

# Preface

We live in the era of Big Data. We are witnessing radical expansion and integration of digital devices, networking, data storage, and computation systems. Data generation and consumption is becoming a main part of people's daily life especially with the pervasive availability and usage of Internet technology and applications. In the enterprise world, many companies continuously gather massive datasets that store customer interactions, product sales, results from advertising campaigns on the Web in addition to various types of other information. The term *Big Data* has been coined to reflect the tremendous growth of the world's digital data which is generated from various sources and many formats. Big Data has attracted a lot of interest from both the research and industrial worlds with a goal of creating the best means to process, analyze, and make the most of this data.

This handbook presents comprehensive coverage of recent advancements in Big Data technologies and related paradigms. Chapters are authored by international leading experts in the field. All contributions have been reviewed and revised for maximum reader value. The volume consists of twenty-five chapters organized into four main parts. Part I covers the fundamental concepts of Big Data technologies including data curation mechanisms, data models, storage models, programming models, and programming platforms. It also dives into the details of implementing Big SQL query engines and big stream processing systems. Part II focuses on the semantic aspects of Big Data management, including data integration and exploratory ad hoc analysis in addition to structured querying and pattern matching techniques. Part III presents a comprehensive overview of large-scale graph processing. It covers the most recent research in large-scale graph processing platforms, introducing several scalable graph querying and mining mechanisms in domains such as social networks. Part IV details novel applications that have been made possible by the rapid emergence of Big Data technologies, such as Internet-of-Things (IOT), Cognitive Computing, and SCADA Systems. All parts of the book discuss open research problems, including potential opportunities, that have arisen from the rapid progress of Big Data technologies and the associated increasing requirements of application domains. We hope that our readers will benefit from these discussions to enrich their own future research and development.

This book is a timely contribution to the growing Big Data field, designed for researchers and IT professionals and graduate students. Big Data has been recognized as one of leading emerging technologies that will have a major contribution and impact on the various fields of science and various aspect of the human society over the coming decades. Therefore, the content in this book will be an essential tool to help readers understand the development and future of the field.

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