DATA 2013

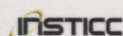## 2nd INTERNATIONAL CONFERENCE ON
DATA MANAGEMENT TECHNOLOGIES AND APPLICATIONS

Proceedings

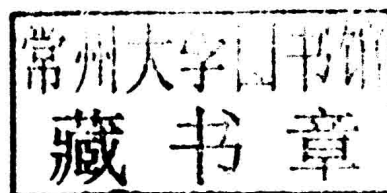REYKJAVÍK, ICELAND

29 - 31 JULY, 2013

DATA 2013

Proceedings of the
2nd International Conference on
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29 - 31 July, 2013

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**INSTICC – Institute for Systems and Technologies of Information, Control
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Co-organized by
Reykjavik University

Edited by Markus Helfert, Chiara Francalanci and Joaquim Filipe

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FOREWORD

This volume contains the proceedings of the 2nd International Conference on Data Technologies and Applications - DATA 2013. The conference is co-organized by the Reykjavik University (RU) and sponsored by the Institute for Systems and Technologies of Information, Control and Communication (INSTICC).

The purpose of DATA is to bring together researchers and practitioners interested in databases, data warehousing, data mining, data management, data security and other aspects of information systems and technology involving advanced applications of data.

DATA 2013 received 62 paper submissions from 27 countries. In order to evaluate each submission, a double blind paper review was performed by the Program Committee. In total, 34 papers are published in these proceedings and presented at the conference. Of these, 7 were selected to be published as full papers and 27 were selected as short papers. The full paper acceptance ratio was 11%, and the short paper acceptance ratio was 44%.

DATA's program includes a panel to discuss aspects of data technologies and applications from both theoretical and practical perspectives, with the participation of distinguished world-class researchers and practitioners; furthermore, the program is enriched by several keynote lectures delivered by renowned experts in their areas of knowledge. These high points in the conference program definitely contribute to reinforce the overall quality of the DATA conference.

The program for this conference required the dedicated effort of many people. Firstly, we must thank the authors, whose research efforts are herewith recorded. Next, we thank the members of the Program Committee and the auxiliary reviewers for their diligent and professional reviewing. We would also like to deeply thank the invited speakers for their invaluable contribution and for taking the time to prepare their talks. Special thanks to the leadership, faculty and staff of Reykjavik University (RU) for hosting the conference in its campus and providing RU facilities and resources. Finally, a word of appreciation for the hard work of the INSTICC team; organizing a conference of this level is a task that can only be achieved by the collaborative effort of a dedicated and highly capable team.

A successful conference involves more than paper presentations; it is also a meeting place, where ideas about new research projects and other ventures are discussed and debated. Therefore, a social event & banquet has been arranged for the evening of July 30 (Tuesday) in order to promote this kind of social networking.

We wish you all an exciting conference and an unforgettable stay in the city of Reykjavík. We hope to meet you again next year at DATA 2014 in Vienna, Austria.

Markus Helfert
Dublin City University, Ireland

Chiara Francalanci
Politecnico di Milano, Italy

Joaquim Filipe
Polytechnic Institute of Setúbal / INSTICC, Portugal

INVITED SPEAKERS

KEYNOTE SPEAKERS

Main-memory Centric Data Management
Open Problems and Some Solutions

Wolfgang Lehner

Dresden University of Technology, Germany

Abstract: Data management systems are currently sandwiched by two major developments. On the one hand, the underlying hardware characteristics has changed dramatically within the last years by providing a huge number of cores and extremely large main memory capacities in the Terabyte range for commodity servers. While these developments have great impact on system architecture, current systems are only slowly starting to exploit these capabilities. On the other hand, more and more non-standard applications are eager to take advantage of the features provided by database management systems. Especially knowledge extraction processes interactively analyzing large, mostly empirically collected datasets are generating a huge variety of requirements to the underlying data management platform using complex statistical models. Within the keynote, I will dive into some detail with respect to different requirements giving examples from different areas. From there I will derive open problems and give some solutions to pave the way for positioning database systems as the central information hub for operational applications and analytical knowledge extraction processes.

BRIEF BIOGRAPHY

Wolfgang Lehner is full professor, head of the database technology group, and director of the System architecture institute at the Dresden University of Technology (Technische Universität Dresden), Germany. Wolfgang Lehner conducts are variety of different research projects with his team members ranging from designing data-warehouse infrastructures from a modeling perspective, supporting data-intensive applications and processes in large distributed information systems, adding novel database functionality to relational database engines to support data mining/forecast algorithms, investigate techniques of approximate query processing (e.g. sampling) to speed up execution times over very large data sets, and exploit the power of main-memory centric database architectures with emphasis on modern hardware capabilities. Apart from basic and mostly theoretic research questions, Wolfgang Lehner puts a strong emphasis on practical research work within joint industrial projects, on an international, national, and regional level. He has published multiple text books and more than 150 reviewed research papers in conference proceedings and international journals.

Context-aware Decision Support in Dynamic Environments
Theoretical & Technological Foundations

Alexander Smirnov

SPIIRAS, Russian Academy of Sciences, Russian Federation

Abstract: Context-aware decision support is required in situations happening in dynamic, rapidly changing, and often unpredictable distributed environments. Such situations can be characterized by highly decentralized up-to-date data sets coming from various resources located in cyber-physical space. The goals of context-aware support of operational decision making are to timely provide the decisions maker with up-to-date information, to assess the relevance of information & knowledge to a decision, and to gain insight in seeking and evaluating possible decision alternatives.

The lecture addresses theoretical and technological foundations of context-aware decision support. The theoretical fundamentals are built around ontologies as a widely accepted tool for the semantic modeling of context information. They provide efficient facilities to represent application knowledge, and to make resources of the dynamic environments context-aware and interoperable.

The proposed fundamentals are supported by advanced intelligent technologies (ontology management, context management, constraint satisfaction, smart space, and decision mining). An application of these ideas is illustrated by examples of decision support systems for dynamic logistics.

BRIEF BIOGRAPHY

Alexander V. Smirnov is head of Computer Aided Integrated Systems Laboratory at St.Peterburg Institute for Informatics and Automation of the Russian Academy of Sciences - SPIIRAS (1994), Deputy-Director for Research (1996). He received his Ph.D from St.Petersburg State University of Electrical Engineering (1984) and D.Sc. from SPIIRAS (1994), and became a Full Professor in 1998. Currently he is a part-time full professor of St.Petersburg State Electrical Engineering University, Department of Research Automation. He has been involved in projects sponsored by Ford, Nokia, US DoD, European Research Programs (Information Society Technologies, Esprit, Eureka/Factory, etc.), and Russian agencies in the areas of distributed intelligent systems, ontology management, intelligent decision support systems, etc. He is a member of technical committee of IFAC TC 5.1 on Manufacturing Plant Control; IEEE SMC TC on Self-Organized Distributed and Pervasive Systems, IFIP TC WG5.1 on Global Product Development for the Whole Life-Cycle. His current research is in the areas of ontology-driven information integration, context management, operational decision support, virtual organization management. He published more than 300 research papers in reviewed journals and proceedings of international conferences, books, manuals.