Lecture Notes in Computer Science

7238

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

Alfred Kobsa

University of California, Irvine, CA, 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

TU Dortmund University, Germany

Madhu Sudan

Microsoft Research, Cambridge, MA, USA

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max Planck Institute for Informatics, Saarbruecken, Germany

Sang-goo Lee Zhiyong Peng Xiaofang Zhou Yang-Sae Moon Rainer Unland Jaesoo Yoo (Eds.)

Database Systems for Advanced Applications

17th International Conference, DASFAA 2012 Busan, South Korea, April 15-18, 2012 Proceedings, Part I



Volume Editors

Sang-goo Lee

Seoul National University, Seoul 151747, South Korea

E-mail: sglee@snu.ac.kr

Zhiyong Peng

Wuhan University, Wuhan 430081, Hubei Province, China

E-mail: peng@whu.edu.cn

Xiaofang Zhou

University of Queensland, Brisbane, QLD 4072, Australia

E-mail: zxf@itee.uq.edu.au

Yang-Sae Moon

Kangwon National University, Chuncheon 200701, Kangwon, South Korea

E-mail: ysmoon@kangwon.ac.kr

Rainer Unland

University of Duisburg-Essen, 45117 Essen, Germany

E-mail: rainer.unland@icb.uni-due.de

Jaesoo Yoo

Chungbuk National University, Cheongju 361-763, Chungbuk, South Korea

E-mail: yjs@chungbuk.ac.kr

ISSN 0302-9743 ISBN 978-3-642-29037-4 e-ISSN 1611-3349 e-ISBN 978-3-642-29038-1

DOI 10.1007/978-3-642-29038-1

Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2012933786

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

LNCS Sublibrary: SL 3 – Information Systems and Application, incl. Internet/Web and HCI

© Springer-Verlag Berlin Heidelberg 2012

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.

The use of general descriptive names, registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

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

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

It is our great pleasure to welcome you to the proceedings of the 17th International Conference on Database Systems for Advanced Applications (DASFAA 2012), which was held in Busan, Korea, in April, 2012. DASFAA is an international conference which provides a forum for technical presentations and discussions among database researchers, developers and users from academia, business and industry, in the areas of databases, large-scale data management, data mining, search and recommendation, and the Web.

The call for papers attracted 159 research submissions from 24 countries (based on the affiliation of the first author). Among them, the Program Committee selected, through a comprehensive review process, 44 regular papers and 8 short papers for presentation. The Industrial Committee, chaired by Won Suk Lee, Mukesh Mohania and Jeffrey Yu, selected 8 industrial papers for presentation. The conference program also included 8 demo presentations selected from 17 submissions by the Demo Committee chaired by Wolf-Tilo Balke and Seung-Won Hwang.

This volume also includes extended abstracts of the two invited keynote lectures by Divesh Srivastava (AT&T Research) and Sang Kyun Cha (Seoul National University and SAP Labs Korea), whose topics were on "Enabling Real-Time Data Analysis" and "A New Paradigm of Thinking and Architecture for Real-Time Information Processing at Fingertips," respectively. The Tutorial Chair, Wook-Shin Han, organized four tutorials by leading experts on topics ranging from probabilistic databases to detecting clones and reuse on the Web. A stimulating panel was organized by the Panel Chair, Kyuseok Shim. This rich and attractive conference program boasts conference proceedings that span two volumes of Springer's Lecture Notes in Computer Science series.

Beyond the main conference Hwanjo Yu, Yu Ge and Wynne Hsu, who chaired the Workshop Committee, put together five workshops that catered to specific interests of the conference participants. The workshop papers are included in a separate volume of proceedings also published by Springer in its *Lecture Notes in Computer Science* series.

DASFAA 2012 was jointly organized by Pusan National University and the Database Society of Korea. It received in-cooperation sponsorship from the Korea Institute of Information Scientists and Engineers, the Database Society of Japan, the China Computer Federation Database Technical Committee, and the Korea Database Agency. We are grateful to the industry and institutional sponsors who contributed generously to making DASFAA 2012 successful.

