Lecture Notes in Networks and Systems

Volume 244

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ISSN 2367-3370 ISSN 2367-3389 (electronic)
Lecture Notes in Networks and Systems
ISBN 978-981-16-2918-1 ISBN 978-981-16-2919-8 (eBook)
https://doi.org/10.1007/978-981-16-2919-8

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Preface and Acknowledgement

The main aim of this proceedings book is to bring together leading academic scientists, researchers, and research scholars to exchange and share their experiences and research results on all aspects of Intelligent ecosystems, data Sciences, and IoT systems. ICWSNUCA 2021 is a multidisciplinary conference organized with the objective of bringing together academic scientists, professors, research scholars, and students working in various fields of engineering and Technology. On ICWSNUCA 2021, you will have the opportunity to meet some of the world's leading researchers, to learn about some innovative research ideas and developments around the world, and to become familiar with emerging trends in Science-Technology. The conference will provide the authors, research scholars, listeners with opportunities for national and international collaboration and networking among universities and institutions for promoting research and developing the technologies globally. This conference aims to promote translation of basic research into institutional and industrial research and convert applied investigation into real-time application.

ICWSNUCA 2021 is hosted by Department of Computer Science and Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Hyderabad, India. ICWSNUCA 2021 has been held during 26–27th February, 2021, in online mode (ZOOM Platform). The conference brought together researchers from all regions around the world working on a variety of fields and provided a stimulating forum for them to exchange ideas and report on their researches. The proceeding of ICWSNUCA 2021 consists of 45 best-selected papers which were submitted to the conferences, and peer-reviewed by conference committee members and international reviewers. The Presenters have presented through virtual screen. Many distinguished scholars and eminent speakers have joined from different Countries like India, Malaysia, Bangladesh, Sri Lanka, Iraq, Libya, and Taiwan to share their knowledge and experience and to explore better ways of educating our future leaders. This conference became a platform to share the knowledge domain among different countries' research culture. The main and foremost pillar of any academic conference is the authors and the researchers. So, we are thankful to the authors for choosing this conference platform to present their works in this pandemic situation.

We are sincerely thankful to Almighty for supporting and standing at all times with us, whether it's good or tough times and given ways to concede us. Starting

from the Call for papers till the finalization of chapters, all the team members given their contributions amicably, which it's a positive sign of significant team works, the editors and conference organizers are sincerely thankful to all the members of Springer especially Mr. Aninda Bose for the providing constructive inputs and allowing an opportunity to finalize this conference proceeding. We are also thankful to Dr. Thomas Ditzinger, Prof. William Achauer, and Prof. Anil Chandy for their support. We are also grateful to Mr. Daniel Joseph Glarance, Project Coordinator, Springer for his cooperation. We are thankful to all the reviewers who hail from different places in and around the globe, who shared their support and stand firm toward quality chapter submission in this pandemic situation.

Finally, we would like to wish you have good success in your presentations and social networking. Your strong supports are critical to the success of this conference. We hope that the participants not only enjoyed the technical program in conference but also found eminent speakers and delegates in the virtual platform. Wishing you a fruitful and enjoyable ICWSNUCA 2021.

Hyderabad, India — Padmalaya Nayak
Nadia, India — Sheng-Lung Peng
Taipei City, Taiwan — Souvik Pal

About This Book

The conference proceeding book is a depository of knowledge enriched with recent research findings. The main focus of this volume is to bring all the computing and communication-related technologies in a single platform. ICWSNUCA 2021 is aimed at providing a platform for knowledge exchange of the most recent scientific and technological advances in the fields of data analytics and computational Science, to strengthen the links in the scientific community. This event aspires to bring together leading academic scientists, researchers, industry persons, and research scholars to exchange and contribute to their knowledge, experiences and research outcome on all the phases of Computer Science, Information technology, and data analytics. This book focuses on the applications, use-cases, architectures, deployments, and recent advances of Wireless Sensor Networks as well as Ubiquitous Computing. Different Research Topics may be illustrated in this book, like Wireless Sensor Networks for the Internet of Things, IoT Applications for eHealth, smart cities, etc., architectures for WSNs and IoT, WSNs hardware and new devices, Low-power wireless technologies, Wireless ad hoc Sensor networks, Routing and data transfer in WSNs, Multicast communication in WSNs, Security management in WSNs and in IoT systems, and Power consumption optimization in WSNs. In recent years, we have been hearing about Internet of Things, Industrial IoTs (IIoTs), Industry 4.0, Smart Factories, Smart HealthCare, Smart Logistic and Supply Chains, Smart Mobility, and Smart Energy, etc. These technologies deliver huge economy and financial benefits and will continue the same in near future. But surprisingly, sensor nodes are the backbone of these technologies and these nodes can be worn, carried, embedded in the environment that can provide interesting contextual information. We find sensors in our daily life, starting from Mobile devices, Automobiles, Industrial automation, Robotic systems, Vehicular Tracking and Management Systems, etc. A significant increase in real-world event monitoring capability with Wireless Sensor Networks will lead to a further evolution of ubiquitous computing. Wireless Sensor Networks continue to attract a lot of attention from the academia and industry among researchers, industrials, equipment and chip manufacturers and service providers for promoting large-scale deployments in many applications, such as environmental monitoring, military and medical surveillance, health and wellness applications, intelligent traffic management and user's tracking and identification,

