Title:

2nd Workshop on Distributed and Intelligent Edge Computing for 6G Communications

Scope:

6G networks envision ubiquitous computing and connectivity which will ultimately lead to massive growth in data traffic and billions of edge nodes connected with each other. To avoid delays and single point of failure in huge networks, edge devices are now widely employed for various applications, such as intelligent transportation systems, surveillance, and home automation. However, in many scenarios, sophisticated Artificial Intelligence (AI) algorithms are required consuming significant amount of processing power and occupying large storage size which may exceed the available resources of typical edge devices. To overcome this challenge, recent delay sensitive, distributed, and intelligent trends in computing paradigms such as Tiny Machine Learning, Federated Learning, Mobile Edge Computing, Multiaccess Edge Computing, Fog Computing and Computational Offloading are under research, aiming to optimize latency, computing complexity, and resourceful utilization of bandwidth, thus giving rise to a potential research direction of distributed and Intelligent Edge Computing (IEC). Due to significant tasks expected to be handled by edge devices in 6G communications, IEC is deemed to play an important role. To support distributed AI applications on the edge computing platform, efficient life-cycle management and closed-loop automation tools are required to manage the highly heterogeneous computing elements in edge computing (e.g., embedded devices, intelligent base stations, edge and fog, servers, etc.). Also, novel methods are needed to ensure IEC security against attacks, the privacy of the data their models and their trustworthiness, avoiding erroneous decisions and ensuring high performance AI/ML models.

This workshop aims invites researchers from industry and academia to share their recent findings and views on technical advances in IEC and distributed communications. Potential topics include but are not limited to:

- IEC solutions for Beyond 5G (B5G) and 6G communication networks
- Distributed or collaborative intelligence for B5G and 6G communication networks, such as federated learning and Tiny Machine learning
- Edge computing architectures, functionalities and interfaces for B5G and 6G
- Solutions towards a zero-touch service orchestration across B5G/6G with IEC
- Over-the-air (OTA) or online learning and inference
- Coding practices for AI solutions to exploit hardware accelerated platforms
- Orchestration of heterogeneous edge computing devices
- AI based edge computing resource allocation and management
- Communication protocol design for IEC
- Security, privacy, and trust in IEC
- Explainable AI and Trustworthy AI in edge computing
- Digital Twins for IEC
- Intelligent computation offloading
- Mobility management of edge computing devices
- Joint optimization of computing, network, and storage resources of edge devices
- Quality of Service (QoS) aware computation offloading in edge devices
- Key scenarios/applications for distributed IEC and communications (e.g., connected vehicles, UAVs, metaverse)
- Testbeds and simulation platforms for IEC
- Energy efficiency in IEC

- Latency or bandwidth management in IEC
- Limitations or challenges of distributed edge intelligence
- The combination of latest trends such as blockchain, big data, quantum communications, smart grid with edge computing

Organizers:

General Co-chair:

- Dr. Muhammad Ali Jamshed, University of Glasgow, UK (muhammadali.jamshed@glasgow.ac.uk)
- Dr. Ferheen Ayaz, University of Sussex, Brighton, UK (f.ayaz@sussex.ac.uk)
- Dr. Aryan Kaushik, University of Sussex, Brighton, UK (aryan.kaushik@sussex.ac.uk)
- Dr. Lina Mohjazi, University of Glasgow, UK (lina.mohjazi@glasgow.ac.uk)
- Dr. Irene Vilà, Universitat Politècnica de Catalunya, Spain (irene.vila.munoz@upc.edu)

TPC Co-Chair:

- Dr Masood Ur-Rehman, University of Glasgow, UK
- Dr Haris Pervaiz, University of Essex, UK
- Prof. Muhammad Ali Imran, University of Glasgow, UK

Bio:

Dr. Muhammad Ali Jamshed received the B.Sc. degree in electrical engineering from COMSATS University, Islamabad, Pakistan, in 2013 and the M.Sc. degree in Wireless communications from the Institute of Space Technology, Islamabad Pakistan, in 2016, and a Ph.D. degree from the University of Surrey, Guildford, U.K, in 2021. He is endorsed by Royal Academy of Engineering under exceptional talent category. He was nominated for Departmental Prize for Excellence in Research in 2019 at the University of Surrey. He is a Fellow of Royal Society of Arts. He served briefly as Wireless Research Engineer at BriteYellow Ltd, UK, and then moved to James Watt School of Engineering, University of Glasgow, as a Post-Doctoral Research Assistant and then promoted to Knowledge Exchange Associate. He has contributed to three patent (under review) and authored/co-authored 10 book chapters and more than 37 technical articles in leading journals and peer reviewed conferences. His main research interests include EMF exposure reduction, low SAR antennas for mobile handsets, machine learning for wireless communication, Backscatter communication, and wireless sensor networks. He is serving as a Reviewer for IEEE Wireless Communication Letters and IEEE Transactions of Wireless Communication. Moreover, he served as a Reviewer, TPC, and the workshop Chair, at many well- known conferences, i.e., ICC, WCNC, VTC, PIMRC, GlobeCom etc., and other scientific workshops.

