THE 27th International Conference on Data Engineering (ICDE 2011) was held in Hannover, Germany, on 11-16 April. ICDE 2011 received 491 research manuscripts, 26 industrial contributions, and 67 demo proposals, for a total of over 584 submissions. The research program featured 98 papers, the industrial program included eight submitted papers, and 21 demonstration proposals were selected for presentation to the conference audience.

This special section consists of journal versions of eight best papers among the 98 research papers accepted by the program committees. These papers have been significantly revised, improved, and extended beyond their initial version that appears in the proceedings of ICDE 2011. They went through a rigorous review process to ensure the high quality and comply with TKDE publication standards.

The first paper, titled “Computing Structural Statistics by Keywords in Databases” by Lu Qin, Jeffrey Xu Yu, and Lijun Chang, uses keywords to identify interesting dimensions and then aggregate those interesting instances in the SQL aggregate spirit. The study supports OLAP functions nicely.

The second paper, “Data Cube Materialization and Mining over MapReduce” by Arnab Nandi, Cong Yu, Philip Bohannon, and Raghu Ramakrishnan, addresses the practical needs in data warehousing of materializing data cubes on Web-scale datasets using holistic measures. The strong performance study on real and synthetic datasets clearly shows that the proposed method can scale up to data size with billions of tuples for holistic measures.

The third paper is “Exact In-Network Aggregation with Integrity and Confidentiality” by Stavros Papadopoulos, Aggelos Kiayias, and Dimitris Papadis. The paper provides a nice solution to the integrity and confidentiality in-network aggregation on sensor networks that deployed in open and unsafe environments where the aggregation process can be outsourced to an untrustworthy party. The proposed approach covers many different aggregates and can provide exact answers.

The fourth paper is “Finding Top-k Preferable Products” by Yu Peng, Raymond Chi-Wing Wong and Qian Wan. The paper tackles an interesting application problem: Given a set of existing products, can we find k “best” possible products that are not dominated by any existing ones? Two optimization objectives are considered: maximizing total profit and the number of customers, respectively.

The fifth paper, “Knowledge Transfer with Low-Quality Data: A Feature Extraction Issue” by Brian Quanz, Jun Huan, and Meenakshi Mishra, extends sparse coding to transfer knowledge between sources of data, particularly to improve the prediction performance. The paper reports encouraging results on a real-world chemical toxicity case.

The next paper, “Reassessing Top-Down Join Enumeration” by Pit Fender and Guido Moerkotte, tackles a core problem in database engines: finding an optimal execution order of join operations. A nice feature of the paper is that it links theoretical results with practical performance, particularly on cyclic query graphs that are very challenging.

The seventh paper is “Design Independent Query Interfaces” by Arash Termehchy, Marianne Winslett, Yodsawalai Chodpathumwan, and Austin Gibbons. It tackles the practical need of forming queries on databases of complex schemas. Theoretically, the paper assesses the design independence provided by schema free query interfaces (SFQI), and proposes an XML SFQI. The advantages of the new approach are justified by an evaluation on real data.

Finally, the paper “Subscriber Assignment for Wide-Area Content-Based Publish/Subscribe” by Albert Yu, Pankaj K. Agarwal, and Jun Yang addresses the problem of assigning subscribers to brokers in a content-based publish/subscribe system covering a wide area. Showing that the optimization problem is NP-hard, the paper seeks a nice greedy method from a skillful combination of linear programming, randomized rounding, corset, and iterative reweighted sampling.

We are fortunate to have eight strong papers in this special section. We are sure the readers will enjoy them. However, organizing a special section is never easy, and is impossible without the cooperation and help of the authors and the reviewers. We want to thank Beng Chin Ooi, the Editor-in-Chief of the IEEE Transactions on Knowledge and Data Engineering, and all of the authors and reviewers for their contributions.
constructive and prompt support. We also want to thank the program committee, the organization committee, and the participants of ICDE 2011 for making the conference and the editing of this special section an enjoyable experience.

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Guest Editors

Serge Abiteboul received the These d’Etat from the University of Paris Sud and the PhD degree in computer science from the University of Southern California in Los Angeles, California. He is with Telecom Paris. His research is on databases, electronic commerce, document management, digital libraries, and, more recently, on Web data management. He is a researcher at INRIA Saclay and ENS Cachan. He has held professor positions at Stanford University, Ecole Polytechnique, Oxford University, and College de France. He is one of the coauthors of Foundations of Databases, the reference in database theory. He cofounded a start-up in 2000, named Xyleme. He received the 1998 ACM SIGMOD Innovation Award. He has been program chair of a number of conferences including ACM PODS ’95, ICALP ’94, ICDT ’90, ECDL ’99, VLDB ’09, and ICDE ’11. He was awarded an ERC Advanced Grant in 2008, namely, Webdam, on foundations of Web data management. He has been a member of the French Academie des Sciences since 2008.

Christoph Koch received the PhD degree in artificial intelligence from TU Vienna and CERN in 2001 and the Habilitation degree in 2004. He is a professor of computer science at EPFL, specializing in data management. Until 2010, he was an associate professor in the Department of Computer Science at Cornell University. From 2005 to 2007, he was an associate professor of computer science at Saarland University. He has been a postdoctoral researcher at TU Vienna and the University of Edinburgh from 2001 to 2003, and an assistant professor at TU Vienna from 2003 to 2005. He has won Best Paper Awards at PODS ’02, ICALP ’05, and SIGMOD ’11, a Google Research Award in 2009, and an ERC Starting Grant in 2011. He cochaired the program committees of DBPL ’05, WebDB ’08, and ICDE ’11, and was PC vice-chair of ICDE ’08 and ICDE ’09. He has served on the editorial board of the ACM Transactions on Internet Technology as well as in numerous program committees. He currently serves as PC cochair of VLDB ’13 and editor-in-chief of the Proceedings of VLDB.

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