



## Guest editorial: towards enhancing ambient systems, networks and technologies

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Published online: 28 January 2019

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This special issue is based on the best papers selected from the 9th International Conference on Ambient Systems, Networks and Technologies (ANT-2018), which was held in Porto, a Portugal, on 8–11 May 2018. The conference attracted a large number of scientific papers that contributed to the state-of-the-art in the ambient systems, networks and technologies. All the papers selected for this special issue have been extended from their original versions and underwent two rounds of rigorous peer-review process. Based on the reviewers' feedback, as well as the evaluations of the Guest Editors, nine papers were selected for this special issue from 14 invited submissions. The accepted papers augment ambient systems by uncovering interesting methodologies related to networks, tracking and sensing technologies, cloud computing, human computer interaction, and agent-based and management models.

The first paper by Ahriz et al. is entitled “Performance Evaluations in Optical and Wireless Networks for CONDOR Project”. The authors of this paper discussed the importance of network performance that provides services to a great number of users while assuring user's quality of service requirements. The main aim of this paper is to evaluate the wireless and optical networks' performances in terms of link quality, throughput, jitter and delay. The demonstrated results show that a high throughput in optical and wireless

networks supports a big load through the launched mobile applications while P2P wireless network connections upset some video applications.

The second paper by Petrakis et al. is entitled “iPACS: A Physical Access Control System as a Service and Mobile Application”. This paper proposed a system named *iPACS* which refers to an automated Physical Access Control System as a cloud service for controlling users' activity, navigation and access in large residential infrastructures, such as apartment buildings and shopping malls. The basic idea of this system is achieved by installing beacon Bluetooth radio transmitters that broadcast their identifier to nearby devices (e.g. users' mobile phones) and then transmit this information safely, together with other application and user data, to a private cloud. The provided services are deployed over secure private clouds capable of dealing safely with sensitive information while ensuring users privacy. The experimental results suggested that the usage capacities and response times of iPACS can be improved significantly by applying certain optimizations on the implementation and deployment of services in the cloud.

The third paper by Dias and Grilo is entitled “Multi-Hop LoRaWAN Uplink Extension: Specification and Prototype Implementation”. This paper presented the design and implementation of a multi-hop uplink solution compatible with the LoRaWAN specification, which can act as an extension to already deployed gateways. The authors showed that the routing protocol is successfully implemented and assessed using a linear and bottleneck topology, where the packet reception rate and throughput are measured. This paper also presents the protocol specification and detailed description of a prototype implementation, as well as experimental performance results.

The fourth paper by Poniszewska-Maranda et al. is entitled “A Real-time Service System in the Cloud”. The authors of this paper discussed cloud computing and its services and how it influenced the way the software is built. This paper aimed to examine the benefits of cloud usage to support

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real-time service systems, using the Salesforce platform. It explored the meaning and the role of cloud computing for the real-time service systems efficient functioning. This paper demonstrated a service management platform for the Polish Billiards and Snooker Association, based on a real-time system located in the cloud. This system is set up as a private cloud to grant access to the snooker organization employees only.

The fifth paper by Žemgulys et al. is entitled “Recognition of Basketball Referee Signals from Real-Time Videos”. The authors described the importance of hand gesture recognition in the area of human computer interaction filed. This paper proposed an image segmentation technique based on the histogram of oriented gradients and local binary pattern features. With their approach, it is allowed to recognize the signals of basketball referee from recorded game videos and achieved an accuracy of 95.6% using local binary pattern features and support vector machine for classification. The results revealed the proposed technique is relevant to real-time analysis of sports games.

The sixth paper by Harmon and Miller is entitled “Microsimulating Labour Market Job-Worker Matching”. This paper introduced a new agent-based microsimulation model of urban labour markets, in which workers actively seeking employment in each time period are matched with vacant jobs. The model is designed to operate within the integrated land use, transportation, environment urban simulation model system. The model’s performance is tested within a known historical time-period. This paper showed that accurate labour market simulation is possible with agent-based components on both the job supply and demand sides.

The seventh paper is Eze et al. is entitled “A Configurable Identity Matching Algorithm for Community Care Management”. This paper showed the challenge of systematic performance management for complex patient care. This paper introduced a configurable identity matching algorithm for correlating shared data from multiple stakeholders into a common data model to support performance management of community healthcare. It also illustrated its use in a case study of cloud-hosted performance management for community care of complex patients at a regional health authority in Canada. The proposed algorithm is a generic such that it can be applied to other situations, and other geographies.

The eighth paper by AbdulGhaffar et al. is entitled “Internet of Things Based Multiple Disease Monitoring and Health Improvement System”. The authors of this paper aimed to provide IoT based system for monitoring multiple diseases using Cisco packet tracer tool. Their solution is divided into two parts. The first part consists of data collection and processing from sensors and microcontrollers. The second part consists of the different services such as disease diagnosis, medicine administration, and emergency responses. The authors focused on three diseases, namely: hypertension, glaucoma, and chronic obstructive pulmonary; while other diseases can be incorporated.

The ninth paper by Malik and Zatar is entitled “Agent Based Routing Approach to Support Structural Health Monitoring-Informed, Intelligent Transportation System”. This paper proposed a multiagent-based system approach to augment the lifetime of wireless sensor network that supports Structural Health Monitoring-Informed, Intelligent Transportation Systems. The proposed routing approach in this system consists of a mobile agent that is able to traverse the network, i.e., sensor nodes, mounted onto a bridge using multi-hop communication; collecting and aggregating the data; as such eliminating the major causes of power consumption: direct transmission/broadcast from each sensor node to the sink, and redundant sensory data. The experiments provided in this paper using an open source simulator showed agent-based approach is 30% more energy efficient in comparison to direct transmission to the sink.

The guest editors would like to take this opportunity to thank all the authors for the efforts they put in the preparation of their manuscripts and for their valuable contributions. We wish to express our deepest gratitude to the referees who provided very useful and thoughtful feedback to our authors. Our sincere thanks go to the Editor-in-Chief for his kind help and support.

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