Dr. Ferheen Ayaz is a Research Fellow at University of Sussex, UK working for the project of Network Plus: Green, Connected and Prosperous Britain. She has previously worked as a Research Associate in University of Glasgow, UK. She has research experience on prestigious projects related to edge computing, communications and security including H2020 MSCA RISE SEEDS, Petras funded MAISE.

She serves as the Steering Committee member in IEEE Women in Engineering UK & Ireland and Early Careers Officer in IEEE Cybersecurity Group. She organized IEEE Women in Engineering Career Development Event at Queen Mary University of London in September 2022 and IEEE

Young Professionals UK & Ireland Virtual STEM Symposium in November 2021. She has also served as a chair in IEEE WCNC 2023 workshop and TPC member in IEEE VTC 2020, 2021 and 2023.

She has been highly commended as Rising Star in Equity, Diversity and Inclusion Heroes Awards by World Skills UK in February 2022, funded Industrial Placement by IEEE Electron Devices Society in August 2021, awarded N2Women Fellowship in August 2020 and runner-up prize in Research Poster Competition, University of Sussex in June 2020.

Dr. Aryan Kaushik is Assistant Professor at the University of Sussex, UK. He has been with University College London, UK, from 2020-21, University of Edinburgh, UK, from 2015-19, and Hong Kong University of Science and Technology, Hong Kong, from 2014-15. He has held visiting appointments at Imperial College London, UK, University of Luxembourg, Luxembourg, Beihang University, China, and Athena RC, Greece. He is the Editor of upcoming book on "Integrated Sensing and Communications for Future Wireless Networks: Principles, Advances and Key Enabling Technologies," Elsevier. He has been an Associate Editor of the IEEE Open Journal of the Communications Society, IEEE Communications Letters, IET Signal Processing and IET Networks, and Lead/Co-Lead Guest Editor for several Special Issues at IEEE and IET journals such as IEEE Internet of Things Magazine and IEEE Open Journal of the Communications Society. He has been Track Chair for IEEE ICC 2024 and IEEE WCNC 2023, Publication Chair at IEEE WCNC 2024 and IEEE ICMLCN 2024, Tutorial/Invited Speaker at IEEE WCNC 2023 conference and workshop, EuCNC and 6G Summit, ICASIS 2023 and WiSPNET 2023, and General Chair for workshops at conferences such as IEEE PIMRC 2023, IEEE WCNC 2023, IEEE PIMRC 2022 and IEEE SECON 2022. https://sites.google.com/view/aryankaushik/

Dr. Lina Mohjazi (S'04-M'18-SM'20) received the B.Sc. (Honors) degree from the United Arab Emirates (UAE) University, Al-Ain, UAE, in 2008 (Full Scholarship), the M.Sc. degree from Khalifa University (KU), Abu Dhabi, UAE, in 2012 (Full Scholarship), and the Ph.D. degree from the University of Surrey, Guildford, U.K., in 2018, all in electrical and electronic engineering. Dr. Mohjazi is a Lecturer (Assistant Professor) at the University of Glasgow in the School of Engineering. From 2015 to 2020 she was with Khalifa University (KU) as a Lecturer. From 2018 to 2020 she was a Research Associate at the KU Center for Cyber-Physical Systems (C2PS), KU, UAE. From 2019 to 2020 she was a Visiting Research Associate with the Communications, Sensing and Imaging (CSI) group at the School of Engineering, University of Glasgow, UK. She has authored and co-authored 18 research papers in international high-impact journals and highly-rated conferences.

Dr. Mohjazi is an active reviewer for more than 20 top-notch and multidisciplinary IEEE journals and conferences. She is currently an Area Editor for Physical Communication (Elsevier) and a Review Editor for Frontiers in Communications and Networks. Dr. Mohjazi has been a member of the technical program committees and has served as a Technical Session Chair for several IEEE flagship conferences. She actively participates in organizing IEEE conferences and workshops.

Dr. Irene Vilà received the B.E. degree in Telecommunication Systems Engineering in 2015, the M.S. degree in Telecommunication Engineering in 2017 and the PhD degree in Signal Theory and Communications in 2022, all from Universitat Politècnica de Catalunya (UPC). She is currently a postdoctoral research fellow between the Mobile Communication Research Group (GRCM) of the Department of Signal Theory and Communications (TSC) at Universitat Politècnica de Catalunya (UPC), Barcelona, and the CONNECT centre of Trinity College Dublin (TCD), Dublin. This

postdoctoral stage is supported postdoctoral Margarita Salas grant for training young doctors by the Ministry of Universities of the Spanish Government. She has been involved in Spanish and European research projects founded by both public and private organizations. She has published 18 papers in leading journals and conferences, receiving two best paper runner-up awards at conferences. Her research interests focus on the field of mobile communications, particularly on radio resource management, network optimization, Radio Access Network (RAN) slicing, artificial intelligent for the RAN, self-organizing networks, edge computing. She has served as reviewer in high impact journals such as IEEE TWC, IEEE TVT, IEEE Access and as a guest editor in an special issue in Sensors.