The conference would not have been possible without the support and hard work of many colleagues. We would like to express our special thanks to Honorary Conference Chair, Kyu-Young Whang, for his valuable advice on all aspects of organizing the conference. We thank the DASFAA Steering Committee

VI Preface

for their leaderships and encouragement. We thank the General Co-chairs, Yoon Joon Lee and Kazutoshi Sumiya, Organizing Committee Chair, Bonghee Hong, Publicity Co-chairs, Eenjun Hwang, Jae-Gil Lee and YunChan Chang, Local Arrangements Committee Co-chairs, Joonho Kwon and Ok-Ran Jeong, Finance Chair, Min-Su Lee, Web Co-chairs, Ha-Joo Song and Young-Koo Lee, Demo Award Committee Co-chairs, Young-Kuk Kim, Takahiro Hara and Kyoung-Gu Woo, Best Paper Committee Co-chairs, SangKeun Lee, Hiroyuki Kitagawa and Xiaofeng Meng, Sponsor Co-chairs, Yunmook Nah and Kyu-Chul Lee, Registration Chair, Sanghyun Park, Steering Committee Liaison, Byeong-Soo Jeong, APWEB Liaison, Wookey Lee, and EDB Liason, Jinho Kim.

Finally, our thanks go to all the committee members and other individuals involved in putting this all together, and to all authors who submitted their papers to this conference.

April 2012

Sang-goo Lee Zhiyong Peng Xiaofang Zhou Yang-Sae Moon Rainer Unland Jaesoo Yoo

Organization

Honorary Conference Chair

Kyu-Young Whang KAIST, South Korea

Conference General Co-chairs

Yoon Joon Lee KAIST, South Korea

Kazutoshi Sumiya University of Hyogo, Japan

Program Committee Co-chairs

Sang-goo Lee Seoul National University, South Korea

Zhiyong Peng Wuhan University, China

Xiaofang Zhou University of Queensland, Australia

Organizing Committee Chair

Bonghee Hong Pusan National University, South Korea

Workshop Co-chairs

Hwanjo Yu POSTECH, South Korea Yu Ge Northeastern University, China

Wynne Hsu National University of Singapore, Singapore

Industrial Co-chairs

Won Suk Lee Yonsei University, South Korea

Mukesh K. Mohania IBM Research, India

Jeffrey Xu Yu Chinese University of Hong Kong, China

Tutorial Chair

Wook-Shin Han Kyungbook National University, South Korea

Panel Chair

Kyuseok Shim Seoul National University, South Korea

Demo Co-chairs

Wolf-Tilo Balke TU-Braunschweig, Germany Seung-Won Hwang POSTECH, South Korea

Publicity Co-chairs

Eenjun Hwang Korea University, South Korea

Jae-Gil Lee KAIST, South Korea

YunChan Chang Victoria University, Australia

Local Arrangements Co-chairs

Joonho Kwon Pusan National University, South Korea

Ok-Ran Jeong Gachon University, South Korea

Finance Chair

Min-Su Lee Ewha Womans University, South Korea

Publication Co-chairs

Rainer Unland University of Duisburg-Essen, Germany
Jaesoo Yoo Chungbuk National University, South Korea
Yang-Sae Moon Kangwon National University, South Korea

Web Co-chairs

Ha-Joo Song Pukyong National University, South Korea Young-Koo Lee Kyung Hee University, South Korea

Demo Award Committee Co-chairs

Young-Kuk Kim Chungnam National University, South Korea

Takahiro Hara Osaka University, Japan

Kyoung-Gu Woo Samsung Electronics, South Korea

Best Paper Committee Co-chairs

SangKeun Lee Korea University, South Korea University of Tsukuba, Japan Xiaofeng Meng Renmin University of China, China

