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# Database Systems for Advanced Applications

17th International Conference, DASFAA 2012

*International Workshops:*

FlashDB, ITEMS, SNSM, SIM<sup>3</sup>, DQDI

Busan, South Korea, April 15-18, 2012

Proceedings

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# Preface

Database Systems for Advanced Applications (DASFAA) is an annual international database conference, located in the Asia-Pacific region, which showcases state-of-the-art R&D activities in database systems and their applications. It provides a forum for technical presentations and discussions among database researchers, developers, and users from academia, business, and industry. DASFAA 2012, the 17th in the series, was held in Busan during April 15–18, 2012. Among the proposals submitted in response to the call-for-workshops, we carefully selected five workshops, each focusing on a specific area that contributes to the main themes of the DASFAA conference. This volume contains the papers accepted for these five workshops that were held in conjunction with DASFAA 2012. They are:

- The Second International Workshop on Flash-Based Database Systems (FlashDB 2012)
- The First International Workshop on Information Technologies for Maritime and Logistics (ITEMS 2012)
- The Third International Workshop on Social Networks and Social Web Mining (SNSM 2012)
- The Second International Workshop on Spatial Information Modeling, Management and Mining (SIM3 2012)
- The 5th International Workshop on Data Quality in Data Integration Systems (DQDI 2012)

We are very grateful to the workshop organizers for their tremendous effort in soliciting papers, selecting papers by peer review, and preparing attractive programs. We asked all workshops to follow a rigid paper-selection process, including the procedure to ensure that any Program Committee members were excluded from the review process of any paper they were involved in. A requirement about the overall paper acceptance rate was also imposed on all the workshops. We would like to express our appreciation to Sang-goo Lee, Bonghee Hong, Won Suk Lee, Wook-Shin Han, Kyuseok Shim, and many other people for their support in the workshop organization. Our thanks also go to Rainer Unland, Jaesoo Yoo, and Yang-Sae Moon for their hard work in compiling this proceedings volume.

April 2012

Hwanjo Yu  
Ge Yu  
Wynne Hsu

# FlashDB 2012 Workshop Organizers' Message

Recently, new storage media such as flash memory and phase change memory have been developed very quickly, bringing big challenges to the architecture of computer systems as well as the design of system software. In particular, NAND flash (either SLC- or MLC-based) in the form of solid state disks (SSDs) has been an alternative to traditional magnetic disks, both in the home-user environment and in the enterprise computing environment, owing to its shock-resistance, low power consumption, non-volatility, and high I/O speed. The special features of flash memory and other new storage media impose new challenges to traditional data management technologies. As a result, traditional database architectures and algorithms designed for magnetic-disk-based storage fail to utilize new storage media efficiently. Meanwhile, the new characteristics of modern storage media, such as not-in-place update and asymmetric read/write/erase latencies of flash memory, also bring great challenges in optimizing database performance, by using new query processing algorithms, indexes, buffer management schemes, and new transaction processing protocols. Consequently, how to exploit the characteristics of flash memory and other new storage media has become an important topic of database systems research. In order to make use of the characteristics of flash memory and other new storage media, the data management community needs to rethink the algorithms and technical issues in magnetic-disk-oriented database systems and make them be adapted to the advances in the underlying storage infrastructure.

The Second International Workshop on Flash-Based Database Systems (FlashDB 2012) was held on April 15, 2012, in Busan, South Korea, in conjunction with DASFAA 2012. The overall goal of the workshop was to bring together researchers who are interested in optimizing database performance on flash memory or other new storage media by designing new data management techniques and tools.

The workshop attracted submissions from Germany, Poland, France, Iceland, Korea, and China. All submissions were peer reviewed by at least three Program Committee members to ensure that high-quality papers were selected. On the basis of the reviews, the Program Committee selected five submissions as full papers and two submissions as short papers for inclusion in the workshop proceedings. The final program of the workshop also consisted of one invited talk from Indilinx Inc.

The Program Committee of the workshop comprised 17 experienced researchers and experts from both industry and academia. We would like to thank the valuable contribution of all the Program Committee members during the peer-review

process. Also, we would like to acknowledge the DASFAA 2012 Workshop Co-chairs for their great support in ensuring the success of FlashDB 2012, and the support from the Natural Science Foundation of China (No. 60833005) and Singapore A-Star DSI.

