

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Friedemann Mattern

ETH Zurich, Switzerland

John C. Mitchell

Stanford University, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz

University of Bern, Switzerland

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

University of Dortmund, Germany

Madhu Sudan

Massachusetts Institute of Technology, MA, USA

Demetri Terzopoulos

New York University, NY, USA

Doug Tygar

University of California, Berkeley, CA, USA

Moshe Y. Vardi

Rice University, Houston, TX, USA

Gerhard Weikum

Max-Planck Institute of Computer Science, Saarbruecken, Germany

Johann Eder Hele-Mai Haav
Ahto Kalja Jaan Penjam (Eds.)

Advances in Databases and Information Systems

9th East European Conference, ADBIS 2005
Tallinn, Estonia, September 12-15, 2005
Proceedings

Volume Editors

Johann Eder

University of Klagenfurt, Department of Informatics Systems

Universitätsstrasse 65, 9020 Klagenfurt, Austria

E-mail: eder@isys.uni-klu.ac.at

Hele-Mai Haav

Ahto Kalja

Jaan Penjam

Tallinn University of Technology, Institute of Cybernetics

Akadeemia 21, 12618 Tallinn, Estonia

E-mail: {helemai,ahto,jaan}@cs.ioc.ee

Library of Congress Control Number: 2005932083

CR Subject Classification (1998): H.2, H.3, H.4, H.5, J.1

ISSN 0302-9743

ISBN-10 3-540-28585-7 Springer Berlin Heidelberg New York

ISBN-13 978-3-540-28585-4 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

Springer is a part of Springer Science+Business Media

springeronline.com

© Springer-Verlag Berlin Heidelberg 2005

Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper SPIN: 11547686 06/3142 5 4 3 2 1 0

Preface

The 9th East-European Conference on Advances in Databases and Information Systems was held on September 12–15, 2005, in Tallinn, Estonia.

It was organized in a cooperation between the Institute of Cybernetics at Tallinn University of Technology, the Department of Computer Engineering of Tallinn University of Technology, and the Moscow chapter of ACM SIGMOD.

The main objective of the ADBIS series of conferences is to provide a forum for the dissemination of excellent research accomplishments and to promote interaction and collaboration between the Database and Information Systems research communities from Central and East European countries and the rest of the world. The ADBIS conferences provide an international platform for the presentation of research on database theory, the development of advanced DBMS technologies, and their advanced applications in particular in information systems.

The 2005 conference continued the ADBIS conferences held in St. Petersburg (1997), Poznan (1998), Maribor (1999), Prague (2000), Vilnius (2001), Bratislava (2002), Dresden (2003), and Budapest (2004). The conference consisted of regular sessions with technical contributions reviewed and selected by an international Program Committee, as well as of invited talks and tutorials given by leading scientists.

For the first time the ADBIS conferences had a satellite event, a workshop on data mining and knowledge discovery. The ADMKD 2005 workshop, with its own international Program Committee as well as proceedings, served as a forum to encourage researchers and practitioners to discuss and investigate data mining research and implementation issues, and to share experience in developing and deploying data mining systems.

The ADBIS series of conferences continues with growing interest as demonstrated by the large number of 144 submitted papers from 40 countries from all over the world. This volume contains one invited paper and 27 high-quality papers selected in a rigorous reviewing process by the international Program Committee with members from 27 countries. The papers cover a wide range of topics of database and information systems research, in particular, database theory, data modelling and query processing as well as database interoperability and XML databases.

As a tradition, the next 19 papers from the PC ranking were accepted in a be included to separate volume of research communications published by Tallinn University of Technology Press as a local volume of ADBIS 2005 proceedings, and published electronically in the CEUR Workshop Proceedings series: <http://SunSITE.Informatik.RWTH-Aachen.DE/Publications/CEUR-WS/>.

Many people and organizations contributed to the success of ADBIS 2005. Our thanks go to the authors and invited speakers for their outstanding con-

tribution to the conference and the proceedings. We very much acknowledge the Program Committee members for their reviewing and for accepting a heavy workload. Our thanks go also to the additional referees who carefully reviewed the submissions. Without the willingness and enthusiasm of many scientists sharing their expertise and voluntarily donating their time for thoroughly evaluating the merits of submitted work, this conference would not have been possible.

We wish to thank all the organizing team and our sponsors, who made the conference possible. Our special thanks go to Ms. Kristiina Kindel for maintaining the ADBIS 2005 Web site and Mr. Rein Lõugas for the technical preparation of the manuscript of the conference proceedings.

Last but not least, we are grateful to Springer for supporting the publication of the ADBIS 2005 proceedings in their LNCS series.

