Shahram Latifi Editor

ITNG 2022 19th International Conference on Information Technology-New Generations



Advances in Intelligent Systems and Computing

Volume 1421

Series Editor

Janusz Kacprzyk, Systems Research Institute, Polish Academy of Sciences, Warsaw, Poland

The series "Advances in Intelligent Systems and Computing" contains publications on theory, applications, and design methods of Intelligent Systems and Intelligent Computing. Virtually all disciplines such as engineering, natural sciences, computer and information science, ICT, economics, business, e-commerce, environment, healthcare, life science are covered. The list of topics spans all the areas of modern intelligent systems and computing such as: computational intelligence, soft computing including neural networks, fuzzy systems, evolutionary computing and the fusion of these paradigms, social intelligence, ambient intelligence, computational neuroscience, artificial life, virtual worlds and society, cognitive science and systems, Perception and Vision, DNA and immune based systems, self-organizing and adaptive systems, e-Learning and teaching, human-centered and human-centric computing, recommender systems, intelligent control, robotics and mechatronics including human-machine teaming, knowledge-based paradigms, learning paradigms, machine ethics, intelligent data analysis, knowledge management, intelligent agents, intelligent decision making and support, intelligent network security, trust management, interactive entertainment, Web intelligence and multimedia.

The publications within "Advances in Intelligent Systems and Computing" are primarily proceedings of important conferences, symposia and congresses. They cover significant recent developments in the field, both of a foundational and applicable character. An important characteristic feature of the series is the short publication time and world-wide distribution. This permits a rapid and broad dissemination of research results.

Indexed by DBLP, INSPEC, WTI Frankfurt eG, zbMATH, Japanese Science and Technology Agency (JST).

All books published in the series are submitted for consideration in Web of Science.

For proposals from Asia please contact Aninda Bose (aninda.bose@springer.com).

Advisory Board

Nikhil R. Pal, Indian Statistical Institute, Kolkata, India

Rafael Bello Perez, Faculty of Mathematics, Physics and Computing, Universidad Central de Las Villas, Santa Clara, Cuba

Emilio S. Corchado, University of Salamanca, Salamanca, Spain

Hani Hagras, School of Computer Science and Electronic Engineering, University of Essex, Colchester, UK

László T. Kóczy, Department of Automation, Széchenyi István University, Gyor, Hungary

Vladik Kreinovich, Department of Computer Science, University of Texas at El Paso, El Paso, TX, USA

Chin-Teng Lin, Department of Electrical Engineering, National Chiao Tung University, Hsinchu, Taiwan

Jie Lu, Faculty of Engineering and Information Technology, University of Technology Sydney, Sydney, NSW, Australia

Patricia Melin, Graduate Program of Computer Science, Tijuana Institute of Technology, Tijuana, Mexico

Nadia Nedjah, Department of Electronics Engineering, University of Rio de Janeiro, Rio de Janeiro, Brazil

Ngoc Thanh Nguyen, Faculty of Computer Science and Management, Wrocław University of Technology, Wrocław, Poland

Jun Wang, Department of Mechanical and Automation Engineering, The Chinese University of Hong Kong, Shatin, Hong Kong

More information about this series at https://link.springer.com/bookseries/11156

Shahram Latifi Editor

ITNG 2022 19th International Conference on Information Technology-New Generations



Editor
Shahram Latifi
Department of Electrical and Computer
Engineering
University of Nevada
Las Vegas, NV, USA

ISSN 2194-5357 ISSN 2194-5365 (electronic) Advances in Intelligent Systems and Computing ISBN 978-3-030-97651-4 ISBN 978-3-030-97652-1 (eBook) https://doi.org/10.1007/978-3-030-97652-1

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG 2022 This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Contents

Cha	air's Message	ix
Par	t I Software Engineering	
1	Cross-Platform Blended Modelling with JetBrains MPS and Eclipse Modeling Framework Malvina Latifaj, Hilal Taha, Federico Ciccozzi, and Antonio Cicchetti	3
2	A Conceptual Framework for Software Modeling of Automation Systems Mohammad Ashjaei, Alessio Bucaioni, and Saad Mubeen	11
3	Virtual Reality Multiplayer Interaction and Medical Patient Handoff Training and Assessment Christopher Lewis, Daniel Enriquez, Lucas Calabrese, Yifan Zhang, Steven J. Anbro, Ramona A. Houmanfar, Laura H. Crosswell, Michelle J. Rebaleati, Luka A. Starmer, and Frederick C. Harris, Jr.	
4	A Tool for Syntactic Dependency Analysis on the Web Stack	25
5	Using Software for Computational Fluid Dynamics and Molecular Dynamics Jeena Shetti, Stefan Pickl, Doina Bein, and Marian Sorin Nistor	35
6	Blended Modeling Applied to the Portable Test and Stimulus Standard Muhammad Waseem Anwar, Malvina Latifaj, and Federico Ciccozzi	39
7	An Evaluation Framework for Modeling Languages Supporting Predictable Vehicular Software Systems Enxhi Ferko, Igli Jasharllari, Alessio Bucaioni, Mohammad Ashjaei, and Saad Mubeen	47
8	A Model-Based Approach for Quality Assessment of Insulin Infusion Pump Systems	57
9	Narrowing the Gap Between Software Engineering Teaching and Corporate Environment Marcelo A. M. da Conceicao, Oswaldo S. C. Neto, Andre B. Baccarin, Luan H. S. Dantas, Joao P. S. Mendes, Vinicius P. Lippi, Gildarcio S. Gonçalves, Adilson M. Da Cunha, Luiz A. Vieira Dias, Johnny C. Marques, and Paulo M. Tasinaffo	65
10	API-First Design: A Survey of the State of Academia and Industry Nicole Beaulieu, Sergiu M. Dascalu, and Emily Hand	73

