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Conceptual Modeling

32th International Conference, ER 2013
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Proceedings

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Foreword

This volume presents the papers selected for presentation at the 32nd International Conference on Conceptual Modeling (ER 2013), held in Hong Kong, November 11–13, 2013. The International Conference on Conceptual Modeling is the leading conference in the area of information systems and database design, attracting over 100 world-class researchers from around the world, who work in both academia and industry.

Following the tradition of the conferences, ER 2013 provided a forum to exchange ideas and experiences, and to discuss current research and applications, with a major focus on conceptual modeling. The conference topics include: theories of concepts and ontologies underlying conceptual modeling, methods and tools for developing and communicating conceptual models, and techniques for transforming conceptual models into effective implementations. This year, the conference was held in the greater Shatin area of Hong Kong, which features such places of interest as the Ten Thousand Buddhas Monastery, the Hong Kong Heritage Museum, and the Shatin Racecourse. On the banks of the Shing Mun River, the event was located within a cluster of malls and has easy connections to many transportation links such as the MTR (Hong Kong subway system). The nearby New Town Plaza offers an immense variety of brand boutique as well as dining and entertainment venues.

ER 2013 was the outcome of the joint effort of many sponsors, colleagues, students, and volunteers. In particular, it was one of the celebratory events of the 50th Anniversary of The Chinese University of Hong Kong. We wish to express our gratitude for the help and contributions from other sponsors, including the City University of Hong Kong, the K.C. Wong Education Foundation, and the Department of Computer Science and Engineering of the Hong Kong University of Science and Technology. We would also like to thank the authors who submitted papers, demos, and tutorials, and panels as well as the conference participants. We are especially grateful to the ER Steering Committee members for their support in organizing ER 2013, and to the chairs and members of the Technical Program Committee and the external reviewers for their relentless work in reviewing submissions with expertise and patience in order to develop a top-quality scientific program. Many thanks as well to the Workshop, Panel, Tutorial, Demos, PhD Symposium Chairs and committee members for their professional services. ER 2013 owes special thanks to the organizers of the Symposium of Conceptual Modeling Education, a new initiative to this conference series, and to the Local Organization and the Fund-raising Chairs, who

devoted a great deal of time and energy to ensure the success of this conference. Thank you to our Publicity Chairs, our Webmaster, and our Registration and Proceedings Chairs, for their work in ushering this conference through its various stages of development.

July 2013

Qing Li
Ho-fung Leung

Preface

Since the first version of the entity-relationship (ER) model by Peter Chen appeared in *ACM Transactions on Database Systems (TODS)* in 1976, both the ER model and conceptual modeling have been key success factors for modeling computer-based systems. The International Conference on Conceptual Modeling is an important venue for the presentation and exchange of ideas and concepts that relate to traditional and emerging issues in conceptual modeling of information systems. Work on conceptual modeling has continued to evolve as the ER model has been applied, modified, and extended to research in database management systems, business process management, and management information systems. Conceptual modeling plays a vital role in the emerging, new data era where the correct design and development of mobile or sensors analytics, big data systems, non-SQL databases, smart cities and biomedical systems will be crucial. The 32^{nd} International Conference on conceptual modeling was a forum where some of these novel areas, as well as their fundamental and theoretical issues which are directly related to conceptual modeling, were discussed.

The ER conference continues to attract some of the best researchers and keynote speakers, from both academia and industry, who work on topics in traditional and emerging areas of conceptual modeling. This year, 148 abstracts and 126 full papers were submitted to the conference. Each paper was reviewed by at least three reviewers and, based upon these reviews, 23 full papers and 17 short papers were selected for publication in the proceedings and presentation at the conference. The acceptance rate for regular papers was 18.25%, and for regular and short papers together, 31.74%. These papers were organized into sessions that represent leading research areas in conceptual modeling, including topics related to querying, semantics, fundamental concepts, applications, and emerging issues. The program included four research prototype demos providing an interactive way for participants to appreciate contemporary issues in conceptual modeling research. The demos have prior, corresponding theoretical publications. The four demos address different conceptual modeling issues related to implementations, applications, and innovative techniques, thus making visible the pragmatic aspects of conceptual modeling. The scientific program also featured three interesting keynote presentations by David Embley, Marie-Aude Aufaure, and Surajit Chaudhuri, each of whom has shared some of their thoughts and insights in these proceedings.

We wish to thank the 101 Program Committee members and the external reviewers who provided insightful reviews and discussions on the papers. We also appreciate the diligence of the senior reviewers who provided guidance and

recommendations, as well the selection of best paper awards. Most importantly, we thank the authors who submitted high-quality research papers on a wide variety of topics, thus making this conference possible. We hope you enjoy the program.

