

Preface

The amount of data stored in the world's medical databases doubles every 20 months, and adequate health and health care will soon be impossible without proper data supervision from modern machine learning methodologies like cluster models, neural networks, and other data mining methodologies. In the past three years we completed three textbooks entitled "Machine Learning in Medicine Part One, Two, and Three" (ed. by Springer Heidelberg Germany, 2012–2013).

It came to our attention that physicians and students often lacked time to read the entire books, and requested a small book, without background information and theoretical discussions, and highlighting technical details. For this reason we produced a 100-page cookbook, entitled "Machine Learning in Medicine—Cookbook One," with data examples available at extras.springer.com for readers to perform their own analyses, and with reference to the above textbooks for those wishing background information. Already at the completion of this cookbook we came to realize that many essential machine learning methods were not covered. The current volume entitled "Machine Learning in Medicine—Cookbook Two" is complementary to the first. It is also intended for providing a more balanced view of the field, and as a must-read not only for physicians and students, but also for any one involved in the process and progress of health and health care.

Similar to the first cookbook, the current work will describe in a nonmathematical way the stepwise analyses of 20 machine learning methods, that are, likewise, based on three major machine learning methodologies:

Cluster Methodologies ([Chaps. 1–3](#)),
Linear Methodologies ([Chaps. 4–11](#)),
Rules Methodologies ([Chaps. 12–20](#)).

In extras.springer.com the data files of the examples are given (both real and hypothesized data), as well as eXtended Markup Language (XML), SPS (Syntax), and ZIP (compressed) files for outcome predictions in future patients. In addition to condensed versions of the methods, fully described in the three textbooks, a first introduction is given to SPSS Modeler (SPSS' data mining workbench) in the [Chaps. 15, 18, and 19](#), while improved statistical methods like various automated analyses and simulation models are in [Chaps. 1, 5, 7 and 8](#).

The current 100-page book entitled “Machine Learning in Medicine—Cookbook Two,” and its complementary “Cookbook One” are written as training companions for the 40 most important machine learning methods relevant to medicine. We should emphasize that all of the methods described have been successfully applied in the authors’ own research.

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Ton J. Cleophas
Aeilko H. Zwinderman

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Cleophas, T.J.; Zwinderman, A.H.

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