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Distributed Computing and Artificial Intelligence, Special Sessions, 15th International Conference

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Preface

The 15th International Conference on Distributed Computing and Artificial Intelligence 2018 is an annual forum that will bring together ideas, projects, and lessons associated with distributed computing and artificial intelligence, and their application in different areas. Artificial intelligence is changing our society. Its application in distributed environments, such as the Internet, electronic commerce, environment monitoring, mobile communications, wireless devices, distributed computing, to mention only a few, is continuously increasing, becoming an element of high added value with social and economic potential, in industry, quality of life, and research. These technologies are changing constantly as a result of the large research and technical effort being undertaken in both universities and businesses. The exchange of ideas between scientists and technicians from both the academic and industry sector is essential to facilitate the development of systems that can meet the ever-increasing demands of today's society.

The present edition brings together past experience, current work, and promising future trends associated with distributed computing, artificial intelligence, and their application in order to provide efficient solutions to real problems. This conference is a stimulating and productive forum where the scientific community can work toward future cooperation in distributed computing and artificial intelligence areas. Nowadays, it is continuing to grow and prosper in its role as one of the premier conferences devoted to the quickly changing landscape of distributed computing, artificial intelligence, and the application of AI to distributed systems.

This year's technical program will present both high quality and diversity, with contributions in well-established and evolving areas of research. More than 120 papers were submitted to main and special sessions' tracks from over 20 different countries (Algeria, Angola, Austria, Brazil, Colombia, France, Germany, India, Italy, Japan, Netherlands, Oman, Poland, Portugal, South Korea, Spain, Thailand, Tunisia, UK and USA), representing a truly "wide area network" of research activity.

Moreover, DCAI'18 Special Sessions have been a very useful tool in order to complement the regular program with new or emerging topics of particular interest to the participating community. The DCAI'18 Special Sessions technical program

has selected 64 papers and, as in past editions, it will be special issues in JCR-ranked journals such as Neurocomputing, and International Journal of Knowledge and Information Systems. Special Sessions that emphasize on multi-disciplinary and transversal aspects, such as Advances on Demand Response and Renewable Energy Sources in Smart Grids (ADRESS), AI–driven methods for Multimodal Networks and Processes Modeling (AIMPM), Social Modelling of Ambient Intelligence in Large Facilities (SMAILF), Communications, Electronics and Signal Processing (CESP), Complexity in Natural and Formal Languages (CNFL), Web and Social Media Mining (WASMM), have been especially encouraged and welcome.

This symposium is organized by the University of Castilla-La Mancha, the Osaka Institute of Technology, and the University of Salamanca. The present edition was held in Toledo, Spain, on June 20–22, 2018.

We thank the sponsors (IBM, Indra, IEEE Systems Man and Cybernetics Society Spain) and the funding supporting of the Junta de Castilla y León (Spain) with the project *"Moviurban: Máquina Social para la Gestión sostenible de Ciudades Inteligentes: Movilidad Urbana, Datos abiertos, Sensores Móviles"* (Id. SA070U16 —Project co-financed with FEDER funds), and finally, the Local Organization members and the Program Committee members for their hard work, which was essential for the success of DCAI'18.

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Organization of Special Session on Advances on Demand Response and Renewable Energy Sources in Smart Grids (ADRESS)

Smart grid concepts are rapidly being transferred to the market and huge investments have already been made in renewable-based electricity generation and in rolling out smart meters. However, the present state of the art does not ensure neither a good return of investment nor a sustainable and efficient power system. The work so far involves mainly larger stakeholders, namely power utilities and manufacturers, and their main focus has been on the production and grid resources. This vision is missing a closer attention to the demand side and especially to the interaction between the demand side and the new methods for smart grid management.

Efficient power systems require, at all moments, the optimal use of the available resources to cope with demand requirements. Demand response programs framed by adequate business models will play a key role in more efficient systems by increasing demand flexibility both on centralized and distributed models, particularly for the latter as renewable energy generation and storage are highly dependable of uncontrolled factors (such as wind and solar radiation) for which anticipated forecasts are subjected to significant errors.

The complexity and dynamic nature of these problems require the application of advanced solutions to enable the achievement of relevant advancements in the state of the art. Artificial intelligence and distributed computing systems are, consequently, being increasingly embraced as a valuable solution. ADRESS aims at providing an advanced discussion forum on recent and innovative work in the fields of demand response and renewable energy sources integration in the power system. Special relevance is indorsed to solutions involving the application of artificial intelligence approaches, including agent-based systems, data mining, machine learning methodologies, forecasting, and optimization, especially in the scope of smart grids and electricity markets.

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Organization of Special Session on AI–Driven Methods for Multimodal Networks and Processes Modeling (AIMPM)

The special session entitled AI–driven methods for Multimodal Networks and Processes Modeling (AIMPM 2018) is a forum that will share ideas, projects, researches results, models, experiences, applications, etc., associated with artificial intelligence solutions for different multimodal networks-born problems (arising in transportation, telecommunication, manufacturing, and other kinds of logistic systems).

