Lecture Notes in Networks and Systems

Volume 418

Series Editor

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

Advisory Editors

Fernando Gomide, Department of Computer Engineering and Automation—DCA, School of Electrical and Computer Engineering—FEEC, University of Campinas—UNICAMP, São Paulo, Brazil

Okyay Kaynak, Department of Electrical and Electronic Engineering, Bogazici University, Istanbul, Turkey

Derong Liu, Department of Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, USA
Institute of Automation, Chinese Academy of Sciences, Beijing, China

Witold Pedrycz, Department of Electrical and Computer Engineering, University of Alberta, Alberta, Canada
Systems Research Institute, Polish Academy of Sciences, Warsaw, Poland

Marios M. Polycarpou, Department of Electrical and Computer Engineering, KIOS Research Center for Intelligent Systems and Networks, University of Cyprus, Nicosia, Cyprus

Imre J. Rudas, Óbuda University, Budapest, Hungary

Jun Wang, Department of Computer Science, City University of Hong Kong, Kowloon, Hong Kong

The series "Lecture Notes in Networks and Systems" publishes the latest developments in Networks and Systems—quickly, informally and with high quality. Original research reported in proceedings and post-proceedings represents the core of LNNS.

Volumes published in LNNS embrace all aspects and subfields of, as well as new challenges in, Networks and Systems.

The series contains proceedings and edited volumes in systems and networks, spanning the areas of Cyber-Physical Systems, Autonomous Systems, Sensor Networks, Control Systems, Energy Systems, Automotive Systems, Biological Systems, Vehicular Networking and Connected Vehicles, Aerospace Systems, Automation, Manufacturing, Smart Grids, Nonlinear Systems, Power Systems, Robotics, Social Systems, Economic Systems and other. Of particular value to both the contributors and the readership are the short publication timeframe and the world-wide distribution and exposure which enable both a wide and rapid dissemination of research output.

The series covers the theory, applications, and perspectives on the state of the art and future developments relevant to systems and networks, decision making, control, complex processes and related areas, as embedded in the fields of interdisciplinary and applied sciences, engineering, computer science, physics, economics, social, and life sciences, as well as the paradigms and methodologies behind them.

Indexed by SCOPUS, INSPEC, WTI Frankfurt eG, zbMATH, SCImago.

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).

More information about this series at https://link.springer.com/bookseries/15179

Ajith Abraham · Niketa Gandhi ·
Thomas Hanne · Tzung-Pei Hong ·
Tatiane Nogueira Rios ·
Weiping Ding
Editors

Intelligent Systems Design and Applications

21st International Conference on Intelligent Systems Design and Applications (ISDA 2021) Held During December 13–15, 2021

Springer

Editors
Ajith Abraham
Scientific Network for Innovation
and Research Excellence
Machine Intelligence Research
Labs (MIR Labs)
Auburn, WA, USA

Niketa Gandhi
Scientific Network for Innovation
and Research Excellence
Machine Intelligence Research
Labs (MIR Labs)
Auburn, WA, USA

Thomas Hanne
Institut für Wirtschaftsinformatik
Fachhochschule Nordwestschweiz
Olten, Switzerland

Tzung-Pei Hong
Department of Computer Science
and information Engineering
National University of Kaohsiung
Kaohsiung, Taiwan

Tatiane Nogueira Rios
Federal University of Bahia
Ondina, Brazil

Weiping Ding
Nantong University
Nantong Shi, Jiangsu, China

ISSN 2367-3370 ISSN 2367-3389 (electronic)
Lecture Notes in Networks and Systems
ISBN 978-3-030-96307-1 ISBN 978-3-030-96308-8 (eBook)
https://doi.org/10.1007/978-3-030-96308-8

© 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

Preface

Welcome to the 21st International Conference on Intelligent Systems Design and Applications (ISDA'21) held in the World Wide Web. ISDA'21 is hosted and sponsored by the Machine Intelligence Research Labs (MIR Labs), USA. ISDA'21 brings together researchers, engineers, developers and practitioners from academia and industry working in all interdisciplinary areas of computational intelligence and system engineering to share their experience, and to exchange and cross-fertilize their ideas. The aim of ISDA'21 is to serve as a forum for the dissemination of state-of-the-art research, development and implementations of intelligent systems, intelligent technologies and useful applications in these two fields.