September 2005

Johann Eder
Hele-Mai Haav
Ahto Kalja
Jaan Penjam

Conference Organization

General Chair

Jaan Penjam (Institute of Cybernetics at Tallinn University of Technology, Estonia)

General Co-chair

Ahto Kalja (Department of Computer Engineering of Tallinn University of Technology, Estonia)

Program Committee Co-chairs

Johann Eder (University of Klagenfurt, Austria)

Hele-Mai Haav (Institute of Cybernetics at Tallinn University of Technology, Estonia)

Program Committee

Antonia Albani

Luciano Baresi

Janis Barzdins

Andras Benczur

Maria Bielikova

Juris Borzovs

Sjaak Brinkkemper

Bostjan Brumen

Albertas Caplinskas

Wojciech Cellary

Asuman Dogac

Johann Eder

Remigijus Gustas

Hele-Mai Haav

Mirjana Ivanovic

Hannu Jaakkola

Leonid Kalinichenko

Ahto Kalja

Marite Kirikova

Mikhail Kogalovsky

Christoph Koch

Christian Koncilia

John Krogstie

Rein Kuusik

Peri Loucopoulos

Kalle Lyytinen

Yannis Manolopoulos

Rainer Manthey

Saulius Maskeliunas

Mihhail Matskin

Misha Missikoff

Tadeusz Morzy

Pavol Navrat

Nikolay Nikitchenko

Kjetil Norvag

Boris Novikov

Thimios Panagos

Torben Bach Pedersen

Jaan Penjam

Jaroslav Pokorny

VIII Organization

Henrikas Pranevichius
Boris Rachev
Jolita Ralyte
Gunter Saake
Klaus-Dieter Schewe
Joachim Schmidt
Vaclav Snasel
Dan Suciuc
Eva Söderström
Kuldar Taveter

Jaak Tepandi
Bernhard Thalheim
Olegas Vasilecas
Victor Vianu
Gottfried Vossen
Tatjana Welzer
Viacheslav Wolfengagen
Robert Wrembel
Alexander Zamulin

ADBIS Steering Committee

Chairman: Leonid Kalinichenko (Russian Academy of Science, Russia)

Andras Benczur (Hungary)	Tadeusz Morzy (Poland)
Radu Berbaru (Romania)	Pavol Navrat (Slovakia)
Albertas Caplinskas (Lithuania)	Boris Novikov (Russia)
Johann Eder (Austria)	Jaroslav Pokorny (Czech Republic)
Janis Eiduks (Latvia)	Boris Rachev (Bulgaria)
Hele-Mai Haav (Estonia)	Anatoly Stogny (Ukraine)
Mirjana Ivanovic (Yugoslavia)	Bernhard Thalheim (Germany)
Mikhail Kogalovsky (Russia)	Tatjana Welzer (Slovenia)
Yannis Manolopoulos (Greece)	Viacheslav Wolfengagen (Russia)
Rainer Manthey (Germany)	

Organizing Committee

Eve Kann, Kristina Kindel, Sulev Kuiv, Rein Lõugas, Marje Tamm (Institute of Cybernetics at Tallinn University of Technology, Estonia)
Marion Lepmets, Tarmo Robal (Department of Computer Engineering, Tallinn University of Technology, Estonia)

Additional Referees

B. Akcay	M. Družovec
A. Ansper	D. Eleyan
S. Apel	F.A. Ferrarotti
M. Aziz	M. Freudenthal
G.B. Laleci	L. Galambos
G. Barzdins	M. Garcia
P. Bertolazzi	I. Geist
V. Bicer	G. Gidofalvi
S. Bossung	A. Glazs
A. Buldas	S. Hagemann
R. Butleris	S. Hartmann
D. Buy	T. Herstel
E. Celms	H. Höpfner
J. Chmielewski	P. Hupe
V. Derballa	A. Imada
L. Dmitriy	M. Janssen

Y. Kabak
I. Karydis
A. Kaya
M. Kirchberg
A. Kiss
S. Klöckner
V. Kotkas
J. Laucius
J. Lechtenbörger
T. Leich
N. Leonid
C. Letz
J. Løland
W.M.N. Wan Kadir
W. Martens
N. Mehandjiev
T. Namli
A. Nanopoulos
L. Nemuraite
L. Novak
A. Okcan
M. Olduz
B. Paradauskas
I. Petrounias
K. Podnieks

