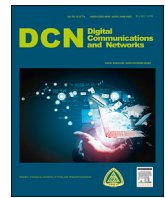




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Editorial: special issue on “big data security and privacy”



As human beings are deep into the information age, we have been witnessing the rapid development of Big Data. Security and privacy are the most concerned issues in Big Data. Big Data definitely desires the security and privacy protection all through the collection, transmission and analysis procedures. The features of Big Data bring unprecedented challenges to security and privacy protection. To protect the confidentiality, integrity and availability, traditional security measures such as cryptography, event analysis, intrusion detection, prevention and access control have taken a new dimension. To protect the privacy, new pattern of measures such as privacy-preserved data analysis need to be explored. There is a lot of work to be done in this emerging field.

The purpose of this special issue is to make the security and privacy communities realizing the challenges and tasks that we face in Big Data. We focus on exploring the security and privacy aspects of Big Data as supporting and indispensable elements of the emerging Big Data research. We received a large number of submissions from many countries. After a rigorous review and revision process, we assembled six papers on the latest advances in state-of-the-art of Big Data security and privacy, covering different perspectives of big data security and privacy, including access control, authentication, cloud outsourcing, virtualization, privacy in smart grid, and big data job scheduling.

In “Content Sensitivity Based Access Control Framework for Big Data.” Kumar et al. propose an access control framework, which enforces access control policies dynamically based on the sensitivity of the data. This framework enforces access control policies by harnessing the data context, usage patterns and information sensitivity. They also prove the effectiveness of the proposed method through experiments.

Li et al., in “A Distributed Authentication and Authorization Scheme for In-Network Big Data Sharing,” propose a Distributed Authentication and Authorization Scheme (DAAS) to achieve identity verification and fine-grained authorization in a distributed manner for the pervasive in-network big data sharing environment. In the performance evaluations, the authors show that the DAAS can achieve lower bandwidth cost compared to the existing schemes.

In “CEXP: Secure and Verifiable Outsourcing of Composite Modular Exponentiation with Single Untrusted Server,” Li et al. present a new and efficient algorithms for secure outsourcing of composite modular exponentiation based on a single server. Comparing with the state-of-the-art algorithms, their scheme has a remarkable improvement in verification capability, enabling users to detect any misbehaviour with the optimal probability 1.

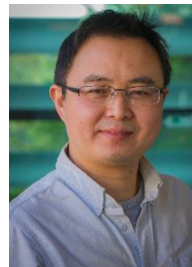
In the paper titled “Achieving Privacy-Preserving Big Data Aggregation with Fault Tolerance in Smart Grid,” Guan and Si propose a privacy-preserving data aggregation scheme based on secret sharing with fault tolerance in smart grid, which ensures that control center gets the

integrated data without compromising user's privacy. Meanwhile, they also consider fault tolerance and the resistance to differential attack during the data aggregation.

Ruan and the co-authors present the paper, “Visualization for big data security: a case study on KDD99 cup data set”. They argue that despite the rising research growth in IDS, it suffers from lack of work on big data visualization. The authors utilize a hash algorithm, a weight table and sampling method to deal with the big data problems in volume, variety and velocity. By utilizing a visualization algorithm, researchers are able to gain insights into the KDD99 data set with a clear identification of ‘normal’ clusters and describe distinct clusters of effective attacks.

Usama et al. offer an extensive survey on big data processing, titled “Job Schedulers for Big Data Processing in Hadoop Environment: A Survey.” They thoroughly investigate the job scheduling methods in Hadoop. Moreover, the authors also describe advantages, disadvantages, features, and a comparative study of various Hadoop job scheduling algorithms, such as, FIFO, fair, capacity, deadline constraints, delay, and resource aware scheduling.

We would like to thank all the authors who submitted their research work to this Special Issue. We would also like to acknowledge the contribution of many experts in this field who have participated in the review process, and offered comments and suggestions to the authors to improve their work. In particular, we would like to express our sincere appreciation to the Editor-in-Chief, Dr Chonggang Wang, for his constructive suggestions and timely guidance. We also thank Ms Yi Guo for her professional assistance during the life cycle of this Special Issue.



Shui Yu is currently a Senior Lecturer of School of Information Technology, Deakin University. He is a member of Deakin University Academic Board (2015–2016), a Senior Member of IEEE, and a member of AAAS and ACM, the Vice Chair of Technical Committee on Big Data Processing, Analytics, and Networking of IEEE Communication Society, and a member of IEEE Big Data Standardization Committee.

Dr Yu's research interest includes Security and Privacy in Networking, Big Data, and Cyberspace, and mathematical modelling. He has published two monographs and edited two books, more than 180 technical papers, including top journals and top conferences, such as IEEE TPDS, IEEE TC, IEEE TIFS, IEEE TMC, IEEE TKDE, IEEE TETC, and IEEE INFOCOM. Dr Yu initiated the research field of networking for big data in 2013. His h-index is 25.

Dr Yu actively serves his research communities in various roles. He is currently serving the editorial boards of IEEE Communications Surveys and Tutorials, IEEE Access, IEEE Journal of Internet of Things, IEEE Communications Magazine, and a number of other international journals. He has served more than 70 international conferences as a member of organizing committee, such as publication chair for IEEE [Globecom2015] and [2017], IEEE [INFOCOM2016] and [2017], TPC co-chair

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Albert Y. Zomaya is currently the Chair Professor of High Performance Computing & Networking and Australian Research Council Professorial Fellow in the School of Information Technologies, The University of Sydney. He is also the Director of the Centre for Distributed and High Performance Computing which was established in late 2009. Professor Zomaya is the author/co-author of seven books, more than 450 publications in technical journals and conferences, and the editor of 14 books and 19 conference volumes. He was the Editor in Chief of the IEEE Transactions on Computers and Springer's Scalable Computing Journal, serves as an associate

editor for another 19 journals including some of the leading journals in the field. He is the Founding Editor of the Wiley Book Series on Parallel and Distributed Computing and the Co-Editor (with Professor Yi Pan) of the Wiley Book Series on Bioinformatics and (with Professor Mary Eshaghian-Wilner) the Wiley Book Series on Nature Inspired Computing. He is the Editor in Chief of the Parallel and Distributed Computing Handbook ([McGraw-Hill,1996]).

Professor Zomaya is a Fellow of the IEEE, Fellow of the American Association for the Advancement of Science, a Fellow of the Institution of Engineering and Technology, a Distinguished Engineer of the ACM and a Chartered Engineer (CEng). He received the 1997 Edgeworth David Medal by the Royal Society of New South Wales for outstanding contributions to Australian Science. In September 2000 he was awarded the Meritorious Service Award and in 2006 was made a member of the Golden Core (both from the IEEE Computer Society). Also, he received the IEEE TCPP Outstanding Service Award and the IEEE TCSC Medal for Excellence in Scalable Computing, both in 2011. His research interests are in the areas of algorithms, complex systems, parallel and distributed systems.

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