July 2013

Wilfred Ng
Veda C. Storey
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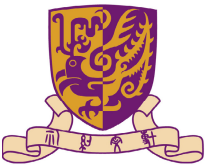

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Keynotes
(Abstracts)

Big Data—Conceptual Modeling to the Rescue

David W. Embley[1] and Stephen W. Liddle[2]

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Abstract. Big data is characterized by volume, variety, velocity, and veracity. We should expect conceptual modeling to provide some answers since its historical perspective has always been about structuring information—making its volume searchable, harnessing its variety uniformly, mitigating its velocity with automation, and checking its veracity with application constraints. We provide perspectives about how conceptual modeling can "come to the rescue" for many big-data applications by handling volume and velocity with automation, by inter-conceptual-model transformations for mitigating variety, and by conceptualized constraint checking for increasing veracity.

What's Up in Business Intelligence? A Contextual and Knowledge-Based Perspective

Marie-Aude Aufaure

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Abstract. The explosive growth in the amount of data poses challenges in analyzing large data sets and retrieving relevant information in real-time. This issue has dramatically increased the need for tools that effectively provide users with means of identifying and understanding relevant information. Business Intelligence (BI) promises the capability of collecting and analyzing internal and external data to generate knowledge and value, providing decision support at the strategic, tactical, and operational levels. Business Intelligence is now impacted by the Big Data phenomena and the evolution of society and users, and needs to take into account high-level semantics, reasoning about unstructured and structured data, and to provide a simplified access and better understanding of data. This paper will depict five years research of our academic chair in Business Intelligence from the data level to the user level, mainly focusing on the conceptual and knowledge level.

Big Data and Enterprise Analytics

Surajit Chaudhuri

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Abstract. In this talk, I will describe the key secular trends that characterize the field of Big Data with respect to enterprise analytics. I will describe some of the open challenges for enterprise analytics in the context of Big Data. Although some of these problems are not new, their importance is amplified by Big Data. As an example, we will discuss the task of data exploration and leveraging unstructured data for enterprise analytics.

Table of Contents

Keynotes

Big Data—Conceptual Modeling to the Rescue 1
David W. Embley and Stephen W. Liddle

Whats Up in Business Intelligence? A Contextual and Knowledge-Based Perspective 9
Marie-Aude Aufaure

Modeling and Reasoning

Modeling and Reasoning with Decision-Theoretic Goals 19
Sotirios Liaskos, Shakil M. Khan, Mikhail Soutchanski, and John Mylopoulos

TBIM: A Language for Modeling and Reasoning about Business Plans 33
Fabiano Francesconi, Fabiano Dalpiaz, and John Mylopoulos

Automated Reasoning for Regulatory Compliance 47
Alberto Siena, Silvia Ingolfo, Anna Perini, Angelo Susi, and John Mylopoulos

Fundamentals of Conceptual Modeling

Is Traditional Conceptual Modeling Becoming Obsolete? 61
Roman Lukyanenko and Jeffrey Parsons

Cognitive Mechanisms of Conceptual Modelling: How Do People Do It? 74
Ilona Wilmont, Sytse Hengeveld, Erik Barendsen, and Stijn Hoppenbrouwers

A Semantic Analysis of Shared References 88
Roland Kaschek

Are Conceptual Models Concept Models? 96
Chris Partridge, Cesar Gonzalez-Perez, and Brian Henderson-Sellers

Business Process Modeling I

Visual Modeling of Business Process Compliance Rules with the Support of Multiple Perspectives 106
David Knuplesch, Manfred Reichert, Linh Thao Ly, Akhil Kumar, and Stefanie Rinderle-Ma

Deciding Data Object Relevance for Business Process Model Abstraction 121
Josefine Harzmann, Andreas Meyer, and Mathias Weske

Matching Business Process Models Using Positional Passage-Based Language Models 130
Matthias Weidlich, Eitam Sheetrit, Moisés C. Branco, and Avigdor Gal

Towards an Empirically Grounded Conceptual Model for Business Process Compliance 138
Martin Schultz

Business Process Modeling II

Improving Business Process Intelligence with Object State Transition Events 146
Nico Herzberg, Andreas Meyer, Oleh Khovalko, and Mathias Weske

A Conceptual Model of Intended Learning Outcomes Supporting Curriculum Development 161
Preecha Tangworakitthaworn, Lester Gilbert, and Gary B. Wills

Cost-Informed Operational Process Support 174
Moe T. Wynn, Hajo A. Reijers, Michael Adams, Chun Ouyang, Arthur H.M. ter Hofstede, Wil M.P. van der Aalst, Michael Rosemann, and Zahirul Hoque

Network Modeling

Automating the Adaptation of Evolving Data-Intensive Ecosystems 182
Petros Manousis, Panos Vassiliadis, and George Papastefanatos

sonSchema: A Conceptual Schema for Social Networks 197
Zhifeng Bao, Y.C. Tay, and Jingbo Zhou

