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# Web-Age Information Management

WAIM 2014 International Workshops:  
BigEM, HardBD, DaNoS, HRSUNE,  
BIDASYS

Macau, China, June 16–18, 2014  
Revised Selected Papers

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# Preface

Web-Age Information Management (WAIM) is a leading international conference for researchers, practitioners, developers, and users to share and exchange their cutting-edge ideas, results, experiences, techniques, and tools in connection with all aspects of web data management. The conference invites original research papers on the theory, design, and implementation of Web-based information systems. As the 15th event in the increasingly popular series, WAIM 2014 was held in Macau, China, during June 16–18, 2014.

Along with the main conference, WAIM workshops intend to provide international groups of researchers with a forum for the discussion and exchange of research results contributing to the main themes of the WAIM conference. This WAIM 2014 workshop volume contains the papers accepted for the following five workshops that were held in conjunction with WAIM 2014. These five workshops were selected after a public call-for-proposals process, each of which focuses on a specific area that contributes to the main themes of the WAIM conference. The five workshops were as follows:

- The Second International Workshop on Emergency Management in Big Data Age (BigEM 2014).
- The Second International Workshop on Big Data Management on Emerging Hardware (HardBD 2014).
- International Workshop on Data Management for Next-Generation Location-Based Services (DaNoS 2014).
- International Workshop on Human Aspects of Making Recommendations in Social Ubiquitous Networking Environments (HRSUNE 2014).
- International Workshop on Big Data Systems and Services (BIDASYS 2014).

All the organizers of the previous WAIM conferences and workshops have made WAIM a valuable trademark, and we are proud to continue their work. We would like to express our thanks and acknowledgments to all the workshop organizers and Program Committee members who contributed to making the workshop program such a success. They put a tremendous amount of effort into soliciting and selecting research papers with a balance of high quality, novelty, and applications. They also followed a rigorous review process. A total of 38 papers were accepted. Last but not least, we are grateful to the main conference organizers and the local Organizing Committee for their great support and wonderful arrangements.

May 2014

Yueguo Chen  
Wolf-Tilo Balke  
Jianliang Xu

## **BigEM 2014 Workshop Organizers' Message**

With the advances of emergency management and information communication technologies, to improve the efficiency and accuracy of emergency management systems through modern data processing techniques becomes a crucial research issue. The past decade has witnessed huge technical advances in sensor networks, internet/web of things, cloud computing, mobile/embedded computing, spatial/temporal data processing, and big data, and these technologies have provided new opportunities and solutions to emergency management.

Data processing/analysis in emergency management is a typical big data scenario. Numerous sensors and monitoring devices continuously sample the states of the physical world, while the web data processing techniques make the internet a huge data repository which can reflect the states of the cyber world and the human world. The efficient processing of these data imposes a big challenge to the data management community. It is important to develop advanced data management and data processing mechanisms to support disaster detection, disaster response and control, rescue resource planning and scheduling, and emergency commanding.

The Second International Workshop on Emergency Management in Big Data Age (BigEM 2014) was held in conjunction with the 15th International Conference on Web-Age Information Management (WAIM 2014) in Macau, China, during June 16–18, 2014. The purpose of BigEM 2014 was to provide a forum for researchers and practitioners to exchange ideas and progress in the related areas of big data management, such as cloud computing, parallel algorithms, internet of things, spatial database, complex event detection, optimization theory, intelligent transportation systems, and social networks. All submissions were reviewed by at least three Program Committee members in order to ensure that high-quality papers were selected. Following a rigorous review process, 15 papers were selected for publication in the workshop proceedings.

The Program Committee of BigEM 2014 consisted of 17 experienced researchers and experts in the area of big data management. We would like to thank all the authors for submitting their papers to the workshop and the valuable contributions of all the Program Committee members during the peer-review process. Also, we would like to thank the WAIM 2014 Workshop Co-chairs for their great support in ensuring the success of BigEM 2014.

May 2014

Xiaofeng Meng  
Hui Zhang  
Yi Liu  
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## **HardBD 2014 Workshop Organizers' Message**

Big data management has received much attention from both academia and industries. While many people concentrate on designing new algorithms to mine valuable information from big data, a lot of researches are focused on improving the time efficiency of big data processing and storage. Regarding the time performance issue, one interesting solution is to utilize new and high-performance hardware in big data systems. Nowadays, hardware characteristics, is rapidly changing, imposing new challenges for an efficient utilization of hardware resources. Recent trends include storage-class memory, massive multi-core processing systems, very large main memory systems, fast networking components, big computing clusters, and large data centers that consume massive amounts of energy. It is clear that many aspects of data management have to evolve with these trends. Utilizing new hardware technologies for efficient big data management is of urgent importance.

