Lecture Notes on Data Engineering and Communications Technologies

Volume 147

The aim of the book series is to present cutting edge engineering approaches to data technologies and communications. It will publish latest advances on the engineering task of building and deploying distributed, scalable and reliable data infrastructures and communication systems.

The series will have a prominent applied focus on data technologies and communications with aim to promote the bridging from fundamental research on data science and networking to data engineering and communications that lead to industry products, business knowledge and standardisation.

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Emerging Trends in Intelligent Systems & Network Security

Springer

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Preface

The advancement in intelligent information systems, cyber-security, and networking technologies has become a critical requirement in the era of interconnected digital worlds. With the exponential growth of wireless communications, the Internet of things, and cloud computing, and the increasingly dominant roles played by electronic commerce in every major industry, safeguarding the information in storage and traveling over the communication networks is increasingly becoming the most critical and contentious challenges for the technology innovators.

This trend opens up significant research activity for academics, research institutes, and their partners (industrialists, governments, civil society, etc.) in order to establish essential and intelligent bases to solve several complex computing problems in the active areas of networking, intelligent systems, and security. In the past two decades, there have been hundreds of algorithms developed capitalizing on the effectiveness of artificial intelligence. Therefore, we envisage intelligent systems and improve our research and lead to cutting-edge discovery by achieving the highest scientific capability as well as encourage open discussions on recent advances in computer communication and information technologies.

In this context, this book addresses the challenges associated with scientific research and engineering applications for the construction of intelligent systems and their various innovative applications and services. The book also aims to provide an integrated view of the problems to researchers, engineers, and practitioners and to outline new topics in networks and security.

This edition is the result of work accepted and presented at the Fifth International Conference on Networks, Intelligent Systems and Security (NISS2022) held on March, 30–31, 2022, in Bandung, Indonesia. It brings together original research, works carried out, and proposed architectures on the main themes of the conference. The goal of this book edition is to construct and build the basics and essentials research, innovations, and applications that can help in the growth of the future next generation of networks and intelligent systems.

We would like to acknowledge and thank the Springer Nature staff for their support, guidance, and for the edition of this book. Finally, we wish to express our sincere thanks to professors Fatos Xhafa, Thomas Ditzinger, and Suresh Dharmalingam for their kind support and help to promote and develop research.

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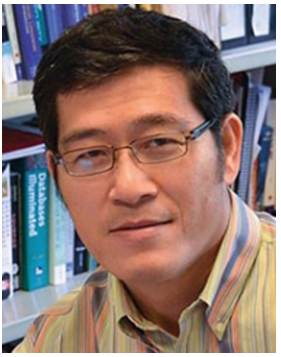
Difficult Data Analysis

Michał Woźniak

Biography: Michał Woźniak is a professor of computer science at the Department of Systems and Computer Networks, Wroclaw University of Science and Technology, Poland. His research focuses on machine learning, compound classification methods, classifier ensembles, data stream mining, and imbalanced data processing. Prof. Woźniak has been involved in research projects related to the aforementioned topics and has been a consultant for several commercial projects for well-known Polish companies and public administration. He has published over 300 papers and three books. He was awarded numerous prestigious awards for his scientific achievements as IBM Smarter Planet Faculty Innovation Award (twice) or IEEE Outstanding Leadership Award and several best paper awards of the prestigious conferences. He serves as program committee chairs and the member for the numerous scientific events and prepared several special issues as the guest editor.

E-CARGO and Role-Based Collaboration

Haibin Zhu



Biography: Haibin Zhu is a full professor and the chair of the Department of Computer Science and Mathematics, founding director of Collaborative Systems Laboratory, and member of the Research Committee, Nipissing University, Canada. He received a B.S. degree in computer engineering from the Institute of Engineering and Technology, China (1983), and M.S. (1988) and Ph.D. (1997) degrees in computer science from the National University of Defense Technology (NUDT), China. He was a visiting professor and a special lecturer in the College of Computing Sciences, New Jersey Institute of Technology, USA (1999–2002), and a lecturer, an associate professor, and a full professor at NUDT (1988–2000). He has accomplished over 200 research works including 28 IEEE Trans. articles, six books, five book chapters, three journal issues, and four conference proceedings.

E-CARGO and Role-Based Collaboration

Shi-Jinn Horng

Biography: Shi-Jinn Horng is a chair professor at Department of Computer Science and Information Engineering, National Taiwan Institute of Science and Technology. He is an expert in distributed and parallel computing, artificial intelligence, and hardware. Shi-Jinn have more than 200 published articles. His current research interests include deep learning and big data, biometric recognition, information security, cloud and fault computing, multimedia, and medical applications.

Feature Object Extraction – Fusing Evidence, Not Rolling the Die

Kathleen Kramer

Biography: Kathleen Kramer is a professor of Electrical Engineering at the University of San Diego, San Diego, CA. She worked to develop new engineering programs as a founding member of the faculty and eventually became the chair of electrical engineering, and then serving as Director of Engineering (2004–2013), providing academic leadership for all of the university's engineering programs. She has also been Member of Technical Staff at several companies, including ViaSat, Hewlett Packard, and Bell Communications Research. Author or co-author of over 100 publications, she maintains an active research agenda and has recent publications in the areas of multi-sensor data fusion, intelligent systems, and neural and fuzzy systems. Her teaching interests are in the areas of signals and systems, communication systems, and capstone design. She received the B.S. degree in electrical engineering magna cum laude with a second major in physics from Loyola Marymount University, and the M.S. and Ph.D. degrees in electrical engineering from the California Institute of Technology.

