

# Preface

Mobility data is ubiquitous, particularly due to the automated collection of time-stamped location information from GPS-equipped devices, from everyday smartphones to dedicated software and hardware in charge of monitoring movement in land, sea, and air. Such wealth of data, referenced both in space and time, enables novel classes of applications and services of high societal and economic impact, provided that the discovery of consumable and concise knowledge out of these raw data collections is made possible. In this book, we aim at presenting a step-by-step methodology to understand, manage, and exploit mobility data: from the collecting and cleansing data stage to their storage in Moving Object Database (MOD) engines, and, then, analyzing and mining mobility data for decision-making purposes. Privacy aspects arising from handling mobility data and emerging topics, such as semantic-aware and distributed data management, towards the Big Data era are also covered. Theoretical presentation is smoothly accompanied by hands-on experience with Hermes tool, a real MOD engine developed at InfoLab, University of Piraeus.

## Book Organization

The book contains 13 chapters organized in five parts. We tried to keep each chapter self-contained to provide maximum reading flexibility.

In the first part of the book, after an introduction (Chap. 1) that sets the scene and discusses at a very high level the original information (mobility data) upon which the content of the book is built, we provide the necessary background knowledge on spatial data management and exploration (Chap. 2).

The second part is about mobility data management. Preliminaries on mobility data management, including the issue of reconstructing trajectories from recorded raw locations, are discussed in Chap. 3. Modeling, querying, and indexing Moving Object Databases (MOD) is the topic of Chap. 4, while Chap. 5 presents current real-world prototype MOD implementations.

In the third part of the book, we focus on mobility data exploration. Preliminaries on mobility data exploration, including multidimensional trajectory data analysis and alternative trajectory similarity measures, are discussed in Chap. 6. Chapter 7 describes mobility data mining in order to get sound mobility patterns, which is the core of the second part, followed by a discussion about mobility data privacy aspects in Chap. 8.

The fourth part of the book studies advanced issues that have arisen only recently, namely, semantic aspects of mobility (Chap. 9) and Big Data aspects (Chap. 10).

In the fifth part, after a short epilogue (Chap. 11), two showcase appendices complete the material of the book. Using two alternative implementation of Hermes, a real MOD implemented at InfoLab and available for research purposes to the community, we provide hands-on experience on most of the topics covered in the previous chapters, from management to exploration and semantics.

The book is supported by online material: lecture slides, solutions to selected exercises, links to web resources, etc. This material can be found at the book's website: <http://infolab.cs.unipi.gr/MDMEbook>.

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