2020 22nd International Symposium on Symbolic and **Numeric Algorithms for Scientific Computing (SYNASC 2020)**

Online Conference 1 – 4 September 2020



IEEE Catalog Number: CFP20387-POD

978-1-7281-7629-1

Copyright © 2020 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP20387-POD

 ISBN (Print-On-Demand):
 978-1-7281-7629-1

 ISBN (Online):
 978-1-7281-7628-4

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400

Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



2020 22nd International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC)

SYNASC 2020

Table of Contents

Preface xii Organizing Committee xiii Program Committee xiv Track Chairs xix Workshop Chairs xx Invited Talks xxii Tutorials xxix Sponsors xxxi	
Invited Papers	
Deep Visual Domain Adaptation 1	
Gender Issues in Computer Science: Lessons Learnt and Reflections for the Future .9	•
Sustainable MLOps: Trends and Challenges .17	
Symbolic Computation	
Regular Papers	
Knot Coloring as Verification .24	

The CAD Conundrum: Lex-Least vs Order 32
Bath, United Kingdom), and Gregory Sankaran (University of Bath, United Kingdom)
Work in Progress Paper
Recent Results on the Lambert W Function 36
Numerical Computing
Regular Papers
Approximate GCD in Lagrange Bases 40
A General Construction for Generating Pseudorandom Sequences Using the Digit Expansion of
Real Functions .48. Norbert Tihanyi (Digital14 LLC, xen1thLabs, UAE) and Bertalan Borsos (ELTE, Hungary)
Efficient Parallel Simulations of Wireless Signal Wave Propagation .55
Filip-George Manole (University Politehnica of Bucharest, Romania),
and Emil-Ioan Slusanschi (University Politehnica of Bucharest, Romania)
Paper on Tools/Experimental Results
Numerical Simulation Algorithm for Fractional-Order Systems Implemented in CUDA .63
Logic and Programming
Regular Papers
Fischer-Ladner Closure for Many-Sorted Modal Logic with Application for Operational Semantics .67
I variation I vI to a trix (CI tit v CI of Dactini Cot, IX of the little)

On One Approach to Goal-Driven Proof Search in Classical First-Order Logic .75
Generating Minimal Unsatisfiable SAT Instances from Strong Digraphs .84
Short Papers
SPIKE, an Automatic Theorem Prover – Revisited .93. Sorin Stratulat (Université de Lorraine, LORIA)
An Experiment on Mizar Adjectives with Extra Visible Arguments .97. Adam Naumowicz (University of Bialystok, Poland)
Advances in the Theory of Computing
Regular Papers
A Graph Theoretical Approach for Testing Binomiality of Reversible Chemical Reaction Networks 101. Hamid Rahkooy (CNRS, Inria, and the University of Lorraine, France; MPI Informatics, Germany) and Cristian Vargas Montero (CNRS, Inria, and the University of Lorraine, France)
Results on Graceful Chromatic Number for Particular Graphs .109. Camelia Obreja (University of Bucharest, Romania)
Distributed Computing
Regular Papers
A Study of Multiparty Interactions in Continuation Semantics .117. Gabriel Ciobanu (A.I.Cuza University of Iasi, Romania) and Eneia Nicolae Todoran (Technical University of Cluj-Napoca, Romania)
Hierarchical Scheduling in On-Demand GPU-as-a-Service Systems .125

An Approach to Support Automated Deployment of Applications on Heterogeneous Cloud-HPC Infrastructures 133 Elisabetta Di Nitto (Politecnico di Milano, Italy), Jesús Gorroñogoitia (ATOS, Spain), Indika Kumara (Jheronimus Academy of Data Science, The Netherlands), Georgios Meditskos (Information Technologies Institute, Centre for Research and Technology Hellas, Greece), Dragan Radolovic (XLAB Research, Slovenia), Karthee Sivalingam (HPE HPC/AI EMEA Research Lab, United Kingdom), and Román Sosa González (ATOS, Spain) **Artificial Intelligence Regular Papers** Onet-Marian (Babes-Bolyai University, Romania) Tackling Morpion Solitaire with AlphaZero-Like Ranked Reward Reinforcement Learning .149..... Hui Wang (Leiden Institute of Advanced Computer Science, Leiden University), Mike Preuss (Leiden Institute of Advanced Computer Science, Leiden University), Michael Emmerich (Leiden Institute of Advanced Computer Science, Leiden University), and Aske Plaat (Leiden *Institute of Advanced Computer Science, Leiden University)* Semantic Image Inpainting via Maximum Likelihood 153..... Sebastian Ciobanu (Alexandru Ioan Cuza University, Romania) and Liviu Ciortuz (Alexandru Ioan Cuza University, Romania) Extractive Summarization using Cohesion Network Analysis and Submodular Set Functions .1.61... Valentin Sergiu Cioaca (University Politehnica of Bucharest, Romania), Mihai Dascalu (University Politehnica of Bucharest, Romania), and Danielle McNamara (Arizona State University, USA) Machine Learning Based Models for Examining Differences between Modern and Ancient DNA in Dental Calculus .169. Maria Iuliana Bocicor (Babes-Bolyai University, Romania), Iulia-Monica Szuhai (Babes-Bolyai University, Romania), Emilia-Loredana Pop (Babes-Bolyai University, Romania), and Ioan-Gabriel Mircea (Babes-Bolyai University, Romania) Cohesion Network Analysis: Customized Curriculum Management in Moodle .175..... Gabriel Gutu-Robu (University Politehnica of Bucharest, Romania), Darius Mihai (University Politehnica of Bucharest, Romania), Mihai Dascalu (University Politehnica of Bucharest, Romania), Mihai Carabas (University Politehnica of Bucharest, Romania), Stefan Trausan-Matu (University Politehnica of Bucharest, Romania), Sunhea Choi (University of Southampton, UK), Keith Godfrey (University of Southampton, UK), Brigitte Angela Brands (Ludwig-Maximilians-Universität Munich, Germany), and Berthold Koletzko (Ludwig-Maximilians-Universität Munich, Germany) Should I Trust a Deep Learning Condition Monitoring Prediction? .182.....