Steering Committee Liaison

Byeong-Soo Jeong Kyung Hee University, South Korea

Sponsor Co-chairs

Yunmook Nah Dankook University, South Korea

Kyu-Chul Lee Chungnam National University, South Korea

Registration Chair

Sanghyun Park Yonsei University, South Korea

APWEB Liaison

Wookey Lee Inha University, South Korea

EDB (International Conference on Emerging Databases) Liaison

Jinho Kim Kangwon National University, South Korea

DASFAA Steering Committee

Ramamohanarao

Kotagiri (Chair) University of Melbourne, Australia Jianzhong Li (Vice Chair) Harbin Institute of Technology, China

Katsumi Tanaka (Advisor) Kyoto University, Japan Kazutoshi Sumiya (Treasurer) University of Hyogo, Japan

Qing Li (Secretary) City University of Hong Kong, China

Masaru Kitsuregawa University of Tokyo, Japan Mukesh K. Mohania IBM Research, India

Byeong-Soo Jeong Kyung Hee University, South Korea Ming-Syan Chen National Taiwan University, Taiwan Eui Kyeong Hong University of Seoul, South Korea Hiroyuki Kitagawa University of Tsukuba, Japan Li-Zhu Zhou Tsinghua University, China

Stephane Bressan National University of Singapore, Singapore BongHee Hong Pusan National University, South Korea

Program Committees

Research Track

Toshiyuki Amagasa University of Tsukuba, Japan Masayoshi Aritsugi Kumamoto University, Japan

Zhifeng Bao National University of Singapore, Singapore

Ladjel Bellatreche Poitiers University, France

Boualem Benatallah University of New South Wales, Australia Sourav Bhowmick Nanyang Technological University, Singapore

Cui Bin Peking University, China

Athman Bouguettaya RMIT, Australia

Jinseok Chae University of Incheon, South Korea

Chee Yong Chan

Jae Woo Chang

National University of Singapore, Singapore
Chonbuk National University, South Korea

Jae-young Chang Hansung University, South Korea

Lei Chen HKUST, China

Ming-Syan Chen National Taiwan University, Taiwan Yi Chen Arizona State University, USA

Hong Cheng Chinese University of Hong Kong, China James Cheng Nanyang Technological University, Singapore

Reynold Cheng University of Hong Kong, China
Jae-heon Cheong Shingu University, South Korea
Byron Choi Hong Kong Baptist University, China

Yon Dohn Chung Korea University, South Korea

Gao Cong Nanyang Technological University, Singapore Alfredo Cuzzocrea ICAR-CNR / University of Calabria, Italy Gill Dobbie University of Auckland, New Zealand Xiaoyong Du Renmin University of China, China

Jianhua Feng Tsinghua University, China
Ling Feng Tsinghua University, China
Yunjun Gao Zhejiang University, China
Yu Ge Northeastern University, China

Stephane Grumbach INRIA, France

Takahiro Hara Osaka University, Japan

Bingsheng He Nanyang Technological University, Singapore Wynne Hsu National University of Singapore, Singapore Haibo Hu Hong Kong Baptist University, China

Ming Hua Facebook, USA

Dong-Hyuk Im Seoul National University, South Korea

Yoshiharu Ishikawa Nagoya University, Japan Adam Jatowt Kyoto University, Japan Ruoming Jin Kent State University, USA Sungwon Jung Sogang University, South Korea Norio Katayama Yiping Ke Chulyon Kim Dongkyu Kim Han-joon Kim Jinho Kim Sang-Wook Kim Markus Kirchberg

Markus Kirchberg Hiroyuki Kitagawa Ig-hoon Lee

Mong Li Lee
Sang-Won Lee
Wang-Chien Lee
Cuiping Li
Jianzhong Li
Xuemin Lin
Chengfei Liu
Eric Lo
Jiaheng Lu
Nikos Mamoulis
Weiyi Meng
Xiaofeng Meng
Jun-Ki Min

Jun Miyazaki

Bongki Moon Yang-Sae Moon Yasuhiko Morimoto Atsuyuki Morishima Miyuki Nakano Tadashi Ohmori Makoto Onizuka

Hyoungmin Park Min Sik Park Sanghyun Park

Young-Ho Park

Jian Pei

Wen-Chih Peng

Lu Qin

Keun Ho Ryu

Simonas Saltenis Markus Schneider

Jialie Shen

National Institute of Informatics, Japan Chinese University of Hong Kong, China Kyungwon University, South Korea