April 2012

Bingsheng He  
Jianliang Xu  
Xiaofeng Meng  
Lihua Yue

# ITEMS 2012 Workshop Organizers' Message

According to the International Maritime Organization, more than 90% of the global trade volume, whether it is oil and gas, bulk or containerized cargo, is carried by sea. To this volume, leisure, passenger, and military shipping must also be added to account for the traffic. The stakeholders in the maritime and logistics industry are numerous. Information technologies (IT) for maritime and logistics is a specialized area that deals with important aspects of IT, including but not limited to simulation of maritime and logistics systems; data analytics; acquisition, processing, and management of maritime data; robotics, Web technologies, artificial intelligence, and decision support systems for safety and security.

The First International Workshop on Information Technologies for Maritime and Logistics (ITEMS 2012) was held on April 15, 2012, in Busan, South Korea, in conjunction with DASFAA 2012. The overall goal of the workshop was to bring together researchers, developers, practitioners, and users from academia, business, and industry who are interested in all the important aspects of information technologies dedicated to the maritime and logistics industry.

The workshop attracted submissions from China, France, India, and South Korea. All submissions were peer reviewed by at least three Program Committee members to ensure that high-quality papers were selected. For this first workshop the Program Committee selected two papers for inclusion in the workshop proceedings. The final program of the workshop also consisted of an invited talk on "IT for Sustainable Networks and Logistics" from SAP Singapore.

The Program Committee of the workshop comprised 15 experienced researchers. We would like to thank the valuable contribution of all the Program Committee members during the peer-review process. Also, we would like to acknowledge the DASFAA 2012 Workshop Co-chairs for their great support in ensuring the success of ITEMS 2012, and the support that we received from the Centre for Maritime Studies at the National University of Singapore.

April 2012

Stephane Bressan  
Bonghee Hong  
Baljeet Malhotra

# SNSM 2012 Workshop Organizers' Message

Today the emergence of Web-based communities and hosted services, such as social networking sites, wikis and folksonomies, brings in tremendous freedom of Web autonomy and facilitates collaboration and knowledge sharing between users. Along with the interaction between users and computers, social media are rapidly becoming an important part of our digital experience, ranging from digital textual information to diverse multimedia forms. These aspects and characteristics constitute the core of second generation of the Web.

A prominent challenge lies in modeling and mining this vast pool of data to extract, represent, and exploit meaningful knowledge and to leverage structures and dynamics of emerging social networks residing in the social media. Social networks and social media mining combines data mining with social computing as a promising new direction of research and offers unique opportunities for developing novel algorithms and tools ranging from text and content mining to link mining.

The Third International Workshop on Social Networks and Social Web Mining (SNSM 2012) was held on April 15, 2012, in Busan, Korea, in conjunction with DASFAA 2012. The overall goal of the workshop was to bring together academic researchers and industrial practitioners from computer science, information systems, statistics, sociology, behavioral science, and organization science disciplines, and provide a forum for recent advances in the field of social networks and social media, from the perspectives of data management and mining.

The workshop attracted 16 submissions from Canada, France, Finland, China, Japan, Korea, India, Bangladesh, and Hong Kong. All submissions were peer reviewed by at least three Program Committee members to ensure that high-quality papers were selected. On the basis of the reviews, the Program Committee selected ten papers for inclusion in the workshop proceedings plus an invited paper.

The Program Committee of the workshop consisted of 45 experienced researchers and experts. We would like to thank the valuable contribution of all the Program Committee members during the peer-review process. Also, we would like to acknowledge the DASFAA 2012 Workshop Co-chairs for their great support in ensuring the success of SNSM 2012. Last but not least, we would like to acknowledge all the authors who submitted very interesting and impressive papers from their recent work.

April 2012

Guandong Xu  
Lin Li  
Wookey Lee



# SIM3 2012 Workshop Organizers' Message

Spatial data exists pervasively in various information systems and applications. The unprecedented amount of spatial data that has been amassed and that is being produced in an increasing speed via various facilities, such as sensors, GPS receivers, smart phones, and remote sensing, calls for extensive, deep, and sustaining research on spatial information modeling, management, and mining. In the past decade, we witnessed increasing research interests in these areas from the database, data mining, and geographic information systems (GIS) communities.

Following the success of the First International Workshop on Spatial Information Modeling, Management and Mining (SIM3 2011) held in conjunction with DASFAA 2011, the Second International Workshop on Spatial Information Modeling, Management and Mining (SIM3 2012) held in conjunction with DASFAA 2012, stuck to the tradition that brings together researchers, developers, users, and practitioners carrying out research and development in spatial information modeling, management, and mining, thereby fostering discussions in all aspects of these research areas and providing a forum for original research contributions and practical experiences of spatial information modeling, management, and mining to highlight future trends in these topics.

