

Preface

“How big is big?” Science writer Stephen Strauss asks in his fun book for kids titled *How Big is Big* and explains that “bigness is something no one can consume.”

In this book, we aim to answer this interesting question, but in the context of computer data. In the *big data* era, we are dealing with the explosive increase of global data and enormous datasets. Unlike seemingly similar terms such as “massive data” or “very big data,” *big data* refers to the datasets that could not be perceived, acquired, managed, and processed by traditional Information Technology (IT) and software/hardware tools within a tolerable time. It can be characterized by four Vs, i.e., Volume (great volume), Variety (various modalities), Velocity (rapid generation), and Value (huge value but very low density).

In this book, we provide a comprehensive overview of the background and related technologies, challenges and future prospects of big data. We first introduce the general background of big data and review related technologies, such as cloud computing, Internet of Things (IoT), data centers, and Hadoop. We then focus on the four phases of the value chain of big data, i.e., data generation, data acquisition, data storage, and data analysis. For each phase, we introduce the general background, discuss the technical challenges, and review the latest advances. We next examine the several representative applications of big data, including enterprise management, IoT, online social networks, healthcare and medical applications, collective intelligence, and smart grid. This book is concluded with a discussion of open problems and future directions. We aim to provide the readers a comprehensive overview and big-picture of this exciting area. We hope this monograph could be a useful reference for graduate students and professionals in related fields, and general readers who will benefit from an understanding of the big data field.

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Wuhan, China
Auburn, AL
Wuhan, China
Vancouver, BC, Canada
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Min Chen
Shiwen Mao
Yin Zhang
Victor C.M. Leung

Big Data

Related Technologies, Challenges and Future
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Chen, M.; Mao, S.; Zhang, Y.; Leung, V.C.

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