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Computational Science and Its Applications – ICCSA 2022 Workshops

Malaga, Spain, July 4–7, 2022
Proceedings, Part I

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Preface

These six volumes (LNCS 13377–13382) consist of the peer-reviewed papers from the workshops at the 22nd International Conference on Computational Science and Its Applications (ICCSA 2022), which took place during July 4–7, 2022. The peer-reviewed papers of the main conference tracks are published in a separate set consisting of two volumes (LNCS 13375–13376).

This year, we again decided to organize a hybrid conference, with some of the delegates attending in person and others taking part online. Despite the enormous benefits achieved by the intensive vaccination campaigns in many countries, at the crucial moment of organizing the event, there was no certainty about the evolution of COVID-19. Fortunately, more and more researchers were able to attend the event in person, foreshadowing a slow but gradual exit from the pandemic and the limitations that have weighed so heavily on the lives of all citizens over the past three years.

ICCSA 2022 was another successful event in the International Conference on Computational Science and Its Applications (ICCSA) series. Last year, the conference was held as a hybrid event in Cagliari, Italy, and in 2020 it was organized as virtual event, whilst earlier editions took place in Saint Petersburg, Russia (2019), Melbourne, Australia (2018), Trieste, Italy (2017), Beijing, China (2016), Banff, Canada (2015), Guimaraes, Portugal (2014), Ho Chi Minh City, Vietnam (2013), Salvador, Brazil (2012), Santander, Spain (2011), Fukuoka, Japan (2010), Suwon, South Korea (2009), Perugia, Italy (2008), Kuala Lumpur, Malaysia (2007), Glasgow, UK (2006), Singapore (2005), Assisi, Italy (2004), Montreal, Canada (2003), and (as ICCS) Amsterdam, The Netherlands (2002) and San Francisco, USA (2001).

Computational science is the main pillar of most of the present research, and industrial and commercial applications, and plays a unique role in exploiting ICT innovative technologies. The ICCSA conference series provides a venue to researchers and industry practitioners to discuss new ideas, to share complex problems and their solutions, and to shape new trends in computational science.

Apart from the 52 workshops, ICCSA 2022 also included six main tracks on topics ranging from computational science technologies and application in many fields to specific areas of computational sciences, such as software engineering, security, machine learning and artificial intelligence, and blockchain technologies. For the 52 workshops we have accepted 285 papers. For the main conference tracks we accepted 57 papers and 24 short papers out of 279 submissions (an acceptance rate of 29%). We would like to express our appreciation to the Workshops chairs and co-chairs for their hard work and dedication.

The success of the ICCSA conference series in general, and of ICCSA 2022 in particular, vitally depends on the support of many people: authors, presenters, participants, keynote speakers, workshop chairs, session chairs, organizing committee members, student volunteers, Program Committee members, advisory committee

members, international liaison chairs, reviewers, and others in various roles. We take this opportunity to wholehartedly thank them all.

We also wish to thank our publisher, Springer, for their acceptance to publish the proceedings, for sponsoring some of the best papers awards, and for their kind assistance and cooperation during the editing process.

We cordially invite you to visit the ICCSA website https://iccsa.org where you can find all the relevant information about this interesting and exciting event.

July 2022

Osvaldo Gervasi
Beniamino Murgante
Sanjay Misra

Welcome Message from Organizers

The ICCSA 2021 conference in the Mediterranean city of Cagliari provided us with inspiration to offer the ICCSA 2022 conference in the Mediterranean city of Málaga, Spain. The additional considerations due to the COVID-19 pandemic, which necessitated a hybrid conference, also stimulated the idea to use the School of Informatics of the University of Málaga. It has an open structure where we could take lunch and coffee outdoors and the lecture halls have open windows on two sides providing optimal conditions for meeting more safely.

The school is connected to the center of the old town via a metro system, for which we offered cards to the participants. This provided the opportunity to stay in lodgings in the old town close to the beach because, at the end of the day, that is the place to be to exchange ideas with your fellow scientists. The social program allowed us to enjoy the history of Malaga from its founding by the Phoenicians...

In order to provoke as much scientific interaction as possible we organized online sessions that could easily be followed by all participants from their own devices. We tried to ensure that participants from Asia could participate in morning sessions and those from the Americas in evening sessions. On-site sessions could be followed and debated on-site and discussed online using a chat system. To realize this, we relied on the developed technological infrastructure based on open source software, with the addition of streaming channels on YouTube. The implementation of the software infrastructure and the technical coordination of the volunteers were carried out by Damiano Perri and Marco Simonetti. Nine student volunteers from the universities of Málaga, Minho, Almeria, and Helsinki provided technical support and ensured smooth interaction during the conference.

A big thank you goes to all of the participants willing to exchange their ideas during their daytime. Participants of ICCSA 2022 came from 58 countries scattered over many time zones of the globe. Very interesting keynote talks were provided by well-known international scientists who provided us with more ideas to reflect upon, and we are grateful for their insights.

