Guest Editorial: Smart Things, Big Data Technology and Ubiquitous Computing solutions for the future Internet of Things

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The Internet of Things (IoT) concept is used to define or reference systems that rely on the autonomous communication of a group of physical objects, being each one of them individually accessible and capable of taking decisions.

Many of the IoT systems and technologies are relatively novel. There are still many untapped applications areas, numerous technical challenges and issues that need to be improved and broadly explored. The aim of this special issue is to provide the latest and most innovative contributions concerning Internet of Things, Big data, and Ubiquitous Computing Technologies that interoperate with the objective of solving problems, provide functionality, or optimize tasks.

Initial proofs of the potential of the IoT and Future Internet paradigms are found in the integration of the real-world information in the Internet through smart objects. Smart objects are being extended to support and enable a huge amount of solutions based on cellular infrastructures and wireless sensor networks. Some examples of smart objects in our daily life are smart watches, smart phones, tablets, building automation sensors, security networks, access control systems, etc. Their flexibility and capabilities are being enhanced with the infrastructure capacities to provide an Internet access by means of a Machine-to-Machine communication paradigm, and using Wireless Sensors Networks provided with technologies such as IPv6 Low Power Wireless Personal Area Networks. The integration with the IPv6 Internet makes these devices and possible services more ubiquitous in different environments and globally accessible by systems and users.

This special issue collects five papers that discuss different aspects of Smart Things, Big Data Technology and Ubiquitous Computing solutions for the future Internet of Things and related technologies. Most of them are selected from those submitted to and presented at the esIoT 2014 Workshop.

- The first article [1], *An IoT based reference architecture for smart water management processes*, proposes a smart water management model combining Internet of Things technologies with business process coordination and decision support systems. A detailed functional architecture considering several layers is provided, which implies IoT technologies for decoupling decision support systems and monitoring from business processes coordination and subsystem implementation. Also a deployment scenario defined for validation, developed in Aula Dei, an experimental station in Zaragoza, and enumerating the list of functions to be tested in this station, is described.

- The second article [2], *Testing a Commercial Sensor Platform for Wideband Applications based on the 802.15.4 standard*, presents the proposal of the authors to handle larger amounts of data of Wireless Sensor Networks to support transmitting of audio and / or video data streams and

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in general for wideband applications. The paper investigates which parameters are relevant to be measured in an 802.15.4 Wireless Sensor Network to determine its suitability to wideband transmission of multimedia streams and their performance is evaluated in a commercial sensor platform.

- In the subsequent article [3], *Augmented Reality enabled IoT services for environmental monitoring utilising serious gaming concept*, a novel application of AR and serious gaming concepts within IoT domain is addressed. The overall aim was to demonstrate the use of the AR technology, which by itself provides more interactive and engaging way to present digital information in the real world, within existing IoT services and solutions creating a new dimension in connecting people with things around them. This concept can be used to provide rich and immersive user experience for promotion of various important issues and concepts, in this case the monitoring of air quality and meteorological parameters.

- In [4], *Integrating the EPCIS and Building Automation System into the Internet of Things: a Lightweight and Interoperable Approach*, an extended version of the EPCIS, which seamlessly integrates building automation systems through interoperable data acquisition capabilities based on OBIX and CoAP, is being presented. Authors also present a new lightweight query interface for the EPCIS that is based on a RESTful Web service and CoAP protocol to open more application scenarios for embedded devices as well as for end users. Finally a performance evaluation campaign of the proposed STIS lightweight interface and a gateway component for building automation systems is described with a great level of details.

- Finally the fifth article [5], *Conserving Energy Through Neural Prediction of Sensed Data*, contributes to a more specific problem in the area of data driven approaches to help conserve energy by reducing the amount of required communication in the sensor network. The method is based on the prediction of sensed data using non-linear autoregressive neural networks. Evaluation and performance is performed by using data obtained from temperature and humidity sensors and under different conditions, indicating that the method substantially reduces power consumption in wireless sensor networks.

We would like to express our sincere appreciation of the valuable contributions made by all the authors and our deep gratitude to all the highly qualified anonymous reviewers who have carefully analyzed the assigned papers and significantly contributed to improve their quality.

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Author Biography

Antonio F. Skarmeta received the M.S. degree in Computer Science from the University of Granada and B.S. (Hons.) and the Ph.D. degrees in Computer Science from the University of Murcia Spain. Since 2009 he is Full Professor at the same department and University. Antonio F. Skarmeta has worked on different research projects in the national and international area in the networking, security and IoT area, like Seinit, Deserec, Enable, Daidalos, SWIFT, IoT6, SMARTIE and SocIOtal. He is the head of the research group ANTS since its creation on 1995 and member of TDL. Actually he is also advisor to the vice-rector of Research of the University of Murcia for International projects and head of the International Research Project Office and national representative for MSCA. He has published over 90 international papers and being member of several program committees. He has also participated in several standardization activities being co-authors of some drafts at the IETF.

M. Victoria Moreno received the B.S. (Hons.) and the M.S. degrees in Telecommunications Engineering in 2006 and 2009 respectively, both of them from the School of Telecommunication Engineering of Cartagena, Spain, and the PhD degree in Computer Science in the University of Murcia in 2014. Currently she is working as postdoctoral researcher in NEC Laboratories Europe. She has been involved in EU projects like IoT6, SMARTIE and SocIoTal. She has published over 20 international papers and being member of several program committees. Her main interests include Intelligent Data Analysis and Smart Environments.

Antonio Iera graduated in Computer Engineering at the University of Calabria, Italy, in 1991 and received a Master Diploma in Information Technology from CEFRIEL/Politecnico di Milano, Italy, in 1992 and a Ph.D. degree from the University of Calabria in 1996. Since 1997 he has been with the University of Reggio Calabria and currently holds the position of full professor of Telecommunications and Director of the Laboratory for Advanced Research into Telecommunication Systems (`http://www.arts.unirc.it`). IEEE Senior Member since 2007. His research interests include, next generation mobile and wireless systems, RFID systems, and Internet of Things.