Georgetown University, USA University of Seoul, South Korea

Kangwon National University, South Korea

Hanyang University, South Korea HP Labs Singapore, Singapore University of Tsukuba, Japan

Seoul National University, South Korea National University of Singapore, Singapore Sungkyunkwan University, South Korea Pennsylvania State University, USA Renmin University of China, China Harbin Institute of Technology, China University of New South Wales, Australia Swinburne University of Technology, Australia Hong Kong Polytechnic University, China

Renmin University of China, China University of Hong Kong, China Binghamton University, USA Renmin University of China, China

Korea University of Technology and Education,

South Korea

Nara Advanced Institute of Science and

Technology, Japan

University of Arizona, USA

Kangwon National University, South Korea

Hiroshima University, Japan University of Tsukuba, Japan University of Tokyo, Japan

University of Electro-Communications, Japan

NTT Corporation, Japan

University of Brithish Columbia, Canada Korea Database Agency, South Korea

Yonsei University, South Korea

Sookmyung Women's University, South Korea

Simon Fraser University, Canada

National Chiao Tung University, Taiwan Chinese University of Hong Kong, China Chungbuk National University, South Korea

Aalborg University, Denmark University of Florida, USA

Singapore Management University, Singapore

XII Organization

Junho Shim Sookmyung Women's University, South Korea

Hyoseop Shin Konkuk University, South Korea Jung Hyeon Sin INET-Hosting, South Korea

Atsuhiro Takasu National Institute of Informatics, Japan

David Taniar Monash University, Australia

Vincent Tseng National Cheng Kung University, Taiwan

Haixun Wang Microsoft Research Asia, China Jianyong Wang Tsinghua University, China John Wang Griffith University, Australia

Wei Wang University of New South Wales, Australia

Raymond Wong HKUST, China

Xiaokui Xiao Nanyang Technological University, Singapore

Jianliang Xu Hong Kong Baptist University, China

Ke Yi HKUST, China

Man Lung Yiu Hong Kong Polytechnic University, China Haruo Yokota Tokyo Institute of Technology, Japan

Jaesoo Yoo Chungbuk National University, South Korea

Rui Zhang University of Melbourne, Australia

Wenjie Zhang University of New South Wales, Australia Baihua Zheng Singapore Management University, Singapore Bin Zhou University of Maryland Baltimore County, USA

Industrial Track

Haibo Hu Hong Kong Baptist University, China

Weining Qian Fudan University, China

Bingsheng HE Nanyang Technological University, Singapore

Marek Kowalkiewicz SAP, Australia

Jilei Tian Nokia Research China, China

Unil Yun Chungbuk National University, South Korea Yang-Sae Moon Kangwon National University, South Korea

Byungjoo Chung Cubrid, South Korea

Demo Track

Ilaria Bartolini University of Bologna, Italy

Changkyu Kim Intel Labs, USA

Jiaheng Lu Renmin University of China, China

Yaokai Feng Kyushu University, Japan Young-In Song Microsoft Research Asia, China Yoonkyong Lee Samsung Electronics, South Korea

Georgia Koutrika IBM Research, USA

Christoph Lofi TU-Braunschweig, Germany

External Reviewers

Brian Ackerman
Kamel Boukhalfa
Panagiotis Bouros
Yulei Fan
Wei Feng
Shen Ge
Reza Hemayati
Hai Huang
Zheng Huo
Stéphane Jean
Yu Jiang

Selma Khouri Chungrim Kim Young-kook Kim Ryan Ko Erwin Leonardi Jing Li Jianxin Li Wenxin Liang Pan Lin

Lin Liu Yunzhong Liu Cheng Long Youzhong Ma Luo Min Jaehui Park Peng Peng Yu Peng Zhenhua Song Yu Shyang Tan Yongxin Tong Guan Wang Hao Wang