vi Contents

Part II	Data	Science	&	Engineeri	ing

11	Public Funding in Brazil	8
12	Environments	9
	Flávio de Assis Vilela and Ricardo Rodrigues Ciferri	
13	Participatory Modeling: A New Approach to Model Graph-Oriented Databases Luis A. Neumann, Enzo Seraphim, Otávio A. O. Carpinteiro, and Edmilson M. Moreira	9
14	Graph-Based Hierarchical Record Clustering for Unsupervised Entity Resolution Islam Akef Ebeid, John R. Talburt, and Md Abdus Salam Siddique	10
15	Semantic-MDBScan: An Approach to Assign a Semantic Interpretation to Behavior Changes Detected in Data Stream Scenarios Eldane Vieira Júnior, Rita Maria Silva Julia, and Elaine Ribeiro Faria	11
16	A Study on Usability Assessment of Educational Systems	12
Par	et III Cybersecurity	
17	Gesturing with Smart Wearables: An Alternate Way to User Authentication	13
18	Software Optimization of Rijndael256 for Modern x86-64 Platforms Nir Drucker and Shay Gueron	14
19	Cybersecurity Ethics Education: A Curriculum Proposal	15
20	Performance Evaluation of Online Website Safeguarding Tools Against Phishing Attacks; a Comparative Assessment Rama Al-Share, Fatima Abu-Akleek, Ahmed S. Shatnawi, and Eyad Taqieddin	16
Par	t IV Blockchain Technology	
21	Blockchain Based Trust for the Internet of Things: A Review Dina Shehada, Maryam Amour, Suadad Muammar, and Amjad Gawanmeh	17
22	The Use of Blockchain Technology in Electronic Health Record Management: An Analysis of State of the Art and Practice Henrique Couto, André Araújo, Rendrikson Soares, and Gabriel Rodrigues	17
23	Blockchain for Security and Privacy of Healthcare Systems: A Protocol for Systematic Literature Review. Saadia Azemour, Meryeme Ayache, Hanane El Bakkali, and Amjad Gawanmeh	18
24	Single Sign-On (SSO) Fingerprint Authentication Using Blockchain	19

Contents vii

Par	t V Health Informatics	
25	A Detection Method for Early-Stage Colorectal Cancer Using Dual-Tree Complex Wavelet Packet Transform Daigo Takano and Teruya Minamoto	205
26	Visualizing 3D Human Organs for Medical Training	211
27	An Information Management System for the COVID-19 Pandemic Using	210
	Blockchain	219
28	Machine Learning for Classification of Cancer Dataset for Gene Mutation	220
	Based Treatment Jai Santosh Mandava, Abhishek Verma, Fulya Kocaman, Marian Sorin Nistor, Doina Bein, and Stefan Pickl	229
Par	t VI Machine Learning	
29	Performance Comparison Between Deep Learning and Machine Learning Models for Gene Mutation-Based Text Classification of Cancer Fulya Kocaman, Stefan Pickl, Doina Bein, and Marian Sorin Nistor	237
30	Stock Backtesting Engine Using Pairs Trading	245
31	Classifying Sincerity Using Machine Learning	255
32	Recommendation System Using MixPMF	263
33	Abstractive Text Summarization Using Machine Learning	269
34	Intelligent System for Detection and Identification of Ground Anomalies	277
	for Rescue. Antonio Dantas, Leandro Diniz, Maurício Almeida, Ella Olsson, Peter Funk, Rickard Sohlberg, and Alexandre Ramos	277
Par	t VII Human-Computer Interaction	
35	An Application for Interaction Comparison Between Virtual Hands and Virtual Reality Controllers Daniel Enriquez, Christopher Lewis, Sergiu M. Dascalu, and Frederick C. Harris, Jr.	285
36	LDAT: A LIDAR Data Analysis and Visualization Tool	293
37	Social Media User Study	303

38	Software Interfaces for New Vehicle Operating Cost Models Used in Economic Analysis of Transportation Investments: A User Study	311
39	Microservice-Based System for Environmental Science Software Applications Vinh Le, Connor Scully Allison, Mitchell Martinez, Sergiu M. Dascalu, Frederick C. Harris, Jr., Scotty D. Strachan, and Eric Fritzinger	321
Par	t VIII Networks	
40	Semantic Interoperability in the Internet of Things: A Systematic Literature Review	333
41	IoT Machine Learning Based Parking Management System with Anticipated Prediction of Available Parking Spots	341
42	Channel State Information Spectrum Gap Filling Using Shallow Neural Networks Avishek Mukherjee, Beata Hejno, and Manish Osti	351
Par	t IX Potpourri	
43	Unveiling a Novel Corporate Structure in World-Class Business, Merging Digital-Physical Environment in Hyper Famili Incorporation	363
44	Developing an Affective Audio Toolbox for Audio Post-production	371
45	Boundary Approximation and External Visibility	379
46	Detection of Strictly L3-Live Structures by Structural Analysis of General Petri Net Using SAT-Solver	387
47	Space Abstraction and of PetriNets Using the Submarking Method Quasi-home States Tomoki Miura and Katsumi Wasaki	393
Ind	ex	399