The Second International Workshop on Big Data Management over Emerging Hardware (HardBD 2014) was held on June 16, 2014 at Macau in conjunction with The 15th International Conference on Web-Age Information Management (WAIM 2014). The overall goal of the workshop is to bring together researchers, practitioners, system administrators, system programmers, and others interested in sharing and presenting their perspectives on the effective management of big data over new hardware platforms, and also to discuss and identify future directions and challenges in this area.

The workshop attracted 12 submissions. All submissions were peer reviewed by two or three Program Committee members to ensure that the high quality of the accepted papers. Based on the reviews, the Program Committee selected four regular papers plus one short paper for inclusion in the workshop proceedings (acceptance rate 42 %). The final program of the workshop also consists of one keynote given by Prof. Shimin Chen who is from the Institute of Computing Technology, Chinese Academy of Sciences.

The Program Committee of the workshop consisted of 15 experienced researchers and experts. We would like to thank the hard work of all the Program Committee members during the peer-review process. Also we would like to acknowledge the WAIM 2014 workshop chairs for their support to HardBD 2014. The workshop is partially supported by the Natural Science Foundation of China (No. 60833005).

May 2014

Xiaofeng Meng  
Jianliang Xu  
Peiquan Jin



# **HardBD 2014 Workshop Organization**

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# **HardBD 2014 Workshop Keynote**

## **Effective Data Feeds for Big Data Analysis**

Shimin Chen

State Key Laboratory of Computer Architecture  
Institute of Computing Technology  
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Velocity is one of the major challenges for big data processing. While it is natural to link velocity to transaction processing and data streaming, this talk investigates a different aspect of velocity – supporting high-speed data feeds for analytical query processing. A basic requirement is to store incoming data feeds. However, this is often not sufficient. I will discuss two of my previous studies in this respect: (1) achieving efficient online updates in data warehouses and (2) supporting high-speed event ingestion in an event log processing system. The first study exploits solid state disks for caching and organizing data updates while maintaining good query performance in data warehouses. The second study shuffles incoming data feeds to support efficient time window-based join operations. From these studies, I would like to argue that efficient data analysis requires careful handling of incoming data feeds. It is important to organize incoming data feeds in an analysis friendly manner so that data analysis operations can run efficiently.

## **DaNoS 2014 Workshop Organizers' Message**

The proliferation of positioning technologies, such as GPS receivers and Wi-Fi, gives locations good opportunities to meet diversely data/information. Locations are combined with keywords in the spatial web querying that return objects that are near a location argument and are relevant to a text argument. Location-based social networking services allow social networks to connect and coordinate users with local people or events that match their interests. Location-based advertising pinpoint consumers' location and provide location-specific advertisements on their mobile devices. As an example, website Vidcinity (Video+Twitter+Foursquare) allows users to share and discover videos near a location. These various fusions enlarge the scope of location-based services and pose new challenges on the data management.

The First International Workshop on Data Management for Next-Generation Location-Based Services (DaNoS) was held on June 16, 2014, in Macau (China) in conjunction with the 21st International Conference on Web-Age Information Management (WAIM 2014). This workshop aims to facilitate the collaboration between researchers by presenting cutting edge research topics and methodologies on location-based service. The topics of interests in DaNoS 2014 include, but are not limited to: (i) Location-based keyword search, in which both spatial proximity and textual relevance; (ii) Location-based social network services, which match local people with similar interests; (iii) Location-based multimedia services, which aim at tagging spatial information on multimedia materials, e.g., video, photo, etc.; (iv) Location-based advertising services, which provide advertisements to location-specific consumers; (v) Location-based tagging system, which attaches spatial tags on the objects in business review websites; (vi) Privacy issues on location-based service; (vii) Spatial query processing on cloud services; and (viii) Other new type of spatial queries.

The workshop attracted four submissions, which are all peer reviewed by at least three Program Committee members to ensure the high-quality papers were selected. On the basis of the reviews, the Program Committee has selected two full papers for inclusion in the workshop proceedings (acceptance rate 50 %). Additionally, we also invite one paper to be involved in the proceeding. The Program Committee of this workshop consisted of five experienced experts on location-based service. We would like to thank authors of submitted papers of DaNoS 2014, and the Program Committee members for their careful reviews.