Hao Wang
Yousuke Watanabe
Kefeng Xuan
MingxuanYuan
Geng Zhao
Jinzeng Zhang
Rui Zhou
Wei Zhang
Xiaojian Zhang

Table of Contents – Part I

Keynote Talks	
Enabling Real Time Data Analysis	1
A New Paradigm of Thinking and Architecture for Real-Time Information Processing at Fingertips	2
Query Processing and Optimization	
Improving the Accuracy of Histograms for Geographic Data Objects Hai Thanh Mai, Jaeho Kim, and Myoung Ho Kim	3
Improving Online Aggregation Performance for Skewed Data	
Distribution	18
A Relational-Based Approach for Aggregated Search in Graph	
Databases	33
Data Semantics and Interoperability	
Discovery of Keys from SQL Tables	48
A Framework for Realizing Artifact-Centric Business Processes in	
Service-Oriented Architecture	63
Appearance-Order-Based Schema Matching	79
XML and Semi-structured Data I	
Fast Result Enumeration for Keyword Queries on XML Data Junfeng Zhou, Zhifeng Bao, Ziyang Chen, and Tok Wang Ling	95
Stars on Steroids: Fast Evaluation of Multi-source Star Twig Queries in RDBMS	110
Erwin Leonardi, Sourav S. Bhowmick, and Fengrong Li	110

Updating Typical XML Views	126
XML and Semi-structured Data II	
Partitioned Indexes for Entity Search over RDF Knowledge Bases Fang Du, Yueguo Chen, and Xiaoyong Du	141
SINBAD: Towards Structure-Independent Querying of Common Neighbors in XML Databases	156
Top-Down SLCA Computation Based on List Partition	172
Efficiently Identifying Contributors for XML Keyword Search	185
Data Mining and Knowledge Discovery I	
Semi-supervised Clustering of Graph Objects: A Subgraph Mining	
Approach	197
Plink-LDA: Using Link as Prior Information in Topic Modeling	213
AnyOut: Anytime Outlier Detection on Streaming Data	228
Data Mining and Knowledge Discovery II	
Ensemble Based Positive Unlabeled Learning for Time Series	2.40
Classification	243
Efficient Mining Regularly Frequent Patterns in Transactional	250
Databases	258
Fast Tree-Based Mining of Frequent Itemsets from Uncertain Data Carson Kai-Sang Leung and Syed K. Tanbeer	272

Data Mining and Knowledge Discovery III	
On the Decidability and Complexity of Identity Knowledge Representation	288
Privacy Preserving Mining Maximal Frequent Patterns in Transactional Databases	303
Ho-Jin Choi	
Data Privacy against Composition Attack	320
Privacy and Anonymity	
Protecting Sensitive Relationships against Inference Attacks in Social Networks	335
You Can Walk Alone: Trajectory Privacy-Preserving through Significant Stays Protection	351
Semi-Edge Anonymity: Graph Publication when the Protection Algorithm Is Available	367
Data Management in the Web	
On-the-Fly Generation of Facets as Navigation Signs for Web	
Objects	382
Searching for Quality Microblog Posts: Filtering and Ranking Based on Content Analysis and Implicit Links	397
HotDigg: Finding Recent Hot Topics from Digg	414
Assessing Web Article Quality by Harnessing Collective Intelligence Jingyu Han, Xueping Chen, Kejia Chen, and Dawei Jiang	428

Graphs and Data Mining Applications	
Context Sensitive Tag Expansion with Information Inference	440
Efficient Subgraph Similarity All-Matching	455
Efficient Algorithm for Mining Correlated Protein-DNA Binding Cores	470
Po-Yuen Wong, Tak-Ming Chan, Man-Hon Wong, and Kwong-Sak Leung	410
A Novel Approach for Finding Alternative Clusterings Using Feature Selection	482
Temporal and Spatial Data I	
General Spatial Skyline Operator	494
Top-k Similarity Join over Multi-valued Objects	509
Indexing Network Voronoi Diagrams	526
Temporal and Spatial Data II	
On Efficient Reverse k-Skyband Query Processing	544
Co-spatial Searcher: Efficient Tag-Based Collaborative Spatial Search on Geo-social Network	560
Traffic Aware Route Planning in Dynamic Road Networks Jiajie Xu, Limin Guo, Zhiming Ding, Xiling Sun, and Chengfei Liu	576
Author Index	593

