

# Foreword

Analyzing large amounts of data is a necessity. Even popular science books, like “super crunchers,” give compelling cases where large amounts of data yield discoveries and intuitions that surprise even experts. Every enterprise benefits from collecting and analyzing its data: Hospitals can spot trends and anomalies in their patient records, search engines can do better ranking and ad placement, and environmental and public health agencies can spot patterns and abnormalities in their data. The list continues, with cybersecurity and computer network intrusion detection; monitoring of the energy consumption of household appliances; pattern analysis in bioinformatics and pharmaceutical data; financial and business intelligence data; spotting trends in blogs, Twitter, and many more. Storage is inexpensive and getting even less so, as are data sensors. Thus, collecting and storing data is easier than ever before.

The problem then becomes *how to analyze* the data. This is exactly the focus of this Third Edition of the book. Jiawei, Micheline, and Jian give encyclopedic coverage of all the related methods, from the classic topics of clustering and classification, to database methods (e.g., association rules, data cubes) to more recent and advanced topics (e.g., SVD/PCA, wavelets, support vector machines).

The exposition is extremely accessible to beginners and advanced readers alike. The book gives the fundamental material first and the more advanced material in follow-up chapters. It also has numerous rhetorical questions, which I found extremely helpful for maintaining focus.

We have used the first two editions as textbooks in data mining courses at Carnegie Mellon and plan to continue to do so with this Third Edition. The new version has significant additions: Notably, it has more than 100 citations to works from 2006 onward, focusing on more recent material such as graphs and social networks, sensor networks, and outlier detection. This book has a new section for visualization, has expanded outlier detection into a whole chapter, and has separate chapters for advanced

methods—for example, pattern mining with top- $k$  patterns and more and clustering methods with biclustering and graph clustering.

Overall, it is an excellent book on classic and modern data mining methods, and it is ideal not only for teaching but also as a reference book.

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