“All models are wrong but some are useful”

George E.P. Box

The first sentence of this foreword includes the philosophy of the day–to-day clinical data analysis. The human body is one of the most complex systems to analyze, so to establish an exact model of any of its parts is an extremely difficult task, and very often the proposed model does not contain all the peculiarities of the phenomenon under study.

The analysis of clinical data is not new; its history lasts more than 100 years. In the early stages, techniques used were mainly contrast hypothesis, linear models, factorial analysis. Those days nor the capacity nor the computational power of current computers were available, but, although, from a present point of view, models used were very primitive, and results obtained showed their usefulness.

Terms like soft computing, data mining, machine learning, intelligent data analysis, extracting knowledge of massive data sets, are all equivalent to refer to the process of extracting knowledge from datasets. Applications of those techniques are wide in almost all fields of knowledge with multiple benefits. Clinical problems are the perfect target for those methods: big amount of data with many different types of variables, that many times contain errors or are incomplete. Moreover, data are, very often, related to difficult predictions or complex diagnostics.

The authors of the different chapters in this handbook show the applications of those techniques to different clinical problems. Chapters include problems of prediction, pattern classification (diagnostic) and multidimensional visualization that allow the specialist to extract conclusions about data. All of them are practical applications than emphasize the validity and wide use of those techniques. Many different kinds of models like, neural models (Multilayer perceptron and Self organizing Maps), support vector machines, Bayesian networks, and fuzzy models have been applied to different kinds of data; i.e. genetic, from UCI, dermatological, electroencephalographical, et cetera.

Summarizing, the reader hold between his/her hands a complete exposition of the state of the art of the applications of those techniques in clinical practice. Bearing in mind the evolution in this field we could complete professor’s Cox sentence and say:

“In clinic, all models are wrong but some are very useful”

Josep Redón

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Josep Redón i Mas was born in Valencia in 1950. He earned his Master's degree in Medicine completed at the Medical School of the University of Valencia (1968-1974) with 12 A+ grades and with an A grade on the Master's final examination. His PhD was earned at the University of Valencia. He was Specialist in Internal Medicine from the Medical Postgraduate Training Program (MIR) done at the Jiménez Diaz Foundation, Madrid, and at the University Hospital La Fe in Valencia. Editorial Activity of his includes: a) Member of the Editorial Board of indexed journals in the field of Hypertension: Journal of Hypertension, Blood Pressure Monitoring; b) Reviewer of both Cardiovascular and Internal Medicine journals: Circulation, Hypertension, Journal of Hypertension, American Journal of Hypertension, American Journal of Medicine, American Journal of Kidney Disease, European Heart Journal, and Nephrology Dialysis and Transplantation; c) Author of numerous editorials and review articles by invitation.