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Editorial

Data-Intensive Computing in Smart Microgrids: Volume II

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Power grids play an important role in modern societies by providing an uninterrupted energy supply and have become a key driving force behind the growth of the world's economies. However, they face various challenges, such as line losses, voltage instability, and energy theft, as well as challenges related to the efficient and effective analysis of big energy data. The integration of information and communication technology and advanced metering infrastructures into traditional grids turns them into smart grids [1]. Nowadays, smart grids are preferable compared with conventional grids that are fully dependent on fossil energy resources, with high costs and carbon emissions. Smart grids enable the integration of electricity generated from renewable energy sources (RES) into the general electricity supply, as well as two-way communication between energy consumers and utilities. As part of smart grids, smart meters are installed in users' homes to collect their energy-consumption data, enabling data exchange between utilities and consumers [2].

Furthermore, microgrids have recently emerged as the building blocks of smart grids, combining distributed renewable energy sources, energy-storage devices, and load-management technologies to improve the reliability of power systems, promote sustainable development, and reduce carbon emissions [2,3]. At the same time, rapid advances in sensor and metering technologies, wireless and network communications, and cloud and fog computing are enabling the collection and accumulation of large amounts of data (e.g., device-status data, energy-generation data, and consumption data). Applying Big Data analytical techniques (e.g., prediction, classification, and clustering) to such data can optimize real-time power generation and operations by accurately predicting power demand, identifying power-consumption patterns, and developing dynamic pricing mechanisms [4]. Efficient and intelligent analysis of data will enable smart microgrids to quickly detect and resolve outages, respond rapidly to electricity demand, deliver more reliable and economical power, and give customers more control over their energy consumption.

In addition, technological advances have influenced energy consumption patterns and behaviors at both individual and group levels. Smart energy generation, transmission, and consumption, as well as smart lifestyles, help optimize energy use while reducing environmental damage and costs. Smart systems make effective decisions by performing analytics based on various emerging technologies, e.g., big data analytics, blockchain, deep learning, and edge computing. In this context, researchers must address the current challenges related to efficient decision support for all generators, operators, customers, and regulators in smart microgrids to achieve holistic and smart energy management that includes power generation, transmission, distribution, environmental friendliness, sustainable generation, and demand-side management. This Special Issue of *Energies*, "Data-Intensive Computing in Smart Microgrids: Volume II", invites the submission of relevant original research articles or comprehensive reviews [5]. The topics of the Special Issue include, but are not limited to, the following:

- Energy-data-intensive analytics in smart microgrids;
- Data-driven management and control of smart microgrids;
- Big data management in smart grids and microgrids;
- Applications of network science in the modeling and analysis of smart microgrids;
- Data-driven dynamic pricing mechanisms and strategies in smart grids;

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- Intelligent decision making in smart microgrids;
- Demand-side management in smart microgrids;
- Energy load/demand forecasting for residential, commercial, and/or industrial consumers;
- Electricity price forecasting for residential, commercial, and/or industrial consumers;
- Power forecasting from renewable energy resources (e.g., solar and wind);
- Management of data for advanced metering infrastructure (AMI) in smart grids;
- Data-driven renewable energy integration in smart grids;
- Smart grid data visualization;
- Renewable energy, battery storage systems, and electric vehicles;
- Power economics;
- Electricity theft detection;
- Prediction and classification for smart grid applications;
- Data security and privacy for smart grid applications;
- Energy policies for power generation/transmission/consumption;
- Machine/deep learning applications for smart grids/microgrids;
- Cloud/fog/edge computing applications for smart grids/microgrids;
- Blockchain applications for smart grids/microgrids.

Conflicts of Interest: The authors declare no conflict of interest.

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Short Biography of Authors

Herodotos Herodotou is an Assistant Professor at the Cyprus University of Technology (CUT). He received his Ph.D. in Computer Science from Duke University in May 2012. His Ph.D. dissertation work received the SIGMOD Jim Gray Doctoral Dissertation Award Honorable Mention, and he received the Outstanding Ph.D. Dissertation Award in Computer Science at Duke. Before joining CUT, he held research positions at Microsoft Research, Yahoo! Labs, and Aster Data. His research interests include large-scale data-processing systems, database systems, and cloud computing. In particular, his work focuses on ease-of-use systems, manageability, and automated tuning for both centralized and distributed data-intensive computing systems. In addition, he is interested in applying database and machine learning techniques in other areas such as smart power grid/microgrids, scientific computing, and maritime technologies. His research work to date has been published in several top scientific conferences and journals, including three books and two book chapters.

Sheraz Aslam completed his PhD at the Cyprus University of Technology (CUT), Cyprus under the supervision of Dr. Herodotos Herodotou and Dr. Michalis P. Michaelides. Currently, he is working as a Research Associate at the same university. He received his M.Sc. degree in Computer Science with a specialization in energy optimization in smart grids/microgrids from the COMSATS University Islamabad (CUI), Islamabad 44000, Pakistan, in 2018. He also worked as a Research Associate with Dr. Nadeem Javaid during his M.Sc. period at the same university. He has authored more than 60 research publications in ISI-indexed international journals and conferences. Mr. Sheraz also served as a TPC member and invited reviewer of international journals and conferences. His research interests include data analytics, generative adversarial networks, and intelligent shipping. Furthermore, he manages special issues at MDPI including for the journals *Sustainability* and *Energies*.