Preface

This handbook is carefully edited book – contributors are worldwide experts in the field of data intensive computing and their applications. The scope of the book includes leading edge data intensive computing architectures and systems, innovative storage, virtualization, and parallel processing technologies applied in data intensive computing, and a variety of data intensive applications.

Data intensive computing refers to capturing, managing, analyzing, and understanding data at volumes and rates that push the frontiers of current technologies. The challenge of data intensive computing is to provide the hardware architectures and related software systems and techniques which are capable of transforming ultra-large data into valuable knowledge. Data intensive computing demands a fundamentally different set of principles than mainstream computing. Data-intensive applications typically are well suited for large-scale parallelism over the data and also require extremely high degree of fault-tolerance, reliability, and availability. In addition, most data intensive applications require real-time or near real-time response. The objective of the project is to introduce the basic concepts of data intensive computing, technologies and hardware and software techniques applied in data intensive computing, and current and future applications.

The handbook comprises of four parts, which consist of 30 chapters. The first part on *Architectures and Systems* includes chapters dealing with network architectures for data intensive computing, data intensive software systems, and high-level programming languages and storage systems for data-intensive computing. The second part on *Technologies and Techniques* covers load balancing techniques, linking technologies, virtualization techniques, feature ranking methods and other techniques applied in data intensive computing. The third part on *Security* includes various aspects on privacy and security requirements and related techniques applied in data intensive computing. The fourth part on *Applications* describes various data intensive applications from earthquake simulations and geosciences to biological systems, social information systems, and bioinformatics.

With the dramatic growth of data intensive computing and systems and their applications, this handbook can be the definitive resource for persons working in this field as researchers, scientists, programmers, engineers, and users. The book is

intended for a wide variety of people including academicians, designers, developers, educators, engineers, practitioners, and researchers and graduate students. This book can also be beneficial for business managers, entrepreneurs, and investors. The book can have a great potential to be adopted as a textbook in current and new courses on Data Intensive Computing.

The main features of this handbook can be summarized as:

1. The handbook describes and evaluates the current state-of-the-art in a new field of data intensive computing.
2. It also presents current systems, services, and main players in this explosive field.
3. Contributors to the handbook are the leading researchers from academia and practitioners from industry.

We would like to thank the authors for their contributions. Without their expertise and effort this handbook would never come to fruition. Springer editors and staff also deserve our sincere recognition for their support throughout the project.

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