

Preface

Machine learning is a novel discipline concerned with the analysis of large and multiple variables data. It involves computationally intensive methods, like factor analysis, cluster analysis, and discriminant analysis. It is currently mainly the domain of computer scientists, and is already commonly used in social sciences, marketing research, operational research and applied sciences. It is virtually unused in clinical research. This is probably due to the traditional belief of clinicians in clinical trials where multiple variables are equally balanced by the randomization process and are not further taken into account. In contrast, modern computer data files often involve hundreds of variables like genes and other laboratory values, and computationally intensive methods are required. This book was written as a hand-held presentation accessible to clinicians, and as a must-read publication for those new to the methods.

Some 20 years ago serious statistical analyses were conducted by specialist statisticians. Nowadays there is ready access for professionals without a mathematical background to statistical computing using personal computers or laptops. At this time we witness a second revolution in data-analysis. Computationally intensive methods have been made available in user-friendly statistical software like SPSS software (cluster and discriminant analysis since 2000, partial correlations analysis since 2005, neural networks algorithms since 2006). Large and multiple variables data, although so far mainly the domain of computer scientists, are increasingly accessible for professionals without a mathematical background. It is the authors' experience as master class professors, that students are eager to master adequate command of statistical software. For their benefit, most of the chapters include all of the steps of the novel methods from logging in to the final results using SPSS statistical software. Also for their benefit, SPSS data files of the examples used in the various chapters are available at extras.springer.com.

The authors have given special efforts for all chapters to have their own introduction, discussion, and references sections. They can, therefore, be studied separately and without the need to read the previous chapters first. In addition to the analysis steps of the novel methods explained from data examples, also background information and clinical relevance information of the novel methods is given, and this is done in an explanatory rather than mathematical manner.

We should add that the authors are well-qualified in their field. Professor Zwinderman is president of the International Society of Biostatistics (2012–2015) and Professor Cleophas is past-president of the American College of Angiology (2000–2012). From their expertise they should be able to make adequate selections of modern methods for clinical data analysis for the benefit of physicians, students, and investigators. The authors have been working and publishing together for over 10 years, and their research of statistical methodology can be characterized as a continued effort to demonstrate that statistics is not mathematics but rather a discipline at the interface of biology and mathematics. The authors are not aware of any other work published so far that is comparable with the current work, and, therefore, believe that it does fill a need.



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