Chapter 7
Organization

Martin Braschler, Thilo Stadelmann, and Kurt Stockinger

Abstract Part II of this book represents its core—the nuts and bolts of applied data science, presented by means of 16 case studies spanning a wide range of methods, tools, and application domains.

We organize the individual chapters in the following way, based on their main focus:

Chapters 8–10 present **fundamentals** that cut across many case studies:

- Brodie gives a detailed account of his opinionated view on the current state of data science as a science (Chap. 8). He also presents a development model based on research-development virtuous cycles for projects as well as the discipline as a whole that is grounded in reality (Chap. 9).
- Christen et al. then present a sound and practical guideline for ethical considerations in analytics projects (Chap. 10).

Chapters 11–16 focus on **methods and tools** within case studies:

- Ruckstuhl and Dettling (Chap. 11) and Stadelmann et al. (Chap. 12) present work on discipline-specific approaches and methodological contributions to data science from a *statistical* and *deep learning*-based viewpoint, respectively.
- Braschler gives a detailed exposition of the challenges of small data collections for *Information Retrieval* in Chap. 13.
- *Visual storytelling* is exemplified by Ackermann and Stockinger in Chap. 14.
- A tutorial on the mutual dependencies and benefits between data science and *computer security* is given by Tellenbach et al. in Chap. 15.
- Finally, Rettig et al. explain the architecture of a *big data stream processing system* based on a specific anomaly detection example (Chap. 16).

M. Braschler (✉) · T. Stadelmann · K. Stockinger
ZHAW Zurich University of Applied Sciences, Winterthur, Switzerland
e-mail: bram@zhaw.ch

Finally, Chapters 17–23 focus on the **applications** themselves:

- *Production*: Hollenstein et al. discuss the reduction of product complexity in industrial production (Chap. 17).
- *Commerce*: Geiger and Stockinger describe market monitoring by means of a carefully designed data warehouse architecture (Chap. 18); whereas Ott et al. report on demand planning by forecasting and how to evaluate its success (Chap. 20).
- *Health*: Leidig and Wolffe show how to predict disease spread in a population using data mining on mobile phone data (Chap. 19); personal health data management facilitated by good governance and IT architecture is discussed by Bignens and Hafen (Chap. 22); and finally, the complete cycle of medical image analysis is described by Mader (Chap. 23).
- *Finance*: Risk assessment using big data infrastructure is the focus of Chap. 21 by Breymann et al.

A more structured overview of the contents to each chapter (e.g., listed by methods applied, tools, discipline-specific viewpoints, stage in the knowledge discovery in databases (KDD) process, etc.) is provided in Part III of this book, serving as an index to the chapters of this part.