IoT

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Editorial

Internet of Things: Building the New Digital Society

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Received: 12 June 2018; Accepted: 12 June 2018; Published: 15 June 2018

Welcome to a New Open Access Journal that connects different academic and industrial research ecosystems from different technical and business profiles to mutualize efforts in the same right direction, for better building the new digital society.

Digital era has revolutionized human society during the last century. In fact, the information digitization process has led to designing computers, phones, and different other machines offering a plethora of applications running on standalone computing machines. Came then, digitized Information transport that has introduced digital communication and networking, where machines were connected forming very large networks, offering applications remotely. These machines connected to these networks created the opportunity to deploy different services, either in voice communication, data transfer, or entertainment, such as as TV, and has led to this digital society; now totally dependent on that biggest network ever, the Internet; one of the major human inventions. In this network, most of the information traffic is created and generated by people through email, web, and, other user services. Now, after the information digitization, the transport and the communication, ubiquitous computing is emerging, relying on digitized information coming from the real-world environment or for the industrial field, allowing the building of more task automation around us to better interact with the real-world environment. Ubiquitous computing, pervasive computing, and ambient intelligence have appeared lately as some of the most challenging and ultimate goals of the digitization process, where automatic processes are expected to be all around us to build the so called smart world, where the real and virtual worlds are co-existing together, where not only people are communicating through the network, but also any connected object or thing involved in a certain process, with and without human intervention, will be communicating and generating traffic in the network. Ubiquitous computing is getting the computing embedded everywhere programmed to act automatically with no manual triggering; it is just omnipresent.

Internet of Things is somehow a leading path to the smart world with ubiquitous computing and networking to ease different tasks around users and provide other tasks, such as easy monitoring of different phenomenon surrounding us. In Internet of Things, environmental and daily life items, named also things, objects, or machines, are enhanced with computing and communication technologies and join the communication framework, meeting a variety of services based on person-to-person, person-to-machine, machine-to-person, and machine-to-machine interactions using wired and wireless communication. These connected machines or objects/things will be new internet or network users and will generate the data traffic of the emerging Internet of Things new services, to be carried out by the current or future Internet. New functionalities, inspired mostly from human senses, will be introduced in the network such as identifying, locating, sensing, deciding, actuating, billing, and acting; building more task automation, shaping the virtual world from the real world. This will be possible with the introduction of technologies, such as RFID or sensors, but also other technologies as robotics, nanotechnology, cloud computing, data mining. and others. This makes Internet of Thing services an

interdisciplinary field, where most of the human senses are somehow reproduced and replaced in this virtual world.

Plenty of technical, research, economical, societal issues are correlated to the Internet of Things. In this IoT journal, we would like to bring together the up-to-date knowledge associated with what a connected object means, what the "Internet" means in the Internet of Thing, the standardization issue and the governance of the Internet of Thing, and what the enabling technologies of Internet of Things are. The closest-to-the-market are described in detail, mainly RFID for identifying and tracking the objects, sensors for sensing the environment and actuating. Both RFID and sensor technologies use wireless connectivity. We also have described the Power line communication technology, used for home networking, where the idea of building smart homes by connecting smart objects at home as smart fridge, smart TV, etc., has emerged prior to the use of the Internet of Things terminology. Services developed in Home Networking are also part of the Internet of Thing services, but does not have the same connectivity issues, as RFID or sensors and embedded systems are tiny devices with limited resources as memory, processor, and mainly battery. We are not ignoring the other issues related to Internet of Things, such as the need for high performance computing, the need for even faster processing, the inherent security constraints, and the limits of the component physics in the increasing speed of processors, etc., that face the expected billion of connected objects generating unprecedented levels of data traffic in the network. Moreover, other research disciplines will have to work and interact with the networking community to build ubiquitous computing and design the Internet of Things services and networking [1,2].