Eligius M. T. Hendrix

Organization

ICCSA 2022 was organized by the University of Malaga (Spain), the University of Perugia (Italy), the University of Cagliari (Italy), the University of Basilicata (Italy), Monash University (Australia), Kyushu Sangyo University (Japan), and the University of Minho, (Portugal).

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Contents – Part I

International Workshop on Advances in Artificial Intelligence Learning Technologies: Blended Learning, STEM, Computational Thinking and Coding (AAILT 2022)

Real-Time Flight Recording via Mobile Devices for Autonomous and Assisted Navigation Tasks 3
Edison Espinosa, Víctor H. Andaluz, and Víctor Enríquez

Natural Language Processing and Deep Learning Based Techniques for Evaluation of Companies' Privacy Policies 15
Saka John, Binyamin Adeniyi Ajayi, and Samaila Musa Marafa

International Workshop on Advancements in Applied Machine-learning and Data Analytics (AAMDA 2022)

Methodology for Product Recommendation Based on User-System Interaction Data: A Case Study on Computer Systems E-Commerce Web Site 35
Tahir Enes Adak, Yunus Sahin, Mounes Zaval, and Mehmet S. Aktas

A Systematic Literature Review of Question Answering: Research Trends, Datasets, Methods 47
Dilan Bakır and Mehmet S. Aktas

Steel Quality Monitoring Using Data-Driven Approaches: ArcelorMittal Case Study 63
Mohamed Laib, Riad Aggoune, Rafael Crespo, and Pierre Hubsch

Adding Material Embedding to the image2mass Problem 77
Divya Patel, Amar Nath, and Rajdeep Niyogi

Hyperparameter Optimisation of Artificial Intelligence for Digital REStoration of Cultural Heritages (AIRES-CH) Models 91
Alessandro Bombini, Lucio Anderlini, Luca dell'Agnello, Francesco Giacomini, Chiara Ruberto, and Francesco Taccetti

A Computational Measure for the Semantic Readability of Segmented Texts 107
Valentino Santucci, Umberto Bartoccini, Paolo Mengoni, and Fabio Zanda

Predictive Maintenance Experiences on Imbalanced Data with Bayesian Optimization Approach 120
Nicola Ronzoni, Andrea De Marco, and Elisabetta Ronchieri

Empowering COVID-19 Fact-Checking with Extended Knowledge Graphs 138
Paolo Mengoni and Jinyu Yang

International Workshop on Advances in information Systems and Technologies for Emergency management, risk assessment and mitigation based on the Resilience (ASTER 2022)

Multi-hazard Analysis and Mapping of Infrastructure Systems at National Level Using GIS Techniques: Preliminary Results 153
Maurizio Pollino, Sergio Cappucci, Cristiano Pesaresi, Maria Giuseppina Farrace, Lorenzo Della Morte, and Giulio Vegliante

International Workshop on Advances in Web Based Learning (AWBL 2022)

Use of Metaverse in Education 171
Mustafa Murat Inceoglu and Birol Ciloglugil

Peculiarities of Formation and Implementation of State Policy in the Field of Continuous Education in Ukraine 185
Ljudmyla Ivashova, Alina Kyrpale, Volodymyr Baibakov, Huba Mariia, George Abuselidze, and Andrii Romin

International Workshop on Block chain and Distributed Ledgers: Technologies and Applications (BDLTA 2022)

A Multilayer Approach to the Security of Blockchain Networks of the Future 205
Alexander Bogdanov, Alexander Degtyarev, Nadezhda Shchegoleva, Vladimir Korkhov, Valery Khvatov, Nodir Zaynalov, Jasur Kiyamov, and Aleksandr Dik

NFT Performance and Security Review 217
Anastasiya Lavrova and Oleg Iakushkin

Building an Example of the DeFi Presale Cross-chain Application 229
Rita Tsepeleva and Vladimir Korkhov

Decomposition, Depositing and Committing of Digital Footprint of Complex Composite Objects 242
Uglev Viktor and Zakharin Kirill

International Workshop on Bio and Neuro inspired Computing and Applications (BIONCA 2022)

PSO Performance for Solving Nonlinear Systems of Equations: Comparing Segmentation of Search Space and Increase of Number of Particles 261
Sérgio Ribeiro and Luiz Guerreiro Lopes

Mathematical Modeling of Chiller-Based Refrigeration Systems for Energy Efficiency Optimization 273
Nadia Nedjah, Luiza de Macedo Mourelle, and Marcelo Silveira Dantas Lizarazu

Mathematical Modeling of Cooling Towers-Based Refrigeration Systems for Energy Efficiency Optimization 289
Nadia Nedjah, Luiza de Macedo Mourelle, and Marcelo Silveira Dantas Lizarazu