ISDA'21 received submissions from 34 countries, and each paper was reviewed by at least five or more reviewers, and based on the outcome of the review process, 132 papers were accepted for inclusion in the conference proceedings (36% acceptance rate). First, we would like to thank all the authors for submitting their papers to the conference and for their presentations and discussions during the conference. Our thanks go to program committee members and reviewers, who carried out the most difficult work by carefully evaluating the submitted papers. Our special thanks to the following plenary speakers, for their exciting plenary talks:

- Yukio Ohsawa, The University of Tokyo, Japan
- Juergen Branke, University of Warwick, UK
- Cengiz Toklu, Beykent University, Turkey
- Günther Raidl, Technische Universität Wien, Austria
- Kalyanmoy Deb, Michigan State University, USA
- Oscar Cordon, University of Granada, Spain
- Andries Engelbrecht, University of Stellenbosch, South Africa
- Antônio de Padua Braga, Federal University of Minas Gerais, Brazil
- Frédéric Guinand, Le Havre Normandy University, France
- Marco Dorigo, Université Libre de Bruxelles, Belgium

We express our sincere thanks to the organizing committee chairs for helping us to formulate a rich technical program. Enjoy reading the articles!

Ajith Abraham
Thomas Hanne
Weiping Ding
General Chairs

Tzung-Pei Hong
Tatiane Nogueira Rios
Program Chairs

ISDA 2021—Organization

General Chairs

Ajith Abraham	Machine Intelligence Research Labs (MIR Labs), USA
Thomas Hanne	University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
Weiping Ding	Nantong University, China

Program Chairs

Tzung-Pei Hong	National University of Kaohsiung, Taiwan
Tatiane Nogueira Rios	Universidade Federal da Bahia, Brazil

Publication Chairs

Niketa Gandhi	Machine Intelligence Research Labs, USA
Kun Ma	University of Jinan, China

Special Session Chair

Gabriella Casalino	University of Bari Aldo Moro, Italy

Publicity Chairs

Aswathy S. U.	Jyothi Engineering College, Kerala, India
Pooja Manghirmalani Mishra	University of Mumbai, Maharashtra, India
Mahendra Kanojia	MVLU College, Maharashtra, India
Anu Bajaj	Machine Intelligence Research Labs (MIR Labs), Washington, USA

International Publicity Team

Mabrouka Salmi	National School of Statistics and Applied Economics (ENSSEA), Kolea, Tipaza, Algeria
Phoebe E. Knight	UTeM, Malaysia
Marco A. C. Simões	Bahia State University, Brazil
Hsiu-Wei Chiu	National University of Kaohsiung, Taiwan
Serena Gandhi	Media Specialist, CA, USA

International Program Committee

Abdul Syukor Mohamad Jaya	Universiti Teknikal Malaysia Melaka, Malaysia
Alfonso Guarino	University of Foggia, Italy
Alzira Mota	Polytechnic Institute of Porto, School of Engineering, Portugal
André Borges Guimarães Serra e Santos	Polytechnic Institute of Porto, Portugal
Angelo Genovese	Università degli Studi di Milano, Italy
Anoop Sreekumar R. S.	Manonmaniam Sundaranar University, India
Antonella Falini	University of Bari Aldo Moro, Italy
Antonella Guzzo	University of Calabria, Italy
Anu Bajaj	Machine Intelligence Research Labs, USA
Arun B Mathews	MTHSS Pathanamthitta, India
Aswathy S. U.	Jyothi Engineering College, India
Bay Vo	Ho Chi Minh City University of Technology (HUTECH), Vietnam
Biju C. V.	Jyothi Engineering College, India
Blerina Spahiu	Università degli Studi di Milano Bicocca, Italy
Carlos Pereira	ISEC, Portugal
Christian Veenhuis	Technische Universität Berlin, Germany
Claudio Savaglio	Institute for High-Performance Computing and Networking (ICAR-CNR), Italy
Daniele Schicchi	Institute for Educational Technology, National Research Council of Italy, Italy
Devi Priya Rangasamy	Kongu Engineering College, India
Dìpanwita Thakur	Banasthali University, India
E. M. Roopa Devi	Kongu Engineering College, India
Ela Pustulka	FHNW Olten, Switzerland
Elizabeth Goldbarg	Federal University of Rio Grande do Norte, Brazil
Fabio Scotti	Università degli Studi di Milano, Italy
Fariba Goodarzian	Machine Intelligence Research Labs, USA
Federico Divina	Pablo de Olavide University, Spain
Gabriella Casalino	University of Bari Aldo Moro, Italy
Gautami Tripathi	Jamia Hamdard, India