May 2014

Xin Lin  
Dingming Wu

# **DaNoS 2014 Workshop Organization**

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Hong Kong Baptist University, China

## **HRSUNE 2014 Workshop Organizers' Message**

With the huge popular social-rich information environments (e.g., Netflix, Yelp, Facebook, Twitter, Google+) penetrating our daily life, people (and organizations) have become more powerless with the flooding information from which decisions must be made. Fortunately, recommender systems are known to be capable of implicitly or explicitly observing users' online activities, learning their likes and dislikes and making personalized (or group-wise) suggestions accordingly. They have become a well-integrated part of a vast number of web/mobile applications available in the cloud and have been used in a wide variety of application areas such as (digital) entertainment (e.g., news articles, music, movies, books, restaurants, etc.), software engineering (for example, recommending replacement methods for adaptive codes; recommending reusable codes from the internet, etc.), and e-learning contexts (gathering interactions during the learning process both in formal and informal learning scenarios through learning management systems, virtual learning communities, and personal learning environments).

While the majority of earlier research efforts have been focused on the algorithmic understanding of making recommendations, more recent ones have aimed at understanding human and social factors of making suggestions and sharing resources (e.g., content items, people, software widgets, etc.) in existing social ubiquitous networks to answer questions such as, among many others: (1) What types of resources (for example, news articles) are mostly likely to be shared and liked/disliked?; (2) Does human factors matter when rating a resource (and thus, are to be taken into account in the recommendation process) such as the users' mood and emotions or the social ubiquitous environment where the resources is consumed?; (3) What effects do the 'share'/'like'/'follow' buttons have on people's information-seeking behaviors; in other words, should traditional recommendation techniques integrate these non-numeric ratings in making suggestions? If so, how?; and (4) What effects would reviews provided by other users have over the popularity/fall of a resource in a social network and does this effect depends on the context where the review has been made?

The First International Workshop on Human Aspects of Making Recommendations in Social Ubiquitous Networking Environments (HRSUNE) was held on June 16, 2014, in Macau (China) in conjunction with the 21st International Conference on Web-Age Information Management (WAIM 2014). This workshop aims at bringing together researchers and practitioners to explore and share their research results on the human and social aspects of making recommendations in the emerging social and increasingly more and more ubiquitous networking environments. The topics of interests in HRSUNE 2014 include, but are not limited to: (i) The social and human aspects of making recommendations (factors including user mood, emotions, personality, social status, etc.); (ii) The effect on the recommendations of the ubiquitous interactions in the social networks, including geospatial and temporal variability of the user (the same user might prefer different recommendations depending on the physical and temporal context); (iii) Social recommendation in software engineering practices; (iv) Particularities of social and human aspects in

making recommendations in e-learning contexts (both formal and informal learning scenarios); (v) Usability of social recommender systems; (vi) Visualizations of recommended resources and of group aspects to made aware to the others in practice; (vii) The psychology and economics of online sharing and recommendations; (viii) Recommending cloud services to support the information needs in social ubiquitous networking environments; and (ix) Any other relevant topic to the theory and application of recommendation system on social activities or cloud services.

The workshop attracted seven submissions. 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 three full papers for inclusion in the workshop proceedings (acceptance rate 43 %). Another three papers were accepted as short papers. The Program Committee of the workshop consisted of 24 experienced researchers and experts. We would like to thank authors of submitted papers for choosing HRSUNE 2014 for the presentation of their research results and the members of the Program Committee for their valuable contributions during the peer-review process. Also, Olga C. Santos would like to acknowledge the support received from the MAMIPEC project (TIN2011-29221-C03-01) funded by the Spanish Ministry of Economy and Competence.

May 2014

Tiffany Tang  
Olga C. Santos

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## **BIDASY 2014 Workshop Organizers' Message**

In the past few years, there has been a rapid growth in big data research and its application technologies. Many novel architectures, algorithms, systems, and applications have been proposed, built, and studied. Compared with traditional databases, big data systems and applications foster many new issues and limitations in actual use and service.

The First International Workshop on Big Data Systems and Services (BIDASY 2014) was held in conjunction with the 15th International Conference on Web-Age Information Management (WAIM 2014) in Macau, China, on June 16, 2014. The purpose of BIDASY 2014 was to provide a forum for researchers and practitioners to exchange current issues, challenges, new technologies, and practical experiences, such as cloud/stream computing, software systems to support big data computing, social network search, and big data application/services, etc. The workshop attracted 13 submissions. All submissions were reviewed by at least three Program Committee members in order to ensure that high-quality papers were selected. Following a rigorous review process, nine papers were selected for presentation, covering a wide range of topics and showing interesting experiences.

The Program Committee of BIDASY 2014 consisted of 15 experienced researchers and experts in the area of data processing and management. We would like to thank all the authors for submitting their papers to the workshop and the valuable contributions of all the Program Committee members during the peer-review process. Also, we would like to thank the WAIM 2014 Workshop Co-chairs for their great support in ensuring the success of BIDASY 2014.

May 2014

Eenjun Hwang  
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