including human–computer interaction. It also provides a premier interdisciplinary platform for researchers, practitioners, and educators to present and discuss the most recent innovations, trends, and concerns as well as practical challenges encountered and solutions adopted in the fields of Computer Science. The primary audience for the book incorporates specialists, researchers, graduate understudies, designers, experts, and engineers who are occupied with research and computer science-related issues. The book will be organized in independent chapters to provide readers great readability, adaptability, and flexibility.

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About the Editors

Padmalaya Nayak is working as Professor in department of Computer Science Engineering in Gokaraju Rangaraju Institute of Engineering Technology, Hyderabad under Jawaharlal Technological University, Hyderabad, since 2009. She completed her doctoral degree from National Institute of Technology, Tiruchirappalli, India in 2010. She has 17 years of teaching and research experience in the area of Ad hoc and Sensor Networks. She has published more than 40 research papers in various International Journals and Conferences. She has also contributed two book chapters to her credit. She has visited many countries to present her research paper in many International Conferences. She has received many National/International Level awards for her academic contributions towards the education system. She is the Reviewer of many IEEE/SPRINGER/ELSEVIER Journals and Conferences. She is the member of IEEE, IETE and IEANG professional bodies. She is also a member of the advisory committee for several conference committees.

Souvik Pal is an Associate Professor and Head of the Computer Science and Engineering Department at the Global Institute of Management and Technology, West Bengal, India. Prior to that, he was associated with Brainware University, Kolkata, India; JIS College of Engineering, Nadia; Elitte College of Engineering, Kolkata; and Nalanda Institute of Technology, Bhubaneswar, India. Dr. Pal received his BTech, MTech, and PhD degrees in the field of Computer Science and Engineering. He has more than a decade of academic experience. He is author or co-editor of 12 books from reputed publishers, including Elsevier, Springer, CRC Press, and Wiley, and he holds three patents. He is serving as a series editor for "Advances in Learning Analytics for Intelligent Cloud-IoT Systems", published by Scrivener Publishing (Scopus-indexed) and "Internet of Things: Data-Centric Intelligent Computing, Informatics, and Communication", published CRC Press, Taylor & Francis Group, USA. Dr. Pal has published a number of research papers in Scopus / SCI-indexed international journals and conferences. He is the organizing chair of RICE 2019, Vietnam; RICE 2020 Vietnam; ICICIT 2019, Tunisia. He has been invited as a keynote speaker at ICICCT 2019, Turkey, and ICTIDS 2019,2021, Malaysia, MAICT 2020, Iraq; ICWSNUSA 2021. His professional activities include roles as associate editor and

editorial board member for more than 100+ international journals and conferences of high repute and impact. His research area includes cloud computing, big data, internet of things, wireless sensor network, and data analytics. He is a member of many professional organizations, including MIEEE; MCSI; MCSTA/ACM, USA; MIAENG, Hong Kong; MIRED, USA; MACEEE, New Delhi; MIACSIT, Singapore; and MAASCIT, USA.

Sheng-Lung Peng is a Professor and the director (head) of the Department of Creative Technologies and Product Design, National Taipei University of Business, Taiwan. He received the PhD degree in Computer Science from the National Tsing Hua University, Taiwan. He is an honorary Professor of Beijing Information Science and Technology University, China, and a visiting Professor of Ningxia Institute of Science and Technology, China. He is also an adjunct Professor of Mandsaur University, India. Dr. Peng has edited several special issues at journals, such as Soft Computing, Journal of Internet Technology, Journal of Real-Time Image Processing, International Journal of Knowledge and System Science, MDPI Algorithms, and so on. His research interests are in designing and analyzing algorithms for Bioinformatics, Combinatorics, Data Mining, and Networks areas in which he has published over 100 research papers.