The workshop received ten submissions. Through a careful review round by the Program Committee, four full papers and one short paper were selected for presentation at the workshop and inclusion in the proceedings. These accepted papers cover various topics of spatial indexing, query processing, and mining. Concretely, He Ma et al. proposed a novel multi-level grid-index and a number of related query types that facilitate application access to augmented, large-scale Geo-tagged video repositories; Ying Fang et al. developed a novel indexing method, History TPR\*-tree (HTPR\*-tree in short), which can support not only predictive queries but also partial history queries involved from the most recent update instant of each object to the last update time of all objects; Soo Kang et al. introduced a linear bi-directional broadcast indexing scheme for sensor networks in road environments; Wengen Li et al. presented an algorithm for evaluating spatial keyword queries under the MapReduce framework; and Biying Tan et al. proposed an effective method to detect high-risk geographical zones and potentially infected neighbors by capturing the significant changes in the infectious disease monitoring data.

The workshop had an invited talk, given by Gao Cong from the Nanyang Technological University, Singapore. In this talk, Dr. Cong introduced the recent advances and his research group's achievements in spatial keyword query processing.

A successful workshop requires a lot of effort from different people. First, we would like to thank the authors for their contributions and the Program Committee members for their reviewing. We also appreciate the DASFAA 2012 Workshop Co-chairs for their excellent coordination. Finally, we would like to thank the local Organizing Committee for its wonderful arrangements.

April 2012

Jihong Guan  
Xin Wang

# DQDI 2012 Workshop Organizers' Message

Data integration has been a subject of intense research and development for over three decades. Basically, the goal of a data integration system is to provide a uniform interface to a multitude of data sources. Difficulties in overcoming the schematic, syntactic, and semantic differences of data from multiple autonomous and heterogeneous sources are well recognized, and have resulted in a data integration market valued at US\$1.34 billion and growing. With the phenomenal increase in the scale and disparity of data, the problems associated with data integration have increased dramatically. A fundamental aspect of user satisfaction from an integration system is the data quality. Industry reports indicate that expensive data integration initiatives stemming from migrations, mergers, legacy upgrades etc., succeed in achieving a common technology platform, but are rejected by the user communities due to the presence (or exposure) of poor data quality. Poor data quality is known to compromise the credibility and efficiency of commercial as well as public endeavors. Several developments from industry as well as academia have contributed significantly toward addressing the problem.

The DQDI workshop (previously titled MCIS) provides a forum to bring together diverse researchers and make a consolidated contribution to new and extended methods to address the challenges of data quality in a collaborative setting. Topics covered by the workshop include data integration, linkage; consistency checking, data profiling, and measurement; methods for data transformation, reconciliation, consolidation; among others. Following the success of this workshop in 2008 in New Delhi, India, 2009 in Brisbane, Australia, 2010 in Tsukuba, Japan, and 2011 in Hong Kong, China, the 5th DQDI was held on April, 2012, in Busan, South Korea, in conjunction with the 17th International Conference on Database Systems for Advanced Applications (DASFAA 2012). This year, the DQDI workshop attracted submissions from Australia, China, Russia, South Korea, and Italy. All submissions were peer reviewed by at least three international reviewers to ensure that high-quality papers were selected. On the basis of technical merit, originality, significance, and relevance to the workshop, the Program Committee decided on five papers to be included in the workshop proceedings (acceptance rate 50%).

The workshop Program Committee consisted of experienced researchers and experts in the area of data analysis and management. We would like to acknowledge the valuable contribution of all the Program Committee members during the peer-review process. Also, we would like to show our gratitude to the DASFAA 2012 Workshop Co-chairs for their great support in ensuring the success of DQDI 2012.

April 2012

Ke Deng  
Xiaochun Yang  
Shazia Sadiq  
Xiaofang Zhou

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Yang-Sae Moon	Kangwon National University, South Korea

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## **First International Workshop on Information Technologies for Maritime and Logistics (ITEMS 2012)**

### **Workshop Co-organizers**

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## Third International Workshop on Social Networks and Social Web Mining (SNSM 2012)

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## **Second International Workshop on Spatial Information Modeling, Management and Mining (SIM3 2012)**

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## 5th International Workshop on Data Quality in Data Integration System (DQDI 2012)

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Xiaochun Yang	Northeastern University, China
Shazia Sadiq	University of Queensland, Australia
Xiaofang Zhou	University of Queensland, Australia

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