

## Guest Editorial Preface

# Special Issue on Big Data Analytics and Intelligent Environments in Internet of Things

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Internet of Things (IoT) refers to an innovative paradigm that seamlessly integrates a multitude of smart objects with the Internet interlinking and fusing the physical (real) and the information (cyber, virtual) worlds. The IoT Applications have to address significant complexity due to such challenging issues as large scale, amounts of data, heterogeneity, diversity, and dynamicity. Classic distributed systems and Internet approaches are not sufficient to solve these unprecedented issues. Advanced data analytics methods are needed to effectively extract value from a variety of data sources. The efficiency is both in the terms of distributed computation (extraction performance) and service intelligence (quality of extracted value). These two aspects of the efficiency lead to the following important topics: *Big Data analytics* and *Intelligent Environments*. Respectively, this special issue collects a diversified variety of works that reflect latest research, development, methodology, and education activity Big Data Analytics and Intelligent Environments in Internet of Things.

The work *Ontology-Driven Situation Assessment System Design and Development in IoT Domains* by Lebedev and Panteleyev considers an ontology-driven approach to software design and development of situation assessment systems for IoT domains and applications. The main idea of the proposed approach is to explicitly formalize a situation assessment system dataflow process in an ontological form. The efficiency of the approach is evaluated using a traffic control scenario. This work targets the area of software development methods for IoT.

The work *On Internet of Things and Big Data in University Courses* by Dmitry Namiot and Manfred Snep-Snepe considers IoT and Big Data educational programs for universities. The discussion aims at a structure for a new educational course to cover information and communication technologies used in IoT systems and related areas, such as Smart Cities. This work targets the area of data engineering methods for IoT.

The work *Semantic Approach to Opening Museum Collections of Everyday Life History for Services in Internet of Things Environments* by Oksana Petrina et al. considers an original smart museum concept and its case study of everyday life history in the History Museum of Petrozavodsk State University. The developed smart services focus on implementation in digitized IoT-enabled infrastructures and information systems already existed in modern museums. This work targets the area of creating intelligent environments for preserving and studying cultural heritage based on IoT technologies and in respect to the Big Data challenge.

The work *Towards the Development of Smart Spaces-based Socio-Cyber-Medicine Systems* by Yulia Zavyalova et al. considers a novel concept of socio-cyber-medicine systems. A semantic layer is introduced to integrate all system and domain objects from the three digitalized worlds: social world, cyber world, and physical world. This work targets the area of creating intelligent environments for collaborative work of medical personnel and patients based on IoT technologies and in respect to the Big Data challenge.

The work *An Approach to Efficiency Evaluation of Services with Smart Attributes* by Kirill Kulakov considers the notion of service intelligence for such a particular application domain as e-Tourism. An approach is proposed to efficiency evaluation of services with smart attributes, where for each attribute an execution scenario and its comparison metrics are defined. This work targets the area of software development methods for intelligent environments in IoT.

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