Questions; 8.10 References; 9 Neural Networks: Perceptrons; 9.1 Multilayer Feedforward Networks; 9.2 Neural Networks for Learning and Classification; 9.3 Perceptrons; 9.3.1 Threshold; 9.4 Learning Rule for Perceptrons; 9.5 Representational Capabilities of Perceptrons; 9.6 Summary; 9.7 Appendix: Models of Mind; 9.8 Questions; 9.9 References; 10 Multilayer Networks

Sommario/riassunto

A thought-provoking look at statistical learning theory and its role in understanding human learning and inductive reasoning. A joint endeavor from leading researchers in the fields of philosophy and electrical engineering, *An Elementary Introduction to Statistical Learning Theory* is a comprehensive and accessible primer on the rapidly evolving fields of statistical pattern recognition and statistical learning theory. Explaining these areas at a level and in a way that is not often found in other books on the topic, the authors present the basic theory behind contemporary machine learning.