P.R.F. Sampaio
M. Rekouts
F. Riaz-ud-Din
A. Riha
F. Rizzolo
P. Rusakovs
J. Rykowski
S. Scherzinger
I. Schmitt
A. Schneidewind
H.-W. Sehring
T. Skopal
F. Taglino
C. Thomsen
I. Timko
L. Tininini
A. Tretiakov
V. Tulin
S. Unal
J. Vain
A. Vakali
M. Vassilakopoulos
P. Vassiliadis
M. Zemlicka

Table of Contents

Invited Paper

XML Databases and Beyond-Plenty of Architectural Challenges Ahead <i>Theo Härder</i>	1
---	---

Regular Papers

Database Theory

Usable Recursive Queries <i>Tomasz Pieciukiewicz, Krzysztof Stencel, Kazimierz Subieta</i>	17
Relation-Collapse: An Optimisation Technique for the Similarity Algebra \mathcal{SA} <i>Thomas Herstel, Ingo Schmitt</i>	29
On Modal Deductive Databases <i>Linh Anh Nguyen</i>	43
Declarative Data Fusion – Syntax, Semantics, and Implementation <i>Jens Bleiholder, Felix Naumann</i>	58
Non-destructive Integration of Form-Based Views <i>Jan Hidders, Jan Paredaens, Philippe Thiran, Geert-Jan Houben, Kees van Hee</i>	74

Database Modelling and Physical Database Design

A Multi-version Data Model and Semantic-Based Transaction Processing Protocol <i>Alexander Yakovlev</i>	87
Managing Schema Versions in Object-Oriented Databases <i>Xian Liu, David Nelson, Simon Stobart, Sue Stirk</i>	97
Efficient Integrity Checking for Databases with Recursive Views <i>Davide Martinenghi, Henning Christiansen</i>	109

A Formal Model for the Problem of View Selection for Aggregate Queries
Jingni Li, Zohreh Asgharzadeh Talebi, Rada Chirkova, Yahya Fathi 125

Efficient Main-Memory Algorithms for Set Containment Join Using Inverted Lists
Dmitry Shaporenkov 139

Query Processing

VA-Files vs. R*-Trees in Distance Join Queries
Antonio Corral, Alejandro D’Ermilius, Yannis Manolopoulos, Michael Vassilakopoulos 153

The Expressivity of Constraint Query Languages with Boolean Algebra Linear Cardinality Constraints
Peter Revesz 167

Heterogeneous Databases and Interoperability

Extensible Canonical Process Model Synthesis Applying Formal Interpretation
Leonid Kalinichenko, Sergey Stupnikov, Nikolay Zemtsov 183

Location Awareness of Information Agents
Merik Meriste, Jüri Helekivi, Tõnis Kelder, Andres Marandi, Leo Mõtus, Jürjo Preden 199

XML and Databases

Algebraic Semantics of XML Schema
Leonid Novak, Alexandre Zamulin 209

Efficient XPath Evaluation
Bing Wang, Ling Feng, Yun Shen 223

A Prototype for Translating XQuery Expressions into XSLT Stylesheets
Niklas Klein, Sven Groppe, Stefan Böttcher, Le Gruenwald 238

Combining Tree Structure Indexes with Structural Indexes in Query Evaluation on XML Data
Attila Kiss, Vu Le Anh 254

A DataGuide-Based Concurrency Control Protocol for Cooperation on XML Data <i>Peter Pleshachkov, Petr Chardin, Sergey Kuznetsov</i>	268
---	-----

Data Mining and Knowledge Discovery

Mining Fuzzy Classification Rules Using an Artificial Immune System with Boosting <i>Bilal Alatas, Erhan Akin</i>	283
Continuous Trend-Based Classification of Streaming Time Series <i>Maria Kontaki, Apostolos N. Papadopoulos, Yannis Manolopoulos</i> . . .	294

Information Systems and Software Engineering

Conceptual Content Management for Software Engineering Processes <i>Sebastian Bossung, Hans-Werner Sehring, Michael Skusa, Joachim W. Schmidt</i>	309
Using Step-Wise Refinement to Build a Flexible Lightweight Storage Manager <i>Thomas Leich, Sven Apel, Gunter Saake</i>	324
BiChord: An Improved Approach for Lookup Routing in Chord <i>Junjie Jiang, Ruoyu Pan, Changyong Liang, Weinong Wang</i>	338

Information Systems Development

On Business Rules Automation: The BR-Centric IS Development Framework <i>Irma Valatkaite, Olegas Vasilecas</i>	349
CFP Taxonomy of the Approaches for Dynamic Web Content Acceleration <i>Stavros Papastavrou, George Samaras, Paraskevas Eiripidou, Panos K. Chrysanthis</i>	365
Long-Term Temporal Data Representation of Personal Health Data <i>Tore Mallaug, Kjell Bratbergsengen</i>	379
Author Index	393