The Influence of Amyloid-Beta on Calcium Dynamics in Alzheimer's Disease: A Spatio-Temporal Study 308
Swadesh Pal, Hina Shaheen, and Roderick Melnik

International Workshop on Configurational Analysis for Cities (CA CITIES 2022)

Driver Factors, Wildcards and Spatial External Effects of Urban Sprawl in Poland (2016–2022) 325
Veranika Kaleyeva, Piotr A. Werner, and Mariusz Porczek

Accessibility and Mobility in the Small Mountain Municipality of Zafferana Etnea (Sicily): Coupling of Walkability Assessment and Space Syntax 338
Antonio Russo, Tiziana Campisi, Giovanni Tesoriere, Alfonso Annunziata, and Chiara Garau

Digital City-Surveillance Models and Urban Security: Integrating Isovist and Space Syntax in Realising Adaptive Decision Support Systems 353
Federico Mara and Valerio Cutini

Towards a Spatial Approach to Territorialize Economic Data in Urban Areas' Industrial Agglomerations 370
Diego Altafini and Valerio Cutini

The 15-Min City: A Configurational Approach for Understanding the Spatial, Economic, and Cognitive Context of Walkability in Vienna 387
Claudia Yamu and Chiara Garau

International Workshop on Computational and Applied Mathematics (CAM 2022)

A Modified Quaternionic Weierstrass Method 407
Maria Irene Falcão, Fernando Miranda, Ricardo Severino, and Maria Joana Soares

Non-symmetric Number Triangles Arising from Hypercomplex Function Theory in $\mathbb{R}^{n+1}$ 420
Isabel Cação, M. Irene Falcão, Helmuth R. Malonek, and Graça Tomaz

A Sixth-Order CEV Option Valuation Algorithm on Non-uniform Spatial Grids 435
Nawdha Thakoor

Fixed Points for Cubic Coquaternionic Maps 450
Maria Irene Falcão, Fernando Miranda, Ricardo Severino, and Maria Joana Soares

Remarks on the Zeros of Quadratic Coquaternionic Polynomials 466
Maria Irene Falcão, Fernando Miranda, Ricardo Severino, and Maria Joana Soares

International Workshop on Computational and Applied Statistics (CAS 2022)

A Note on Kendall's Tau Coefficient for Gap Times in Presence of Right Censoring 481
Cecilia Castro and Ana Paula Amorim

A Bootstrap-Surrogate Approach for Sequential Experimental Design for Simulation Models 498
Rommel G. Regis

Forecasting Models: An Application to Home Insurance 514
Luís Filipe Pires, A. Manuela Gonçalves, Luís Filipe Ferreira, and Luís Maranhão

A New Approach on Density-Based Algorithm for Clustering Dense Areas 530
Paola Perchinunno and Samuela L'Abbate

Percentile Growth Curves for Placenta Measures: A Dynamic Shiny Application 543
Samuel Alves, Ana Cristina Braga, and Rosete Nogueira

Early Delirium Detection Using Machine Learning Algorithms 555
Célia Figueiredo, Ana Cristina Braga, and José Mariz

Drowsiness Detection Using Multivariate Statistical Process Control 571
Ana Rita Antunes, Ana Cristina Braga, and Joaquim Gonçalves

International Workshop on Computational Approaches for Smart, Conscious Cities (CASCC 2022)

Concepts and Challenges for 4D Point Clouds as a Foundation of Conscious, Smart City Systems. 589
Ole Wegen, Jürgen Döllner, and Rico Richter

A Conscious, Smart Site Model for a Solar-Water Energy System. 606
S. Merino, F. Guzmán, J. Martínez, R. Guzmán, J. Lara, and J. Döllner

International Workshop on Computational Mathematics, Statistics and Information Management (CMSIM 2022)

A Meta-analysis Approach for Estimating Salary Mean and Its Confidence Interval 627
Flora Ferreira, José Soares, Fernanda Sousa, Filipe Magalhães, Isabel Ribeiro, Dânia Pinto, and Pedro Pacheco

Mechanical Behavior of the Skin: Men Versus Women, a Preliminary Analysis. 640
M. Filomena Teodoro

Modeling the Forest Fire Occurrence in Some Regions of Portugal. A First Approach 653
M. Filomena Teodoro

Mining Web User Behavior: A Systematic Mapping Study. 667
Nail Taşgetiren and Mehmet S. Aktas

Numerical Solution of a 3D System of Transient and Nonlinear PDEs Arising from Larvae-Algae-Mussels Interactions 684
Ramoni Z. S. Azevedo, Charles H. X. B. Barbosa, Isaac P. Santos, José C. R. Silva, Dayse H. Pastore, Anna R. C. Costa, Claudia M. Dias, Raquel M. A. Figueira, and Humberto F. M. Fortunato

A Novel Sequential Pattern Mining Algorithm for Large Scale Data Sequences 698
Ali Burak Can, Meryem Uzun-Per, and Mehmet S. Aktas

Author Index 709