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*Editorial*

# Advanced Technologies in Smart Cities

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World urbanization is an important process: it is predicted that by 2050 about 64% of the developing world and 86% of the developed world will be urbanized. This phenomenon creates enormous social, economic, and environmental changes, which provide opportunities to use resources more efficiently. Furthermore, considering the looming problem of the pandemic, limiting contact between people in tight environments has become one of the major problems facing cities, where space, resources, and transport are increasingly shared. In this context, advanced technologies such as big data, IoT, and artificial intelligence are used to cope with ever-growing towns and with problems related to the phenomenon of hyper urbanization, to enhance the organization of urban services, reduce costs and resource consumption, and increase contact between citizens and governments. Advanced technologies make towns and cities become "smarter", solving problems related to the organization of a society in which many people share the resources of cities, such as spaces, services, and public places. Smart city applications are developed to manage urban flows and allow for real-time responses. In this Special Issue entitled "Advanced Technologies in Smart Cities", we provide a comprehensive view of the modern city from different perspectives, and include contributions from different research areas, enforcing the interdisciplinary interest in modern city development.

This Special Issue on "Advanced Technologies in Smart Cities" includes seven papers ranging over different technological aspects of the modern cities ranging from the optimization of the telecommunication network in densely urban areas [1], to the evaluation of Blockchain-based technologies for IoT applications [2], from the optimization of the last-mile means of transport for freight distribution [3], to an agile approach for Intelligent Transportation System exploiting Edge Computing technologies [4], a survey approach for Quality of Life evaluation in sustainable cities [5], and finally, a Collaborative Energy Community perspective in Europe [6], as well a proposal of a joint wireless power and information transfer in IoT scenarios [7].

A brief summary of the content associated with each of the selected papers belonging to this Special Issue is included below:

In Cano-Ortega and Sánchez-Sutil [1] the authors focus on an optimization framework for improving the performance of a long-range (LoRa) based communication system. The authors propose to use an artificial bee colony algorithm, allowing to reduce the packet loss in a residential environment with a reduced measurement time span. The algorithm calculates the configuration parameters of the LoRa network, monitoring in real-time the data traffic, and is implemented in the gateway LoRa network monitor (GLNM). This developed system allows performing demand dwelling forecasting studies, analysis of home consumption, optimization of electricity tariffs, etc., applied to smart grids

Furthermore, the work by Saputro and Sari [2] is based on LoRa network implementations for the Internet of Things (IoT). The authors focus here on integrating blockchain technology in the IoT topology to secure the data and transactions that occur in the IoT network. In particular, they focus on establishing a lightweight blockchain platform with

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**Citation:** Mazza, D.; Tarchi, D.; Juan, A.A. Advanced Technologies in Smart Cities. *Energies* **2022**, *15*, 4764. https://doi.org/10.3390/en15134764

Received: 27 May 2022
Accepted: 25 June 2022
Published: 29 June 2022

low latency that could run on devices with low computing resources as well as IoT devices. In this paper, the authors simulate how the broadcast domain works and verify the results in lower latency and energy transmission compared to the standard blockchain model.

A case study regarding freight transportation in the center of a mid-size city is considered in Serrano-Hernandez et al. [3]. Using the analytic hierarchy process methodology, the authors are able to propose alternative transportation modes and routes for last-mile delivery. These alternative distribution plans are assessed considering the economic, environmental, and social dimensions, which make use of an online questionnaire distributed among citizens. Their study promotes the use of drones and bikes in last-mile delivery. The authors also conclude that pedestrian safety and life quality are the most valuable indicators according to citizens, while cargo bikes are seen as the best alternative for deliveries in the city center.

With the focus on smart cities, where new data on the traffic status is continuously being provided by the Internet of Things systems, Peyman et al. [4] discuss how the combination of cloud with fog and edge computing can influence modern transportation systems. To deal with these challenging ecosystems, these authors propose the use of agile optimization algorithms, which are capable of providing real-time solutions to large-scale vehicle routing problems. To illustrate these concepts, a dynamic ride-sharing problem is modeled and solved using an agile optimization algorithm, which employs well-tested biased-randomization techniques.

In Ligarski and Wolny [5] the key role played by citizens in the development of sustainable smart cities is highlighted. In fact, the authors planned and conducted empirical studies to examine the areas influencing the quality of life from the point of view of municipalities, conducting a survey on a sample of 84 municipal offices in Poland. They thoroughly investigated the areas influencing the quality of life, their impact, and their importance and determined that people responsible for research in municipal offices are aware that the quality of life is influenced by many areas and conditions, however, they cannot indicate what can be extended to them.

In Boulanger et al. [6] the authors investigate an active involvement from a bottom-up perspective, creating energy communities, and give a qualitative overview of energy community concepts and strategies at the European level. Providing a threefold methodology, they identify common approaches that are framing the development of energy communities and analyze the most successful steps leading to their creation and growth. The results outline useful considerations for implementing this transition pathway in a real case.

Finally, in Tarchi et al. [7] the authors propose a system enabling the implementation of a self-sustainable wireless network. An energy-efficient fog network architecture for IoT scenarios, jointly implements computation offloading operations and simultaneous wireless information and power transfer (SWIPT), hence, enabling the possibility of jointly transferring energy and computational tasks among the nodes. The system under consideration is composed of three nodes, where an access point (AP) is considered to be always connected to the power network, while a relay node and an end node can harvest energy from the AP. The proposed solution allows for jointly optimizing the computation offloading and the energy harvesting phases while maximizing the network lifetime, to maximize the operational time of the network.

**Author Contributions:** Writing—original draft preparation, D.T.; writing—review and editing, D.M. and A.A.J. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

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

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