Table of Contents – Part II

Top-k and Skyline Query Processing	
Top-k Best Probability Queries on Probabilistic Data	1
Probabilistic Reverse Skyline Query Processing over Uncertain Data Stream	17
Malleability-Aware Skyline Computation on Linked Open Data	33
Information Retrieval and Recommendation	
Effective Next-Items Recommendation via Personalized Sequential Pattern Mining	48
Scalable Top- k Keyword Search in Relational Databases	65
Composition and Efficient Evaluation of Context-Aware Preference Queries	81
Indexing and Search Systems	
An Automaton-Based Index Scheme for On-Demand XML Data Broadcast	96
Colored Range Searching on Internal Memory	111
Circle of Friend Query in Geo-Social Networks	126
A Power Saving Storage Method That Considers Individual Disk Rotation	138

Cloud	Computing	and	Scal	abil	lity

ComMapReduce: An Improvement of MapReduce with Lightweight Communication Mechanisms Linlin Ding, Junchang Xin, Guoren Wang, and Shan Huang	150
Halt or Continue: Estimating Progress of Queries in the Cloud	169
Towards a Scalable, Performance-Oriented OLAP Storage Engine	185
Industrial Papers I: Memory-Based Query Processing	
Highly Scalable Speech Processing on Data Stream Management	
System	203
EVIS: A Fast and Scalable Episode Matching Engine for Massively	010
Parallel Data Streams	213
Real-Time Analysis of ECG Data Using Mobile Data Stream	
Management System	224
A Main Memory Based Spatial DBMS: Kairos	234
Industrial Papers II: Semantic and Decision Support Systems	
Study on the International Standardization for the Semantic Metadata Mapping Procedure	243
Sungjoon Lim, Taesul Seo, Changhan Lee, and Soungsoo Shin	243
Semantics and Usage Statistics for Multi-dimensional Query	
Expansion	250
Hierarchy-Based Update Propagation in Decision Support Systems	261
An Experiment with Asymmetric Algorithm: CPU Vs. GPU	272

Demo Papers I: Social Data	
Tag Association Based Graphical Password Using Image Feature Matching	282
Kyoji Kawagoe, Shinichi Sakaguchi, Yuki Sakon, and Hung-Hsuan Huang	
ACARP: Author-Centric Analysis of Research Papers	287
iParticipate: Automatic Tweet Generation from Local Government	
Data	295
gRecs: A Group Recommendation System Based on User Clustering Irene Ntoutsi, Kostas Stefanidis, Kjetil Norvag, and Hans-Peter Kriegel	299
Demo Papers II: Data Mining	
PEACOD: A Platform for Evaluation and Comparison of Database	
Partitioning Schemes	304
Stream Data Mining Using the MOA Framework	309
Shot Classification Using Domain Specific Features for Movie	
Management	314
PA-Miner: Process Analysis Using Retrieval, Modeling, and	
Prediction Anca Maria Ivanescu, Philipp Kranen, Manfred Smieschek, Philip Driessen, and Thomas Seidl	319
Panel	
Data Management Challenges and Opportunities in Cloud Computing (Abstract)	323
Kyuseok Shim, Sang Kyun Cha, Lei Chen, Wook-Shin Han, Divesh Srivastava, Katsumi Tanaka, Hwanjo Yu, and Xiaofang Zhou	

XXII Table of Contents – Part II

Tutorials

Detecting Clones, Copying and Reuse on the Web (DASFAA 2012	324
Tutorial)	324
Query Processing over Uncertain and Probabilistic Databases Lei Chen and Xiang Lian	326
Tutorial: Data Stream Mining and Its Applications (Abstract) Latifur Khan and Wei Fan	328
Storing, Querying, Summarizing, and Comparing Molecular Networks: The State-of-the-Art	330
Author Index	333