

# Preface

The *Advanced Topics in Database Research* book series has been regarded as an excellent academic books series in the fields of database, software engineering, and systems analysis and design. The goal of the book series is to provide researchers and practitioners the latest ideas and excellent works in the fields. This is the fourth volume of the book series. We are fortunate again to have authors that are committed to submit their best works for inclusion as chapters in this book. In the following, I will briefly introduce the 16 excellent chapters in this book:

Chapter I, “Dynamic Workflow Restructuring Framework for Long-Running Business Processes”, applies the basic concepts of ActivityFlow specification language to a set of workflow restructuring operators and a dynamic workflow management engine in developing a framework for long-running business processes. The chapter explains how the ActivityFlow language supports a collection of specification mechanisms in increasing the flexibility of workflow processes and offers an open architecture that supports user interaction and collaboration of workflow systems of different organizations.

Chapter II, “Design and Representation of Multidimensional Models with UML and XML Technologies”, presents the use of the Unified Modeling Language (UML) and the eXtensible Markup Language (XML) schema in abstracting the representation of Multidimensional (MD) properties at the conceptual level. The chapter also provides different presentations of the MD models by means of eXtensible Stylesheet Language Transformations (XSLT).

Chapter III, “Does Protecting Databases Using Perturbation Techniques Impact Knowledge Discovery”, examines the effectiveness of Generalized Additive Data Perturbation methods (GADP) in protecting the confidentiality of data. Data perturbation is a data security technique that adds noise in the form of random numbers to numerical database attributes. The chapter discusses whether perturbation techniques add a so-called Data Mining Bias to

the database and explores the competing objectives of protection of confidential data versus disclosure for data mining applications.

Chapter IV, “Simultaneous Database Backup Using TCP/IP and a Specialized Network Interface Card”, introduces a prototype device driver, Real-time Online Remote Information Backup (RORIB) in response to the problems in current backup and recovery techniques used in e-business applications. The chapter presents a true real time system that is hardware and software independent that accommodates to any type of system as the alternative to the extremely expensive Private Backup Network (PBN) and Storage Area Networks (SANs).

Chapter V, “Towards User-Oriented Enterprise Modeling for Interoperability”, introduces user oriented Enterprise Modeling as a means to support new approaches for the development of networked organizations. The chapter discusses the structuring of user requirements and describes the initial design of the Unified Enterprise Modeling Language (UEML) developed in a research project sponsored by the European Union.

Chapter VI, “Using a Model Quality Framework for Requirements Specification of an Enterprise Modeling Language”, introduces a Model Quality Framework that tackles the selection and refinement of a modeling language for a process harmonization project in an international organization. The harmonization project uses process models that prioritize what was to be implemented in the specialized language and develops a support environment for the new harmonized process.

Chapter VII, “Population of a Method for Developing the Semantic Web Using Ontologies”, introduces an ONTOMETRIC method that allows the evaluation of existing ontologies and making better selection of ontologies.

Chapter VIII, “An Evaluation of UML and OWL Using a Semiotic Quality Framework”, systematically evaluates the Unified Modeling Language (UML) and Web Ontology Language (OWL) models by using a semiotic quality framework. The chapter highlights the strengths and weaknesses of the two modeling languages from a semiotic perspective. This evaluation better assists researchers in the selection and justification of modeling languages in different scenarios.

Chapter IX, “Information Modeling Based on Semantic and Pragmatic Meaning”, introduces an information modeling approach based on the speech act theory to support meaningful communication between different actors within a social action context. The chapter discusses how taking both semantic and pragmatic meaning into consideration will theoretically justify problems central to information modeling—the identifier problem, the ontological problem, and the predicate problem.

Chapter X, “Higher-Order Types and Information Modeling”, examines the advisability and appropriateness of using higher-order types in information models. The chapter discusses the key issues involved in implementing the model,

suggests techniques for retaining a first-order formalization, and provides good suggestions for adopting a higher-order semantics.

Chapter XI, “Criteria for Comparing Information Modeling Methods: Informational and Computational Equivalence”, introduces an evaluation approach based on the human information processing paradigm and the theory of equivalence of representations. This evaluation approach proposes informational and computational equivalence as the criteria for evaluation and comparison.

Chapter XII, “COGEVAL: Applying Cognitive Theories to Evaluate Conceptual Models”, proposes a propositional framework called COGEVAL that is based on cognitive theories to evaluate conceptual models. The chapter isolates the effect of a model-independent variable on readability and illustrates the dimensions of modeling complexity. This evaluation is particularly useful for creators of new models and practitioners who use currently available models to create schemas.

Chapter XIII, “Quality of Analysis Specifications: A Comparison of FOOM and OPM Methodologies”, shows that the Functional and Object Oriented Methodology (FOOM) is a better approach in producing quality analysis models than the Object-Process Methodology (OPM). The comparison is based on a controlled experiment, which compares the quality of equivalent analysis models of the two methodologies, using a unified diagrammatic notation.

Chapter XIV, “Interoperability of B2B Applications: Methods and Tools”, introduces a Web-based data integration methodology and tool framework called X-TIME in supporting the development of Business-to-Business (B2B) design environments and applications. The chapter develops X-TIME as the tool to create adaptable semantic-oriented meta models in supporting interoperable information systems and building cooperative environment for B2B platforms.

Chapter XV, “Possibility Theory in Protecting National Information Infrastructure”, introduces a quantitative approach called Possibility theory as an alternative to information security evaluation. This research responds to the national concern of the security of both military and civilian information resources due to information warfare and the defense of national information infrastructures. This approach is suitable for information resources that are vulnerable to intensive professional attacks.

Chapter XVI, “Enabling Information Sharing Across Government Agencies”, attends to the increased interest in information sharing among government agencies with respect to improving security, reducing costs, and offering better quality service to users of government services. The chapter proposes a comprehensive methodology called Interagency Information Sharing (IAIS) that uses eXtensible Markup Language (XML) to facilitate the definition of information that needs to be shared. The potential conflicts and the comparison of IAIS with two other alternatives are further explored.

These 16 chapters provide an excellent sample of the state-of-the-art research in the field of database. I hope this book will be a useful reference and a valuable collection for both researchers and practitioners.

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