Editorial: Special Issue on "6G: The Road for Future Wireless Networks (SOUL)"

Ramjee Prasad

Department of Business Development and Technology, Birk Centerpark 15, 8001, CGC, INNOVATORIUM 7400, Herning, Denmark.
E-mail: ramjee@btech.au.dk

The 25th Edition of Strategic Workshop (SW'22) was held on October 27–29, 2022 in Denmark. During the active 3-day discussion, the thematic focus was 6G: The Road for Future Wireless Networks (SOUL), presenting the concept, intelligent discoveries, digital technology-oriented business models, proposals for sustainability solutions & global partnership. The Workshop also discussed the current policies, network & security, safety standards, future global strategies, and the project proposal talks in the relevant area.

The theme of the Workshop was "6G: The Road for Future Wireless Networks (SOUL)". In addition to the technical presentations on SOUL, the primary goal of the strategic workshop was that 6G must address societal needs adequately with privacy, security, transparency concerns inherent from previous generations to facilitate sustainable development for society. 6G will bring a new age in subsequent years, and connectivity will generate an enormous amount of data. We discussed that the ICT plays an essential part in shaping the future of connectivity, internet of things (IoT) and the digital world. It assists in setting up the infrastructure, security, data handling and innovation for the next generation of wireless communication. We also presented new humane questions and perplexities concerning privacy, safety and security issues in this wireless age.

[*] Chosen Topics from the Strategic Workshop, October 27–39, 2022.

We created a dedicated Panel and Sessions in 6G: The Road for Future Wireless Networks (SOUL) to serve the above purpose The Workshop emphasized that for a clear vision and collective negotiation among stakeholders, local population, and business associations for developing transparency in policies and communication for mutual partnerships and healthy competition throughout the globe to achieve the Road for Future Wireless Networks smoothly.

The Special Issue presents nine selected papers that emphasize a wide range of scientific studies in 6G: The Road for Future Wireless Networks (SOUL) and provides an overview of the cutting-edge research, innovation and the collaborative efforts surrounding 6G wireless networks and their use.

The First Paper, "Public Sector – an analysis of privacy disasters: Analysis of GDPR fines on public sector institutions in Europe", by Aaloka Anant, Ramjee Prasad.

This paper explores the relationship between privacy protection laws, innovations and the importance of solutions especially in the European context. To offer insights into how organizations can maintain a balance between innovation and privacy, this paper will serve as a guide for evolving challenges of the digital age.

The Second Paper, "Towards Functional Safety in Dynamic Distributed Systems", by Dirk Dahlhaus, Ingrid Moerman, Nour Mansour, Jeroen Hoebeke, Xianjun Jiao, Jetmir Haxhibeqiri, Josef Börcsök.

To ensure the safety of dynamic distributed systems, this paper explores the importance of advanced approaches, offering insights into the relationship between functional safety and communication infrastructure. To enhance the efficiency and effectiveness of FS concepts in industrial processes, this paper emphasizes the importance of considering communication protocols beyond P2P transmission.

The Third Paper, "The Road to a trustworthy 6G; On the Need for a "Zero Trust 6G" Paradigm", by Geir M. Koien.

This paper delves into the evolving landscape of 6G, and emphasizes on the importance of security and trustworthiness while acknowledging "softwareization" being inevitable. The paper proposes a novel approach that integrates Zero Trust principles into software development, thus introducing a Zero Trust 6G regime, improving the accountability for software and services.

The Fourth Paper, "Sustainability and 6G development: Case Study of sustainable spectrum management", by Maria Matinmikko-Blue.

For the development of the next generation of mobile communication systems (6G), this paper emphasizes the importance of sustainable development and sustainability. To integrate sustainability principles into 6G this paper explores the current activities and presents a case study on sustainable spectrum management and introduces it as a fundamental enabling technology in 6G. Additionally, it proposes actions for sustainable spectrum management principles.

The Fifth Paper, "Circular and Sustainable Multi Business Model Innovation and Development How Can Advanced Sensors, 5G, 6G and Beyond technologies support the process and progress?", by Peter Lindgren

This paper provides insights through three case examples in different business model ecosystems, shedding light on the role of advanced technologies in businesses to pursuit circular and sustainable business models, making the future more environmentally and socially responsible.