Recently, a number of researchers involved in research on analysis and synthesis of multimodal networks devote their efforts to modeling different, real-life systems. The generic approaches based on the AI methods, highly developed in recent years, allow to integrate and synchronize different modes from different areas concerning: the transportation processes synchronization with concurrent manufacturing and cash ones or traffic flow congestion management in wireless mesh and ad hoc networks as well as an integration of different transportations networks (buses, rails, subway) with logistic processes of different character and nature (e.g., describing the overcrowded streams of people attending the mass sport and/or music performance events in the context of available holiday or daily traffic services routine). Due to the above-mentioned reasons, the aim of the workshop is to provide a platform for discussion about the new solutions (regarding models, methods, knowledge representations, etc.) that might be applied in that domain.

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Organization of Special Session on Social Modelling of Ambient Intelligence in Large Facilities (SMAILF)

Ambient Intelligence (AmI) is intended to provide users with systems tightly integrated with their everyday environment and activities. The goal is minimizing the need of explicit actions by users, through the continuous and distributed orchestration of information and actuation devices. With the advances in the field, AmI is pursuing growingly ambitious goals in terms of the size and integration of its smart spaces, the number of served users, and the level of adaptation to them.

This special session was focused on the challenges and potential solutions that appear when AmI moves to Large Premises (LP). In this context, new requirements consider big groups of people moving in premises that fall beyond the classical closed and controlled environments of most AmI systems. The ways of interaction, the expected services, and the behavior of people acquire a new dimension and variability in those interconnected smart spaces. AmI systems need to adapt to the crowds using large numbers of multiple and heterogeneous AmI resources in distributed and frequently uncontrollable environments that cause unexpected dynamic changes in the system topology.

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Organization of Special Session on Communications, Electronics and Signal Processing (CESP)

Today's digital revolution, with millions of connected devices providing real-time information about cities, homes, buildings, vehicles, etc., would not have been possible without the great advances in communications, electronics, and signal processing of the last decades. This special session covers all aspects related with these three pillars: new communication approaches such as 5G, massive MIMO, network function virtualization (NFV), software-defined networks (SDN), or millimeter wave communications; novel results in the field of electronics such as new antennas design, emerging Li-Fi devices, micro-electromechanical systems, or nano-electronics devices; and prevalent signal processing methodologies such as adaptive filtering approaches, fusion techniques, navigation systems, or image and video processing.

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Organization of Special Session on Complexity in Natural and Formal Languages (CNFL)

Complexity has become an important concept in several scientific disciplines. There has been a lot of research on complexity and complex systems in natural sciences, economics, and social sciences. Complexity has always been a central topic in area of formal languages and now also increasingly in natural language research. The main objective of this special session is to bring together researchers from different areas that have in common their interest on linguistic complexity, regarding formal and/or natural languages. We want to boost the interchange of knowledge and methods between specialists that have approached linguistic complexity from different viewpoints. In order to promote interdisciplinarity among researchers that are dealing with any type of linguistic (natural or formal) complexity, this special session was focused in contributions introducing methods, models, definitions, and measures to assess complexity.

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Adrian-Horia Dediu	Universitat Rovira i Virgili, Spain
Adrià Torrens-Urrutia	Universitat Rovira i Virgili, Spain

Organization of Special Session on Web and Social Media Mining (WASMM)

The Web has become an indispensable instrument in the daily life for business activities, learning, entertainment, communication, etc. Offer of products and services to Internet users is practically unlimited; nevertheless, this apparent advantage is also a great drawback due to the fact that the Web provides from multiple sources a great quantity of heterogeneous information difficult to handle and interpret. In this context, data mining methods arise as efficient tools for helping users in the recovery of suitable information, products, or services from the Web. For that reason, recommender systems have become very popular in recent years, mainly in the e-commerce sites, although they are increasing in importance in other areas such as e-learning, tourism, news pages.

Nowadays, social networks are big sources of data, from which valuable information can be extracted by means of data mining algorithms. Social media mining allows us to explore a wide range of aspects regarding users, communities, networks structures, information diffusion, and so on.

WASMM aims at providing a forum for the presentation and discussion of the advances achieved in the Web mining field.

Organizing Committee

María N. Moreno García	University of Salamanca, Spain
Ana María Almeida de Figueiredo	Polytechnic Institute of Engineering of Porto, Portugal

Program Committee

Harshavardhan Achrekar	University of Massachusetts Lowell, USA
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Constantino Martins	Institute of Engineering of Porto, Portugal

Organization of Doctoral Consortium Sessions

The aim of the Doctoral Consortium is to provide a frame where students can present their ongoing research work and meet other students and researchers, and obtain feedback on future research directions. The Doctoral Consortium is intended for students who have a specific research proposal and some preliminary results, but who are still far from completing their dissertation.

All proposals submitted to the Doctoral Consortium underwent a thorough reviewing process with the aim to provide detailed and constructive feedback.

The submissions should identify:

- Problem statement
- Related work
- Hypothesis
- Proposal
- Preliminary results and/or Evaluation plan
- Reflections

Doctoral Consortium Organizer

Antonio Fernández-Caballero University of Castilla-La Mancha, Spain

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