Preface

This is the second volume of the *Advanced Topics in Database Research* book series. Similar to Volume 1, this volume is intended for academic researchers and technical professionals in the areas of database research. It presents the latest research ideas and topics on how to enhance current database systems, improve information storage, refine existing database models, and develop advanced applications. It provides insights into important developments in the field of database and database management. With emphasis on theoretical issues regarding databases and database management, the book is expected to aid in understanding the capabilities and features of new technologies and methodologies, and in meeting the needs of Internet, e-commerce, and mobile-commerce applications.

The book is divided into three sections: (I) Information and Conceptual Modeling in Database; (II) Advanced Database Designs and Applications; and (III) Mobile Data Management.

The first section, "Information and Conceptual Modeling in Database," consists of three chapters. The first chapter, "Meta-Model Based Information Mediation," discusses information mediation, typical mediation architectures, and proposes a meta-model based mediation approach to improve information mediation. The second chapter, "Applying UML for Designing Multidimensional Database and OLAP Applications," proposes the use of Unified Modeling Language (UML) to represent both structural and dynamic properties of data warehouses (DW), multidimensional databases (MDB), and on-line analytical processing

(OLAP) applications. The third chapter, "On the Representation of Temporal Dynamics," reviews the current approaches to representing temporality in conceptual database design and suggests an event analysis approach to model temporality.

The second section, "Advanced Database Designs and Applications," has seven chapters. Chapter IV, "A Review of Experiments on Natural Language Interfaces," provides a review, using both qualitative and quantitative approaches, of experimental studies on natural language interfaces. The next chapter, "The Development of Ordered SQL Packages in Peer-To-Peer Data Warehousing Environments," explores Ordered SQL (OSQL) and demonstrates how the framework of OSQL is able to better adapt the data content of a data warehouse in a dynamic environment. Chapter VI, "Implementation Techniques for Extensible Object Storage Systems," investigates several aspects of the design and implementation of the extensible object storage system, and shows the feasibility of using an object-oriented approach to build an object storage system. The chapter titled, "A Run-Time Based Technique to Optimize Queries in Distributed Internet Databases," develops and demonstrates an adaptive probe-based optimization technique in the context of an Internet-based distributed database environment. Chapter VIII, "Towards Flexible Specification, Composition, and Coordination of Workflow Activities," introduces the Activity Flow specification language for flexible specification, composition, and coordination of workflow activities. Chapter IX, "Performance Implications of Knowledge Discovery Techniques in Databases," describes some of the algorithms used in discovering knowledge from data and fostering a better understanding of the application and appropriateness of knowledge discovery techniques. The last chapter in this section, "Methodology Evaluation Framework for Component-Based System Development," evaluates Component-Based Development (CBD) methodology and proposes CBD method improvements on the basis of the evaluation.

The final section, "Mobile Data Management," consists of three chapters covering the emerging area of database issues in mobile computing and applications. The first chapter in this section, "Software Agents for Mobile Commerce Services Support," presents an agent-based platform to support mobile commerce using mobile devices, and illustrates the usage of the platform with examples of valued customer membership services and subscription services support. "A Framework for Analyzing Mobile Transaction Models" surveys the definition and extension of transactional models to a mobile environment and defines a framework for analyzing competing mobile models. The last chapter in this section and this book, "Considering Mobility in Query Processing for Mobile Commerce Systems," argues that conventional strategies for query processing are no longer

adequate in a mobile commerce environment, and introduces some query processing strategies for enhancements to mobile commerce.

Together, these 13 chapters provide a comprehensive overview of the state-of-the-art in the field of database research. We sincerely hope that the readers will find the book a useful reference for their work.

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