

Lecture Notes in Networks and Systems

Volume 332

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Distributed Computing and Artificial Intelligence, Volume 2: Special Sessions 18th International Conference

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Preface

Research on intelligent distributed systems has matured during the last decade, and many effective applications are deployed now. Nowadays, technologies, such as Internet of Things (IoT), Industrial Internet of Things (IIoT), Big Data, Blockchain, distributed computing in general, are changing constantly as a result of the large research and technical effort being undertaken in both universities and businesses. Most computing systems from personal laptops to edge/fog/cloud computing systems are available for parallel and distributed computing. Distributed computing performs an increasingly important role in modern signal/data processing, information fusion, and electronics engineering (e.g., electronic commerce, mobile communications, and wireless devices). Particularly, applying artificial intelligence in distributed environments is becoming an element of high added value and economic potential.

The 18th International Symposium on Distributed Computing and Artificial Intelligence 2021 (DCAI 2021) is a major forum for the presentation of the development and applications of innovative techniques in closely related areas. The exchange of ideas between scientists and technicians from both academic and business areas is essential to facilitate the development of systems that meet the demands of today's society. The technology transfer in this field is still a challenge, and for that reason, this type of contribution is specially considered in this symposium. DCAI 2021 brings in discussions and publications on the development of innovative techniques to complex problems. This year's technical program covers both high quality and diversity, with contributions in well-established and evolving areas of research. Specifically, 55 papers were submitted to the main track and special sessions, by authors from 24 different countries (Angola, Brazil, Bulgaria, Colombia, Czechia, Denmark, Ecuador, France, Germany, Greece, India, Italy, Japan, Latvia, Lebanon, Mexico, Poland, Portugal, Russia, Spain, Sweden, Tunisia, Turkey, USA), representing a truly "wide area network" of research activity.

Moreover, DCAI 2021 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 technical program of the Special Sessions of DCAI 2021 has selected 23 papers. As in past editions of DCAI, there will be

special issues in highly ranked journals such as Electronics, Sensors, Systems, Robotics, Mathematical Biosciences and ADCAIJ. These special issues will cover extended versions of the most highly regarded works, including from the Special Sessions of DCAI, which emphasize specialized, multi-disciplinary, and transversal aspects. This year, DCAI 2021 has especially encouraged and welcomed contributions on: AI-driven methods for Multimodal Networks and Processes Modeling (AIMPM 2021), Computational Linguistics, Information, Reasoning, and AI 2021 (CompLingInfoReasAI), Surveying & Maritime Internet of Things Education (SMITE 2021), and Theory and Applications of Mathematical Models in Computer Science and Artificial Intelligence (TAMMCSAI).

This year, the symposium DCAI 2021 is organized by the University of Salamanca (Spain). We would like to thank all the contributing authors, the members of the Program Committees, the sponsors (IBM, Armundia Group, EurAI, AEPIA, APPIA, CINI, OIT, UGR, HU, SCU, USAL, AIR Institute, and UNIVAQ), and the Organizing Committees for their hard and highly valuable work. We are especially grateful for the funding supporting by project “XAI - XAI - Sistemas Inteligentes Auto Explicativos creados con Módulos de Mezcla de Expertos,” ID SA082P20, financed by Junta Castilla y León, Consejería de Educación, and FEDER funds. And finally, we are grateful and value Program Committee members for their hard work, which has been essential for the success of DCAI 2021.

October 2021

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Special Session on AI-Driven Methods for Multimodal Networks and Processes Modeling (AIMPM 2021)

The special session entitled AI-driven methods for Multimodal Networks and Processes Modeling (AIMPM 2021) 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). The session will be held in Salamanca as part of the 18th International Symposium Distributed Computing and Artificial Intelligence 2021.

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. There is a number of emerging issues with big potential for methods of artificial intelligence (evolutionary algorithms, artificial neural networks, constraint programming, constraint logic programming, data-driven programming, answer set programming, hybrid methods - AI/OR-Operation Research, fuzzy sets) like multimodal processes management, modeling and planning production flow, production planning and scheduling, stochastic models in planning and controlling, simulation of discrete manufacturing system, supply chain management, mesh-like data network control, multimodal social networks, intelligent transport and passenger and vehicle routing, security of multimodal systems, network knowledge modeling, intelligent web mining & applications, business multimodal processes and projects planning.

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Special Session on Computational Linguistics, Information, Reasoning, and AI 2021 (CompLingInfoReasAI'21)

Computational and technological developments that incorporate natural language and reasoning methods are proliferating. Adequate coverage encounters difficult problems related to partiality, underspecification, agents, and context dependency, which are signature features of information in nature, natural languages, and reasoning.

The session covers theoretical work, applications, approaches, and techniques for computational models of information, language (artificial, human, or natural in other ways), and reasoning. The goal is to promote computational systems and related models of thought, mental states, reasoning, and other cognitive processes.

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Special Session on Surveying and Maritime Internet of Things Education (SMITE 2021)

The special session entitled Surveying & Maritime Internet of Things Education (SMITE 2021) is a forum that will share ideas, projects, researches results, models, experiences, etc., associated with Maritime & Surveyor IoT applications. The session will be held in Salamanca (Spain) as part of the 18th International Symposium Distributed Computing and Artificial Intelligence 2021 (<http://www.dcai-conference.net/>).

The Internet of Things (IoT) is a network of physical “smart” devices (applicable in vessels, vehicles, buildings, factories, etc.) embedded with electronics, software, sensors, actuators that allow interconnectivity between these devices & data exchange. Over the past 5 years, this new technology has grown rapidly and has found applications ranging from people whose devices monitor health and wellness to manufacturers that utilize sensors to optimize the maintenance of equipment and protect the safety of workers. It is expected that by 2025, IoT may reach a total potential market impact of up to \$11.1 trillion. Large shipping corporations are already investing heavily in enabling IoT technology solutions in their fleet to improve transparency, safety, and cost efficiency by optimizing procedures, maintenance & energy efficiency.

Shipowners are set to spend an average of \$2.5 m, each, on Internet of Things (IoT) solutions over the next three years. In addition, the marine surveying infrastructure transformation through IoT technologies is expected to enable the shipping industry, port authorities or environmental agencies, to inspect shipping assets, offshore structures, waterways, and ensure compliance with various standards or specifications. In contrast, formal Maritime & Surveying IoT training on development, installation, service, maintenance & sustainability awareness is at its infancy, especially in the European Union.

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Special session on Theory and Applications of Mathematical Models in Computer Science and Artificial Intelligence (TAMMCSAI)

Special session on Theory and Applications of Mathematical Models in Computer Science and Artificial Intelligence (TAMMCSAI) is intended to bring together researchers working in the areas of theoretical and applied Mathematics in Computer science, Artificial Intelligence, and Data Science to provide a high-quality forum for the dissemination and discussion of research results in these broad areas. TAMMCSAI has originated from the ongoing efforts for promoting research in these fields.

This special session held under aegis of 18th International Conference on Distributed Computing and Artificial Intelligence (DCAI) and will focus on the theoretical and applied mathematical models applied to new data science technologies. This special session is devoted to promoting the investigation of the latest research of mathematical models and foundations and their effective applications, to explore the latest innovations in guidelines, theories, models, ideas, technologies, applications and tools of Computer science, Artificial Intelligence, and Data Science to assess the impact of the approach, and to facilitate technology transfer.

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