Darian Onchis M. (West University of Timisoara, Romania)

Edge Map Response of Dilated and Reconstructed Classical Filters .187
What's Been Happening in the Romanian News Landscape? A Detailed Analysis Grounded in Natural Language Processing Techniques 195
Quality of Pre-Trained Deep-Learning Models for Palmprint Recognition .202
Hybrid Hyper-Parameter Optimization for Collaborative Filtering .210. Péter Szabó (University of Medicine, Romania) and Béla Genge (University of Medicine, Romania)
Automatic Real-Time Road Crack Identification System .218. Lucia-Georgiana Coca (Alexandru Ioan Cuza University of Iasi, Romania), Ciprian-Gabriel Cusmuliuc (Alexandru Ioan Cuza University of Iasi, Romania), Vladut-Haralambie Morosanu (Alexandru Ioan Cuza University of Iasi, Romania), Teodora Grosu (Alexandru Ioan Cuza University of Iasi, Romania), and Adrian Iftene (Alexandru Ioan Cuza University of Iasi, Romania)
A Sentiment-Based Similarity Model for Recommendation Systems 224 Sergiu Limboi (Babes Bolyai University, Romania) and Mara Deac-Petrusel (Babes Bolyai University, Romania)
Paper on Tools/Experimental Results
Increasing the Upper Bound for the EvoMan Game Competition 231 Gabriel-Codrin Cojocaru ("Al. I. Cuza" University, Romania), Sergiu-Andrei Dinu ("Al. I. Cuza" University, Romania), and Eugen Croitoru ("Al. I. Cuza" University, Romania)
Workshop on Agents for Complex Systems
Multi-Agent Recommendation and Aspect Level Sentiment Analysis in B2B CRM Systems .238 Doru Rotovei (West University of Timisoara, Romania) and Viorel Negru (West University of Timisoara, Romania)
Workshop on Digital Image Processing in Medicine and Automotive Industry
Lung Tumor Segmentation Accelerated by CUDA 246

The Driver's Attention Level 251. Ionut-Adrian Tarba (West University of Timisoara, Romania), Mihail Gaianu (West University of Timisoara, Romania), and Sebastian-Aurelian Stefaniga (West University of Timisoara, Romania)
Workshop on Geoinformatics
AgriSen - A Dataset for Crop Classification .259 Teodora Selea (West University of Timisoara, Romania) and Marius-Florin Paslaru (West University of Timisoara, Romania)
Image Semantic Segmentation Based on High-Resolution Networks for Monitoring Agricultural Vegetation 264
Workshop on Big Data Applications
Optimizing Deep Learning Models for Object Detection 27.0
A Bibliometric Overview of the International Symposium on Symbolic and Numeric Algorithms for Scientific Computing between 2005 and 2018 .278
Detecting Individuals High in Neuroticism Based on the Color Features of the Facebook Profile Picture 286.
Diana Paula Dudău (West University of Timisoara, Romania), Florin Alin Sava (West University of Timisoara, Romania), Andrei Rusu (West University of Timisoara, Romania), and Virgil Cervicescu ('Ferdinand I' Military Technical Academy, Romania)
Special Session on Advances in Computational, Symbolic and Secure Algorithms for Permissioned and Permissionless Blockchains
Towards Efficient Governance In Distributed Ledger Systems Using High-Performance Computational Nodes 294 Nicolae-Bogdan-Cristian Togoe (West University of Timisoara), Alexe Luca Snataru (West University of Timisoara), and Cinrian Puncila (West

e

Luca Spataru (West University of Timisoara), and Ciprian Pungila (West University of Timisoara) A Metric-Based Approach to Modelling a Virtual Machine for Smart Contract Execution 302......

Alexe Luca Spataru (West University of Timisoara) and Ciprian Pungila (West University of Timisoara)

Special Session for PhD Students

DS Lab Notebook: A New Tool for Data Science Applications 310
Business Decisions Support using Sentiment Analysis in CRM Systems .315. Bashar Al Asaad (West University of Timisoara, Romania) and Doru Rotovei (West University of Timisoara, Romania)
Author Index 319