Preface

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1. 10 Years of JAISE

The history of humanity has been accompanied with tool development since its very inception. The relationship between humans and tools has grown successfully and inextricably so far for hundreds of thousands of years. So much so that the ability to create, modify and use tools is often used as one of the main factors to explain the success of human kind relative to other branches of the animal kingdom on this planet. For the first time in history tools created by humans (e.g., robots) are starting to become so sophisticated and independent that they are reaching the state where they have all they need to create likes of themselves without additional human help. This is understandably raising reasonable concerns amongst humans.

Meanwhile, in this journal we have been focusing on smart technologies which can provide assistance to humans in light of a still clear understanding that even smart technologies are a tool created to serve humans to have a better experience of life in this planet [1, 5, 4].

Each time window of technological advancement history offers different challenges and the last decade has been a very exciting one with an exponential diversification of technology, with technology effectively blending even more in our daily lives. We are witnesses to this unique time in the history of humanity and we have a responsibility to make it a positive experience for all.

A decade ago, in our Volume 1 Issue 1 (Inaugural Issue) editorial note [2], we presented a number of articles from leading colleague scientists around the world. Their articles outlined the state of the art and set out a plethora of technological, ethical, and societal challenges, some of which are still very much open. For this anniversary issue we repeated the exercise and we are delighted to present five articles produced by collective effort of a number of our Editorial Board members. Each article is the result of a team approach, and in itself reflects on the growing need for multi-disciplinary cooperative work in this fascinating field.

2. This issue

This anniversary issue of JAISE is composed of five papers. The back pages of this issue include an acknowledgment for the 2018 reviewers of JAISE.

The recent advances in sensor development, embedded systems, wireless networks, and computer vision have brought to an increasing interest in corresponding applications of such enabling technologies in different fields of Ambient Intelligence (AmI). The paper **"Sensors, Vision and Networks: from video surveillance to activity recognition and health monitoring"** by Prati, Shan, and Wang presents an overview of the state-of-the-art of three different fields with the shared characteristics of making use of a network of sensors, with the possible application of computer vision, signal processing, and machine learning algorithms. The paper first provides a survey and discusses possible future directions for Intelligent Video Surveillance (IVS) as one of the major applications supported by both hardware and algorithmic progresses. Then, the paper describes and compares the existing technologies of Wireless Sensor Networks (WSNs) and their application to human activity recognition (HAR), offering a survey of the current research trends and challenges. Finally, the paper describes recent advances on camera-based health monitoring (including vision-based Ambient Assisted Living (AAL) and patient monitoring, and camera-based physiological measurements), and dis-

cusses the challenges faced in deploying practical applications.

The Internet of Things (IoT) is a computing paradigm whereby everyday life objects are augmented with computational and wireless communication capabilities, enabling their connection to the Internet. The IoT is seen as the key ingredient for the development of smart environments. However, the current IoT ecosystem offers many alternative communication solutions with diverse performance characteristics. This situation presents a major challenge to identifying the most suitable IoT communication solution for a particular smart environment implementation. The paper **"Internet of Things for Enabling Smart Environments: a Technology-Centric Perspective"** by Gomez, Chessa, Fleury, Roussos, and Preuveneers examines the different requirements of key smart environments such as the smart home, smart health, smart cities and smart factories, and relates them to current IoT communication solutions. The paper describes the core characteristics of these smart environments and then proceeds to provide a thorough survey of relevant IoT communication technologies and architectures, as well as a discussion of the challenges that remain open for research.

We are approaching 20 years since the term Internet-of-Things (IoT) was introduced in a presentation to a major corporation about incorporating RFID tags within their supply chain. The paper **"The Internet of Things: Reflections on the Past, Present and Future from a User Centered and Smart Environment Perspective"** by Chin, Ben Allouch, and Callaghan introduces the Internet-of-Things (IoT) and describes its evolution from a concept proposed in 1999 through its public emergence in 2005 as a global technology, to the present day where IoT devices are available as off-the-shelf products from major manufacturers. The paper presents a five-phase categorisation of the development of the technology, and reports on four case studies which illustrate its various applications. Finally, the paper discusses some of the issues facing future developers and marketers of Internet-of-Things products ranging from the role of artificial intelligence to customer privacy and acceptance issues.