Minimizing Human Effort in Reconciling Match Networks 212
Hung Quoc Viet Nguyen, Tri Kurniawan Wijaya, Zoltán Miklós, Karl Aberer, Eliezer Levy, Victor Shafran, Avigdor Gal, and Matthias Weidlich

Data Semantics

Effective Recognition and Visualization of Semantic Requirements by Perfect SQL Samples 227
Van Bao Tran Le, Sebastian Link, and Flavio Ferrarotti

A Semantic Approach to Keyword Search over Relational Databases 241
Zhong Zeng, Zhifeng Bao, Mong Li Lee, and Tok Wang Ling

Semantic-Based Mappings 255
Giansalvatore Mecca, Guillem Rull, Donatello Santoro, and Ernest Teniente

Security and Optimization

Managing Security Requirements Conflicts in Socio-Technical Systems 270
Elda Paja, Fabiano Dalpiaz, and Paolo Giorgini

Optimising Conceptual Data Models through Profiling in Object Databases 284
Tilmann Zäschke, Stefania Leone, Tobias Gmünder, and Moira C. Norrie

Skyline Queries over Incomplete Data - Error Models for Focused Crowd-Sourcing 298
Christoph Lofi, Kinda El Maarry, and Wolf-Tilo Balke

Ontology-Based Modeling I

Toward an Ontology-Driven Unifying Metamodel for UML Class Diagrams, EER, and ORM2 313
C. Maria Keet and Pablo Rubén Fillottrani

Towards Ontological Foundations for the Conceptual Modeling of Events 327
Giancarlo Guizzardi, Gerd Wagner, Ricardo de Almeida Falbo, Renata S.S. Guizzardi, and João Paulo A. Almeida

Baquara: A Holistic Ontological Framework for Movement Analysis Using Linked Data 342
Renato Fileto, Marcelo Krüger, Nikos Pelekis, Yannis Theodoridis, and Chiara Renso

Searching and Mining

From Structure-Based to Semantics-Based: Towards Effective XML Keyword Search 356
Thuy Ngoc Le, Huayu Wu, Tok Wang Ling, Luochen Li, and Jiaheng Lu

Combining Personalization and Groupization to Enhance Web Search 372
Kenneth Wai-Ting Leung, Dik Lun Lee, and Yuchen Liu

Colored Petri Nets for Integrating the Data Perspective in Process Audits 387
Michael Werner

Conceptual Modeling and Applications I

Former Students' Perception of Improvement Potential of Conceptual Modeling in Practice 395
Albert Tort, Antoni Olivé, and Joan Antoni Pastor

Conceptual Modeling for Ambient Assistance 403
Judith Michael and Heinrich C. Mayr

Empirical Evaluation of the Quality of Conceptual Models Based on User Perceptions: A Case Study in the Transport Domain 414
Daniela S. Cruzes, Audun Vennesland, and Marit K. Natvig

Conceptual Modeling and Applications II

Towards the Effective Use of Traceability in Model-Driven Engineering Projects 429
Iván Santiago, Juan Manuel Vara, María Valeria de Castro, and Esperanza Marcos

Modeling Citizen-Centric Services in Smart Cities 438
Sandeep Purao, Teo Chin Seng, and Alfred Wu

Representing and Elaborating Quality Requirements: The QRA Approach 446
Jie Sun, Pericles Loucopoulos, and Liping Zhao

Towards a Strategy-Oriented Value Modeling Language: Identifying Strategic Elements of the VDML Meta-model 454
Ben Roelens and Geert Poels

Ontology-Based Modeling II

Ontological Distinctions between Means-End and Contribution Links in the i* Framework 463
Renata S.S. Guizzardi, Xavier Franch, Giancarlo Guizzardi, and Roel Wieringa

Applying the Principles of an Ontology-Based Approach to a Conceptual Schema of Human Genome 471
Ana M^a Martínez Ferrandis, Oscar Pastor López, and Giancarlo Guizzardi

Ontologies for International Standards for Software Engineering 479
Brian Henderson-Sellers, Tom McBride, Graham Low, and Cesar Gonzalez-Perez

On the Symbiosis between Enterprise Modelling and Ontology Engineering 487
Frederik Gailly, Sven Casteleyn, and Nadejda Alkhaldi

Demonstration Papers

sonSQL: An Extensible Relational DBMS for Social Network Start-Ups 495
Zhifeng Bao, Jingbo Zhou, and Y.C. Tay

OntoDBench: Interactively Benchmarking Ontology Storage in a Database 499
Stéphane Jean, Ladjel Bellatreche, Carlos Ordonez, Géraud Fokou, and Mickaël Baron

Specifying and Reasoning over Socio-Technical Security Requirements with STS-Tool 504
Elda Paja, Fabiano Dalpiaz, Mauro Poggianella, Pierluigi Roberti, and Paolo Giorgini

Lightweight Conceptual Modeling for Crowdsourcing 508
Roman Lukyanenko and Jeffrey Parsons

Author Index 513