The Sixth Paper, "Securing service instantiation on next-generation networks", by Rodrigo Santos, Daniel Corujo, Jose Quevedo, Rui Aguiar.

This paper explores the potential of the Next Generation of Software Defined Networks (NG-SDN) to address the challenges associated with exposing infrastructure to the third parties. A secure and reliable system for dynamic instantiation of third-party services is proposed whose feasibility was demonstrated with a developed prototype.

The Seventh Paper, "Determining Smart Phone Sensing and K-Means Clustering for Accurate and Timely Railway Track Joint Fault Diagnosis", by Ali Akbar Shah, Abi Waqas Memon, M.A Uqaili, Bhawani Shankar Chowdhry, Tanweer Hussain, Tauha Hussain Ali.

For the joint fault diagnosis of railway track, this paper demonstrates the potential of smartphone sensing and K-Means clustering. It provides a practical solution and highlights the need for further research in the field. The proposed approach is accurate, efficient, cost effective has easy deployment and high scalability, thus can enhance railway safety and reliability in the future.

The Eighth Paper, "Converging Towards Open Radio Access Networks – A Comprehensive Review", by Yahya Sameen Junejo, Faisal Karim Shaikh, Bhawani Shankar.

This paper highlights the necessity for the transition of traditional RAN into the Open RAN (ORAN), considering all its essential parameters. It offers insights into how the technology and architecture of RANs are evolving to meet the increasing demand of modern mobile communication systems. It also discusses the challenges and future of ORAN.

The Ninth Paper, "Low Latency Signature-Based 4-Step Random Access Procedure for Massive Machine-Type Communications", by Wei-Chieh Wang, Yao-Jen Liang, Hwang-Cheng Wang, Fang-Chang Kuo, Chih-Cheng Tseng.

This paper explores the key role of Massive Machine Type Communication (mMTC) as one of the major services in 5G new radio (NR) system. To overcome the large number of random access collisions and retransmission problems and improve the management of simultaneous MTCD access in 5G NR systems, this paper proposes an innovative random access method.

Dr Ramjee Prasad is a Professor Emeritus of Future Technologies for Business Ecosystem Innovation (FT4BI) in the Department of Business Development and Technology, Aarhus University, Denmark. He is the Founder President of the CTIF Global Capsule (CGC). He is also the Founder Chairman of the Global ICT Standardization Forum for India, established in 2009. GISFI aims to increase the collaboration between European, Indian, Japanese, North-American and other worldwide standardization activities in the area of Information and Communication Technology (ICT) and related application areas.

The University of Rome "Tor Vergata", Italy as a Distinguished Professor of the Department of Clinical Sciences and Translational Medicine honoured him on March 15, 2016. He is Honorary Professor of University of Cape Town, South Africa, and University of KwaZulu-Natal, South Africa and also an Adjunct Professor at Birsa Institute of Technology, Sindri, Jharkhand, India.

He has received Pravasi Bhartiya Samman Puraskaar (Emigrant Indian Honor Award by the Indian President) on January 10, 2023 in Indore. He received Ridderkorset af Dannebrogordenen (Knight of the Dannenberg) in 2010 from the Danish Queen for the internationalization of top-class telecommunication research and education.

He has received several international awards such as IEEE Communications Society Wireless Communications Technical Committee Recognition Award in 2003 for making contribution in the field of "Personal, Wireless and Mobile Systems and Networks", Telenor's Research Award in 2005 for impressive merits, both academic and organizational within the area of wireless and personal communication, 2014 IEEE AESS Outstanding Organizational Leadership Award for: "Organizational Leadership in developing and globalizing the CTIF (Center for TeleInFrastruktur) Research Network", and so on.

He has been Project Coordinator of several EC projects, namely, MAGNET, MAGNET Beyond, eWALL, and so on.

He has published more than 50 books, 1000 plus journal and conference publications, more than 15 patents, over 150 PhD Graduates and a more significant number of Masters (over 250). Several of his students are today worldwide telecommunication leaders themselves.

Under his leadership, magnitudes of close collaborations are being established among premier universities across the globe. The collaborations are regulated by guidelines of the Memorandum of Understanding (MoU) between the collaborating universities.