

Guest Editorial

Impact of sensor data on intelligent environments

Francisco Falcone^a, Mounir Ghogho^b and Essaid Sabir^{c,d}

^a Associate Professor, Universidad Pública de Navarra and Institute for Smart Cities, Spain

E-mail: francisco.falcone@unavarra.es

^b Professor, Université Internationale de Rabat, Morocco

E-mail: mounir.ghogho@uir.ac.ma

^c Associate Professor, ENSEM, Hassan II University of Casablanca, Morocco

^d Department of Computer Science, University of Québec At Montréal, Canada

E-mail: e.sabir@ensem.ac.ma

Enabling data gathering, management and processing is one of the key aspects in the advent of adopting Smart Cities and Smart Regions paradigms. In order to effectively establish context aware environments with high degrees of interactivity, a wide variety of data must be collected and used in the framework of sensor-actuator systems. The widespread adoption of mobile technologies, the progressive implantation of different types of wireless sensor networks and the arrival of 5G networks is catalyzing capabilities for data gathering from multiple types of sensors. The combination of these enhanced sensing and communication capabilities with optimized processing techniques, such as Mobile Edge Computing and Fog Computing are paving the way for the successful use of context data within intelligent environments. Within this context, this Thematic Issue, entitled “Impact of sensor data on intelligent environments” is devoted to presenting recent advances in sensor data methodologies and applications within intelligent environments, in which a total of five contributions have been collected.

We would like to thank all the reviewers for their evaluations and constructive comments provided during the review process. We would also like to thank all the authors for their contributions to this Thematic Issue. We are also grateful to JAISE for supporting this Thematic Issue. Finally, we would like to thank the JAISE editorial team, Dr. Andrés Muñoz, Prof. Juan

Augusto, Dr. Vincent Tam and Dr. Hamid Aghajan for their guidance and help in the entire editorial process.

The paper “**Using continuous sensor data to formalize a model of in-home activity patterns**” by Beiyu Lina, Diane J. Cook and Schmitter-Edgecombe Maureen describes a formal model of indoor routine behavior based on data from automatically-sensed and recognized activities, with data sets from multiple smart homes. By identifying human behavior patterns, based on variables such as inter-arrival times, different models can be obtained for human indoor activities as well as for inter-arrival times. The obtained information provides models that can be used for items such as routine behavior prediction and future applications such as automated diagnosis and design customized behavioral interventions.

In the paper “**Remote detection of social interactions in indoor environments through Bluetooth Low Energy beacons**” by Paolo Baronti, Paolo Barsocchi, Stefano Chessa, Antonino Crivello, Michele Girolami, Fabio Mavilia and Filippo Palumbo, the authors investigate the development of automated tools that may provide information to researchers that analyze interactions among humans, without interfering with the subjects under observation in order to avoid behavioral alterations. The approach is based on user group proximity by means of a system that integrates commercial wearable Bluetooth Low Energy (BLE)

tags and a novel algorithm called Remote Detection of Human Proximity (ReD-HuP), achieving very high accuracy values.

In the paper “**Smart and intelligent network selection approach to support location-dependent and context-aware service migration**” by Riaz Ul Amin, Joe Sventek and Abdul Sattar Malik, the authors explore the challenges of location-dependence, intermittent network connectivity and irregular network traffic flows in unplanned areas for VANETs to host and operate non-safety-critical VANETs services. They investigate different shortcomings and address them exploiting location-dependent service migration over an integrated network scheme.

In the paper entitled “**Smoking recognition with smartwatch sensors in different postures and impact of user’s height**” by Sumeyye Agac, Muhammad Shoaib and Ozlem Durmaz Incel, the identification of smoking is analyzed by means of datasets ob-

tained from smartwatch sensors. Aided by supervised learning algorithms, different sensor combinations are examined, considering the effect of user height, as well as their relative position.

The last paper included in this special issue, entitled “**Predicting retail business success using urban social data mining**” by Georgios Papadimitriou, Andreas Komninos, John Garofalakis, investigates the influence of neighbourhood venues on prediction accuracy, depending on their exhibited weekly data patterns. The authors mine a large dataset of high temporal granularity check-in data for two medium-sized cities in Southern and Northern Europe, with the aim to predict the evolution of check-ins of new businesses of any type, from the moment that they appear in a social network. The obtained data can then be used to predict a new business evolution, with a high success rate.