

7th International Young Scientist Conference on Computational Science (YSC 2018)

Procedia Computer Science Volume 136

Heraklion, Greece
2 – 6 July 2018

Editors:

**Alexandra Klimova
Anna Bilyatdinova
Vagelis Harmandaris**

**Angelos Bilas
Alexander Boukhanovsky**

ISBN: 978-1-5108-7246-2

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© by Elsevier B.V.
All rights reserved.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact Elsevier B.V.
at the address below.

Elsevier B.V.
Radarweg 29
Amsterdam 1043 NX
The Netherlands

Phone: +31 20 485 3911
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

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
Email: curran@proceedings.com
Web: www.proceedings.com



Table of Contents

Computational Science by Youth: Modeling and Simulation in Science, Industry, and Society Alexandra Klimova, Anna Bilyatdinova, Angelos Bilas, Vagelis Harmandaris, and Alexander Boukhanovsky	1
Existing Teaching Practices in Augmented Reality Alexandra Klimova, Anna Bilyatdinova, and Andrey Karsakov	5
Artificial Intelligence trends in education: a narrative overview Maud Chassignol, Aleksandr Khoroshavin, Alexandra Klimova, and Anna Bilyatdinova	16
Byzantine fault-tolerant and semantic-driven consensus protocol Stepan Rakitin, Alexander A. Visheratin, and Denis Nasonov	25
An approach for dynamic detection of inefficient supercomputer applications Denis Shaykhislamov, and Vadim Voevodin	35
LiFlow web service for quick launch of large experiment series on supercomputers Evgeniy Kuklin, and Sergei Pravdin	44
Three levels of fail-safe mode in MPI I/O NVRAM distributed cache Artur Malinowski, and Paweł Czarnul	52
Comprehensive approach for optimization traffic routing and using network resources in a virtual data center Irina Bolodurina, and Denis Parfenov	62
A Flexible Datacenter Simulator Eleni Kanellou, Nikolaos Chrysos, and Angelos Bilas	72
Virtualized Multi-Channel RDMAwith Software-Defined Scheduling Kyriakos Paraskevas, Nikolaos Chrysos, Vassilis Papaefstathiou, Pantelis Xirouchakis, Panagiotis Peristerakis, Michalis Giannoudis, and Manolis Katevenis	82
Nocturnal Lights: object-oriented catalog of the nighttime Earth light sources Grigory M. Trifonov, Alexey A. Poyda, Alexandr A. Andreev, Artem V. Prosvetov, and Mikhail N. Zhizhin	91
Optimising Kafka for stream processing in latency sensitive systems Roman Wiatr, Renata Słota, and Jacek Kitowski	99
Adaptive performance model for dynamic scaling Apache Spark Streaming Max Petrov, Nikolay Butakov, Denis Nasonov, and Mikhail Melnik	109
HetSpark: A Framework that Provides Heterogeneous Executors to Apache Spark Klodjan Klodi Hidri, Angelos Bilas, and Chirstos Kozanitis	118
On Domain Decomposition Strategies to Parallelize Branch-and-Bound Method for Global Optimization in Everest Distributed Environment Sergey Smirnov, and Vladimir Voloshinov	128

Comparison of dimensionality reduction schemes for derivative-free global optimization algorithms Vladislav Sovrasov	136
Reinforcement-based Method for Simultaneous Clustering Algorithm Selection and its Hyperparameters Optimization Viacheslav Shalamov, Valeria Efimova, Sergey Muravyov, and Andrey Filchenkov	144
The Development of a Parallel Algorithm and Program for Solving the Stationary Many-Body Schrodinger Equation by the Monte Carlo Method on the Example of S States of Atomic Systems A.A. Danshin	154
Generalized FPK equations corresponding to systems of nonlinear random differential equations excited by colored noise. Revisitation and new directions K.I. Mamis, G.A. Athanassoulis, and K.E. Papadopoulos.	164
Spanning of Meta-Feature Space for Travelling Salesman Problem Yulia Abdrashitova, Alexey Zabashta, and Andrey Filchenkov.	174
Deep semi-supervised salient regions detection using joint predictions of unsupervised models Gali-Ketema Mbogo, Alexander A. Visheratin, and Ksenia D. Mukhina	183
Comparative Study of Combinatorial Algorithms for Solving the Influence Maximization Problem in Networks under a Deterministic Linear Threshold Model Stepan Kochemazov.	190
Learning to Generate Chairs with Generative Adversarial Nets Evgeny Zamyatin, and Andrey Filchenkov	200
The Recognition and Classification of Objects Based on the Modified Distance Metric Sergei Evgenievich Ivanov, Nataliya Gorlushkina, and Anton Govorov.	210
A comparative study of graph partitioning algorithms for simulation of information spread in a multi-community landscape Sergey Kesarev, Valentina Guleva, Oksana Severiukhina, and Klavdiya Bochenina	218
Parallel forecasting of community-wide information spread with assimilation of social network data Oksana Severiukhina, Sergey Kesarev, Max Petrov, and Klavdiya Bochenina.	228
Developing an approach for lifestyle identification based on explicit and implicit features from social media Maria Khodorchenko, and Nikolay Butakov	236
Market basket analysis of heterogeneous data sources for recommendation system improvement Kutuzova Tatiana, and Melnik Mikhail	246
Adaptive look-alike targeting in social networks advertising Artem Popov, and Daria Iakovleva	255
Identifying places of financial interest using open data Ivan Derevitskii, Ivan Nuzhdenko, and Klavdiya Bochenina	265
A comparative study of social data similarity measures related to financial behavior Danila Vaganov, Ekaterina Sheina, and Klavdiya Bochenina	274
Semi-automatic sentiment analysis based on topic modeling Timur Sokhin, and Nikolay Butakov	284
Combined document embedding and hierarchical topic model for social media texts analysis Amir Uteuov, and Anna Kalyuzhnaya	293
Towards Predicting Trend of Scientific Research Topics using Topic Modeling Tesfamariam M. Abuhay, Yemisrach G. Nigatie, and Sergey V. Kovalchuk	304

