

Preface

The UCAmI Conference brings together the fields of ubiquitous computing (UC) and ambient intelligence (AmI). The first one is defined as the integration of human factors, computer science, engineering, and social sciences, and the second one refers to sensitive electronic environments responsive to the presence of people. This year we celebrated the 11th International Conference on Ubiquitous Computing and Ambient Intelligence (UCAmI 2017) in Philadelphia, USA, during November 7–10, 2017. In this conference edition the contributions were submitted to six tracks and two special sessions. The tracks were *Ambient-Assisted Living*, *Human–Computer Interaction*, *Ambient Intelligence for Health*, *Internet of Things and Smart Cities*, *Ad-hoc and Sensor Networks*, and *Sustainability*; and the special sessions were focused on *Socio-Cognitive and Affective Computing*, and *AmI Systems and Machine Learning*.

A total of 100 submissions were received and 60 of them were accepted as full papers to be presented during the conference. The reviews of every submission were managed by the chairs of the corresponding tracks. All submissions were reviewed by at least three members of the Program Committee. The reviewers' comments and recommendations were taken into consideration while selecting submissions for inclusion in the proceedings, and were communicated to the authors. Authors whose manuscripts were accepted were asked to address the reviewers' comments. Next we briefly introduce each conference track and special session.

The *Ambient-Assisted Living* (AAL) track, chaired by Ian Cleland and Jesus Fontecha, selected contributions that highlight the role of AmI in the design of innovative solutions that empower and enrich people's capabilities. This role is facilitated through digitally augmented environments that sense, adapt, and react to human habits, needs, gestures, and emotions. This potential to create more effective, pre-emptive interactions is the core of what makes AmI of interest for developing and deploying solutions for many real-life problems, most notably within ambient-assisted living. Within this context, this edition of the AAL track focused on the "development and testing of ICT-based solutions in real-life situations, which enable and support sustainable care models for older adults." The accepted articles in this track cover several topics including promotion of self-care, improving activity classification in a smart home, and monitoring of social activities.

The *Human–Computer Interaction* (HCI) track, chaired by Francisco J. Gutierrez and Alberto L. Morán, presents novel proposals in the way the people interact with computer and vice versa. Building upon the research and practice traditions of ubiquitous computing, pervasive computing, and context awareness, AmI represents a new generation of user-centered computing environments that aim at finding new ways of integrating information technology in everyday life. More recently, AmI systems have largely increased in complexity and diversity, with advances in diverse domains, including smart homes, ambient-assisted living, e-health, and IoT. However, there are still many open research problems and challenges to be explored. Particularly, we need

to further our understanding on the role of “human” in the interaction with these systems. The aim of this track was to bring together experts, academics, and practitioners from a wide range of disciplines to present and discuss state-of-the-art research and development, up-to-date issues, and HCI challenges in the field of AmI.

The track entitled *Ambient Intelligence for Health* (AmIHealth), chaired by Ramón Hervás and Oresti Baños, presented several contributions that intend to improve people’s quality of life. The AmIHealth track addressed this topic from a holistic point of view, covering a wide variety of research challenges including wellness promotion and coaching, disease monitoring, knowledge and data analytics for health, adaptive and smart interfaces for special needs, among many others. New paradigms are emerging from the aforementioned topics, such as e-health, i-health, and m-health that involve, respectively, the digital society, intelligent systems, and mobile computing, providing technological solutions to effectively impact in people’s life.

The track entitled *Internet of Things (IoT) and Smart Cities*, chaired by Macarena Espinilla and Shuai Zhang, focused on showing how IoT and smart cities technologies make an impact on our communities and everyday lives. The track selected exciting contributions from researchers and teams, most of which are multidisciplinary. They range from research and innovation in multiple IoT services for supporting interoperability and integration, to addressing security and privacy challenges. Furthermore, this track also addressed multiple applications of IoT within the field of smart cities, such as tourism, urban transportation, agricultural activities, and industry 4.0.

The track entitled *Ad-hoc and Sensor Networks*, chaired by Gabriel Urzaiz, presents novel research works on this topic. Computer networks continues to be a very active research field, constituting a basis for most of the existing and emerging technologies for implementing the IoT paradigm. In recent years, emphasis has been placed on mobility, energy-efficiency, heterogeneity, network security, and infrastructureless architectures. Papers in this track range from protocols and architectures, to middleware, sensors and communication issues. This track also addressed energy-efficiency considerations, enabling applications to impact not only on the sustainability of the solutions, but also on the social and economic aspects of our lives.

The track on *Sustainability*, chaired by Pritpal (“Pali”) Singh, selected articles focused on achieving a more sustainable world. Ubiquitous computing uses information and communication technologies, sensors, and other means to improve quality of life, efficiency of operation and services, and reduced environmental impact of different processes. Application areas covered in this track included employing ubiquitous computing and ambient intelligence for better predicting household electrical energy demand under different weather conditions, reducing the energy consumption of buildings, and predicting the onset of frost to mitigate crop damage due to changing weather conditions.

The special session entitled *AmI Systems and Machine Learning* was chaired by José L. Montaña and Rafael Duque-Medina, and co-chaired by Cristina Tirnauca, Sergio Salomón, Santiago Ontañón, and Avelino J. González. This special session considers articles that address the challenge of providing low-level-type intelligence in the absence of artificial intelligence (AI). This challenge has been rapidly solved with emerging software machine learning (ML) applications that provide a balanced combination of ubiquitous technologies and AI methodologies. This session brings together

those investigators who are active in all fields of ML and AI research. Their research work can help AmI systems in a variety of activities, such as interpreting the environment's state, modeling, simulating, and representing entities in the environment, representing the information and knowledge associated with the environment, planning decisions or actions, learning about the environment and associated aspects interacting with humans.

The special session entitled *Socio-Cognitive and Affective Computing* was chaired by Antonio Fernández-Caballero, and co-chaired by Pascual González, José Manuel Pastor, Elena Navarro and Arturo Martínez-Rodrigo. Socio-cognitive and affective computing systems should be able to adapt their behavior according to the physiological computing paradigm. This special session on socio-cognitive and affective computing aims at integrating these various albeit complementary fields. Proposals of researchers who use signals from the brain and/or body to infer people's intentions and psychological state in smart computing systems are welcome. Designing this kind of system requires combining knowledge and methods of ubiquitous and pervasive computing, as well as physiological data measurement and processing, with those of socio-cognitive and affective computing. The special session provided a meeting point for UCAmI 2017 attendees with a current or developing interest in the topics. The selected papers had a special focus on multidisciplinary approaches and multimodality.

We would like to thank all the authors who submitted their work to UCAmI 2017, the chairs of the conference tracks and special sessions for the great effort in making this edition successful, and also the reviewers for providing detailed and constructive reviews.

Furthermore, in an effort to increase the visibility of the contributions of this conference, selected papers were invited to be submitted as extended versions in the following journals: *Sensors*, *Frontiers in Human Neuroscience*, *Journal of Ambient Intelligence and Humanized Computing*, and *Applied Sciences*. We would like to thank the distinguished editors of these journals for providing us with these opportunities.

Finally, we would like to especially thank the organizers, Villanova University and MAmI Research Lab, for the huge effort and dedication toward making UCAmI 2017 a high-quality event and a meeting point for this research community.

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Sergio Ochoa
Pritpal Singh
José Bravo

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