Ambient intelligence (AmI) is intrinsically and thoroughly connected with artificial intelligence (AI). Some even say that it is, in essence, AI in the environment. The paper **"Artificial Intelligence and Ambient Intelligence"** by Gams, Gu, Härmä,

Muñoz, and Tam argues that AI and AmI are interconnected through information and communication technologies (ICT), and provides an overview of the progress in both through information-society laws, super-intelligence, and several related disciplines such as multi-agent systems and the Semantic Web, ambient assisted living and e-healthcare, AmI for assisting medical diagnosis, e-learning and smart cities. Besides offering a short history and a description of the current state, the frontiers and the potential future trends of AmI and AI are also examined in the paper.

The increasing deployment and usage of 'smart' technologies impacting a wide range of everyday life activities has created an urgent need to reconsider their societal implications and how to address these implications with appropriate design methods. The paper **"Grand Challenges for Ambient Intelligence and Implications for Design Contexts and Smart Societies"** by Streitz, Charitos, Kaptein, and Böhlen highlights selected grand challenges that concern especially the social and the design dimensions of research and development in Ambient Intelligence (AmI) and Smart Environments (SmE). The paper presents four perspectives on the subject grounded in different approaches: the 'smart-everything' paradigm, the potential of nonverbal communication interfaces, the role of uncertainty and 'future data', and ethical standards for autonomous and intelligent systems.

3. Reflections

These articles explain the importance of the research and achievements in many fundamental directions. For example, an article explained the advances on video processing and sensor networks and reflected on the importance of their impact on the state of the society in terms of citizen safety and health. The technology underpinning these areas have made major progress in the last decade facilitating now powerful applications with important practical applications. Also IoT was presented in two papers both from its infrastructure as well as humanistic dimensions, and its vast potential for enabling innovations in smart homes, digital healthcare, smart factories and smart cities was explained. The continuous technological progress and the promising potentials in business feeds have resulted in sustained interest in developing IoT systems. One important consequence

of this proliferation and sophistication of the technologies we are exposed to is the dimension of cognitive overload, namely the amount of data made available for our decision making processes. Another important dimension is the aggregation of combinatorial possibilities which makes it possible for systems to grow 'horizontally' as well as 'vertically', possibly even in self-arranging techno-ecologies.

Complementing the harder platform of infrastructure forming the Smart Environments is the softer framework of programming for Ambient Intelligence, which drives the behavior of the system and defines a significant part of the value of the services. There have been significant developments in this direction as well. Emerging areas like Big Data pay homage to the various processing levels needed now to make meaning of the vast amount of data being generated. The other direction of progress is on the sophistication of and quality of reasoning evolved around the notion of context awareness [3].

Of course, this area of scientific exploration would not exist without humans. SmE and AmI are made by humans and should be made for humans. Therefore, there are important issues on human centricity which remain at the centre of discussions in this area. Such issues range from affordances to privacy and security.

Emerging from the surveys presented in this Anniversary Issue are the ongoing shared challenges of interoperability, security, standardization, adaptation and personalization. Some progress has been made in all these directions; however, not enough to make these technologies widely available, used, or to employ an earlier technical term 'pervasive'. This is probably the main current overarching challenge: Can these become technologies for the masses? Some become ephemerally global stimulated by the marketing machinery of big corporations and disguised as the next must-have gadget for everyone. However, the aims and ambitions of the scientific community behind this area goes beyond the current state into a more evenly accessible, functional, comfortable and effective availability of this technological support. Hopefully the next generation of human-tools will manifest this kind of symbiotic growth.

More information about JAISE is available at: http://www.iospress.nl/journal/journal-of-ambient-intelligence-and-smart-environments/

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