AIoT: Cloud or Edge, Big or Small Data, Public or Private Model

Ying-Dar Lin

Biography: Ying-Dar Lin is Chair Professor of computer science at National Chiao Tung University (NCTU), Taiwan. He received his Ph.D. in computer science from the University of California at Los Angeles (UCLA) in 1993. He was a visiting scholar at Cisco Systems in San Jose during 2007–2008, CEO at Telecom Technology Center, Taiwan, during 2010–2011, and Vice President of National Applied Research Labs (NARLabs), Taiwan, during 2017–2018. He cofounded L7 Networks Inc. in 2002, later acquired by D-Link Corp. He also founded and directed Network Benchmarking Lab (NBL) from 2002, which reviewed network products with real traffic and automated tools, also an approved test lab of the Open Networking Foundation (ONF), and spun off O'Prueba Inc. in 2018. His research interests include machine learning for network security, wireless communications, network softwarization, and mobile edge computing. His work on multi-hop cellular was the first along this line, and has been cited over 1000 times and standardized into IEEE 802.11s, IEEE 802.15.5, IEEE 802.16j, and 3GPP LTE-Advanced. He is IEEE Fellow (class of 2013), IEEE Distinguished Lecturer (2014–2017), ONF Research Associate (2014–2018), and received K. T. Li Breakthrough Award in 2017 and Research Excellence Award in 2017 and 2020. He has served or is serving on the editorial boards of several IEEE journals and magazines, including Editor-in-Chief of IEEE Communications Surveys and Tutorials (COMST) with impact factor increased from 9.22 to

29.83 during his term in 2017–2020. He published a textbook, Computer Networks: An Open Source Approach (http://www.mhhe.com/lin), with Ren-Hung Hwang and Fred Baker (McGraw-Hill, 2011).

Communication and Computing Resource Management for Internet of Things

Ning Zhang

Biography: Ning Zhang is Associate Professor in the Department of Electrical and Computer Engineering at University of Windsor, Canada. He received the Ph.D. degree in Electrical and Computer Engineering from University of Waterloo, Canada, in 2015. After that, he was a postdoc research fellow at University of Waterloo and University of Toronto, respectively. His research interests include connected vehicles, mobile edge computing, wireless networking, and machine learning. He is a highly cited researcher and has 20 ESI highly cited papers. He serves as an associate editor of IEEE Internet of Things Journal, IEEE Transactions on Cognitive Communications and Networking, and IEEE Systems Journal; and a guest editor of several international journals, such as IEEE Wireless Communications, IEEE Transactions on Industrial Informatics, and IEEE Transactions on Intelligent Transportation Systems. He also serves/served as a TPC chair for IEEE VTC 2021 and IEEE SAGC 2020, a general chair for IEEE SAGC 2021, a track chair for several international conferences and workshops. He received eight Best Paper Awards from conferences and journals, such as IEEE Globecom and IEEE ICC. He also received IEEE TCSVC Rising Star Award for outstanding contributions to research and practice of mobile edge computing and Internet of things service.

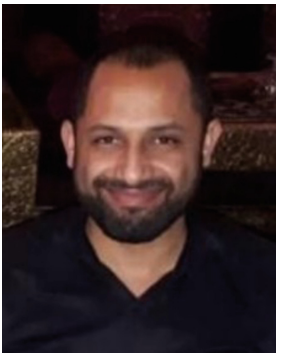
Hardware-Software Co-design Approaches for Sustainable AI

Kaoutar El Maghraoui

Biography: Kaoutar El Maghraoui is a principal research scientist at the IBM Research AI organization where she is focusing on innovations at the intersection of systems and artificial intelligence. She leads the End-Use experimental AI testbed of the IBM Research AI Hardware Center, a global research hub focusing on enabling next-generation chips and systems for AI workloads. She is currently focusing on the operationalization aspects of AI systems in hybrid cloud environments. Kaoutar has extensive experience and deep expertise in HPC, systems software, cloud computing, and machine learning.

Architectures, Challenges and Opportunities within 6G Emerging Technologies

Anouar Boudhir Abdelhakim



Biography: Anouar Boudhir Abdelhakim is currently an associate professor at the Faculty of Sciences and Technique of Tangier. Actually, he is the president of the Mediterranean Association of Sciences and Technologies. He is an adviser at the Moroccan union against dropping out of school. He received the HDR degree from Abdelmalek Essaadi University; he is the co-author of several papers published in IEEExplorer, ACM, and in high indexed journals and conference. He co-edited a several books published on Springer series, and he is a co-founder of a series of international conferences (Smart health17, SCIS'16, SCA18, SCA19, SCA20, NISS18, NISS19, NISS20, NISS21, ICDATA21) till 2016. His supervise several thesis in artificial intelligence, security, and e-healthcare. His key research relates to networking and protocols, ad hoc networks, VANETS, WSN, IoT, big data, AI computer healthcare applications, smart city applications and security applications.

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