The new journal, *IoT*, focuses on Internet of Things related, original research results, and mature research ready for industrial prototyping and technology transfer. This journal publishes papers on the latest advances, as well as review articles on the various aspects of IoT. The IoT paradigm promises an internetworking environment, where multiple enabled heterogeneous devices are connected in different ways with varying levels of intelligence and capabilities. Heterogeneity and security are most challenging in different Internet of Things applications, but more challenges are being tackled by researchers, such as autonomous energy, easy interaction between different Internet of Things devices, big data optimized analysis, embedded security, and so on. Internet of Things is better defined nowadays and clear domains are identified in industrial verticals, such as smart city, smart health, smart building, and the smart home, where different connected objects are well known, such as wearables, sensors, actuators, vehicles, drones, robots, and so on. In the IoT domain, those connected devices carry sensors and actuators that are interconnected via the Internet, mainly using Cloud or Fog architectures, while the high diversity of IoT applications, along with a various network protocols and access techniques, create a promising yet very challenging communication environment. The IoT domain, by its variety of devices and interfaces, offers different types of interactions, such as human-to-human, human-to machine, and machine-to-machine, etc. These interactions are supported by the harmonized cloud Internet of Things platforms that has enabled novel applications that promote the penetration of IoT-based solutions to the citizens and industry at large. Finally, note that Artificial Intelligence, Machine Learning, Blockchain, or Augmented Reality, combined with Internet of Things appears lately as a promising step to take more advantage of the power of Internet of Things applications and this is one of the hot topics in research lately in Internet of Things. Such evolutions and developments create an ecosystem of interoperable and heterogeneous IoT platforms that caters for the user's goals, needs, and requirements, in order to link the diverse physical devices that can enable multiple cross-domain applications, but also create a new societal impact with multiple services opportunities. Furthermore, the unprecedented data generation carried by the Internet of Things is a gold mine for data scientist searching for new and robust solution to leverage the scale, diversity, and dynamics of these generated data, offering new services through Data Mining and Data Analytics. Also, new network paradigms, such as SDN (Software Defined Network) or ICN (Information Centric Network), will help shape and operate the IoT network with scaling and flexible secure isolation per vertical.

It is also important to note that big data and its analytics is of major interest, as it plays an important role in growing the Internet of Things' automatic decision-making processes, leading to new important business perspectives and values. In fact, connected IoT devices need artificial intelligence to analyze their generated data at scale, which is possible with big data analytics to know the patterns and contextual relations that impact business. IoT, in a way, is driving the big data analytics for making decisions in real-time.

The scope of the expected research work will be broad and multidisciplinary and not limited to:

- IoT Communication technologies: Short range vs. long range, licensed vs. Unlicensed.
- IoT Architectures: users-centric, data-centric, service-centric architectures, Event processing. IoT Data Modeling: Semantic Data, Data ontologies, etc.
- Networks of Smart Objects: services, protocols and architectures
- IoT Performance: Optimization of the communication in IoT, scalability of IoT deployment.
- IoT Privacy and Security: Cryptography, Blockchain, Access control, cyber threats.
- IoT Platforms: Cloud-based, Gateway-based and Fog-based IoT solutions.
- IoT Electronics: Embedded systems, Sensors, Actuators.
- IoT Network Virtualization: SDN and NFV technologies for IoT.
- IoT Verticals: Practical and innovative uses of IoT networks (Smart cities, Smart Mobility, Smart Home, Smart health, Smart Grid, etc.).
- IoT Management: IoT devices and resources, Supervision, Configuration, Orchestration, Coordination and Monitoring.
- IoT Networks: Large-scale networks deployment, Dynamic adaptation of IoT networks, Advances in wireless sensor networks.
- of IoT-enabled devices
- IoT for the Industry: Cyber–Physical Systems, SCADA Platforms, Industrial buses and wireless communication.
- IoT Interoperability: Service discovery and composition, semantic data description, IoT standards.
- IoT Interaction: Augmented Reality and Virtual Reality in IoT, Social Internet of Things.
- IoT Artificial Intelligence: Analytics, Big Data, Machine Learning, Self-driving vehicle, Mining platforms and Prediction for the IoT.
- IoT-Enabling Technologies: Sensors, Radio frequency identification, low power and energy harvesting, sensor networks, robotics, machine-type communication.
- IoT Deployment: Test-beds, infrastructures and industrial deployments.
- IoT User experience: Design, Human Machine Interface, UX, Cognitive approach.
- IoT Business aspects: IoT Business model, Economical surveys, understanding and decision making in IoT.

The last word is to say that the *IoT* journal ambitions will be to get the academic and the industrial researchers and service providers together to leverage the best potential of the Internet of Things to build a better society with well-designed digital services. This will be possible only with the support of every member of our editorial board and our editorial support office. Our best achievement will be to get our IoT Journal to become a referential and inspiring journal for the Internet of things community, designers, developers, integrators, and consumers. We highly motivate the authors to submit their original work in this open access journal and benefit from the power of the open access philosophy to reach, not only the researchers community, but also service developers and IoT service consumers. This is the best way to experience the eventual technology transfer and go-to-market experience, in addition to highly cited research and step-by-step research improvement. We invite researchers in academia and in industry to submit original and high-quality research, as well as comprehensive review articles, but also to position papers to IoT journal and contribute to the emerging and innovative IoT technologies and services and their well-integration in the new digital society.

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

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