Case-adaptive ensemble technique for met-ocean data restoration Jose Luis Araya-Lopez, Nikolay O. Nikitin, and Anna V. Kaluzhnaya	311
Anomalies Detection in Metocean Simulation Results Using Convolutional Neural Networks Pavel Vychuzhanin, Alexander Hvatov, and Anna V. Kalyuzhnaya	321
Path space force matching and relative entropy methods for coarse-graining molecular systems at transient regimes Evangelia Kalligiannaki, Markos Katsoulakis, Petr Plechac, and Vagelis Harmandaris	331
Modelling of novel polymer materials through atomistic molecular dynamics simulations Petra Bačová, Anastassia N. Rissanou, and Vagelis Harmandaris	341
Dynamic mortality prediction using machine learning techniques for acute cardiovascular cases Oleg Metsker, Sergey Sikorsky, Aleksey Yakovlev, and Sergey Kovalchuk	351
The impact of cardiac tissue anisotropy on spiral wave superseding: A simulation study using ionic cell models Timofei I. Epanchintsev, Sergei F. Pravdin, and Alexander V. Panfilov	359
Application of clustering methods for detecting critical acute coronary syndrome patients Kirill Magoev, Valeria V. Krzhizhanovskaya, and Sergey V. Kovalchuk	370
An approach to point-to-point reconstruction of 3D structure of coronary arteries from 2D X-ray angiography, based on epipolar constraints Mariia Kalmykova, Alexey Poyda, and Viacheslav Ilyin	380
Modelling Neutrophils' Response to Various Levels of Insults Alva V. Presbitero, Emiliano Mancini, and Valeria V. Krzhizhanovskaya	390
Coupling Game Theory and Discrete-Event Simulation for Model-Based Ambulance Dispatching Xinyu Fu, Alva Presbitero, Sergey V. Kovalchuk, and Valeria V. Krzhizhanovskaya	398
Investigating Application of Change Point Analysis in Monitoring Health Condition of Acute Coronary Syndrome Patients Tefsamariam M. Abuhay, Yemisrach G. Nigatie, Oleg G. Metsker, and Sergey V. Kovalchuk	408
A one-dimensional model of agent propagation in arterial blood flow Andrey Svitenkov, Ivan Pavlov, and Sergey Chivilikhin	416
Evaluating sequence-to-sequence models for simulating medical staff mobility on time Mikhail A. Khovrichiev, Marina A. Balakhontceva, and Mikhail V. Ionov	425
Data-Driven Identification of Hypertensive Patient Profiles for Patient Population Simulation Anna Semakova, and Nadezhda Zvartau	433
A framework for a multi-agent traffic simulation using combined behavioural models Kirill Golubev, Aleksandr Zagarskikh, and Andrey Karsakov	443
Multi-agent crowd simulation on large areas with utility-based behavior models: Sochi Olympic Park Station use case Andrey Simonov, Aleksandr Lebin, Bogdan Shcherbak, Aleksandr Zagarskikh, and Andrey Karsakov	453
Assessment of pedestrian flow volumes through public transport modelling Anastasia A. Lantseva, and Sergey V. Ivanov	463
Crime rate prediction in the urban environment using social factors Varvara Ingilevich, and Sergey Ivanov	472
Computing concave hull with closed curve smoothing: performance, concaveness measure and applications Darina Kalinina, Varvara Ingilevich, Anastasiia Lantseva, and Sergei Ivanov	479

Walking distance estimation using multi-agent simulation of pedestrian flows Ivan Khodnenko, Sergei Kudinov, and Egor Smirnov	489
An Accessibility Driven Evolutionary Transit Network Design Approach in the Multi-agent Simulation Environment Timofey Volotskiy, Jaroslav Smirnov, Dominik Ziemke, and Ihab Kaddoura	499
The method of personalized corporate e-learning based on personal traits of employees Chunaev Anton, and Alexey Shikov	511