Gianluca Zaza	University of Bari Aldo Moro, Italy
Gonglin Yuan	Victoria University of Wellington, New Zealand
Hudson Geovane de Medeiros	Federal University of Rio Grande do Norte, Brazil
Isabel S. Jesus	Institute of Engineering of Porto, Portugal
Islame Felipe da Costa Fernandes	Federal University of Rio Grande do Norte (UFRN), Brazil
Ivo André Soares Pereira	University Fernando Pessoa, Portugal
János Botzheim	Eötvös Loránd University, Hungary
João Ferreira	Instituto Universitário de Lisboa, Portugal
José Everardo Bessa Maia	State University of Ceará, Brazil
José Raúl Romero	University of Cordoba, Spain
K. Ramesh	Hindustan Institute of Technology and Science, India
Kaushik Das Sharma	University of Calcutta, India
Kavita Jain	University of Mumbai, Maharashtra, India
Kingsley Okoye	Tecnologico de Monterrey, Mexico
Kosisochukwu Judith Madukwe	Victoria University of Wellington, New Zealand
Leandro Coelho	Pontifícia Universidade Católica do Parana, Brazil
M. Rubaiyat Hossain Mondal	Bangladesh University of Engineering and Technology, Bangladesh
Mahendra Kanojia	Sheth L.U.J. and Sir M.V. College, India
Manisha Satish Divate	Usha Pravin Gandhi College of Arts, Science and Commerce, Maharashtra, India
Mariella Farella	University of Palermo, Italy
Mohd Abdul Ahad	Jamia Hamdard, New Delhi, India
Murilo Oliveira Machado	Universidade Federal do Mato Grosso do Sul, Brazil
Nidhi Sindhwani	Amity University, Noida, India
Niketa Gandhi	Machine Intelligence Research Labs, USA
Nuno Miguel Gomes Bettencourt	Polytechnic Institute of Porto (ISEP/IPP), Portugal
Nurul Azma Zakaria	Universiti Teknikal Malaysia Melaka, Malaysia
Oscar Castillo	Tijuana Institute of Technology, Mexico
Pasquale Ardimento	Università degli studi di Bari Aldo Moro, Italy
Patrick Hung	Ontario Tech University, Canada
Paulo Moura Oliveira	University of Trás-os-Montes and Alto Douro, Portugal
Pietro Picerno	Università Telematica “e-Campus”, Italy
Pooja Manghirmalani Mishra	University of Mumbai, India
Priya P. Sajan	C-DAC, Kerala, India
Rafael Barbudo Lunar	University of Córdoba, Spain
Reeta Devi	Kurukshetra University, India

Rohit Anand	DSEU, G.B. Pant Okhla-1 Campus, New Delhi, India
Ruggero Donida Labati	Università degli Studi di Milano, Italy
Sabri Pllana	Center for Smart Computing Continuum, Forschung Burgenland, Austria
Sidemar Fideles Cezario	Federal University of Rio Grande do Norte, Brazil
Sílvia Maria Diniz Monteiro Maia	Federal University of Rio Grande do Norte, Brazil
Sindhu P. M.	Nagindas Khandwala College, India
Subodh Deolekar	Welingkar Institute of Management Development and Research, India
Sulaima Lebbe Abdul Haleem	South Eastern University of Sri Lanka, Sri Lanka
Susana Cláudia Nicola de Araújo	Instituto Superior de Engenharia do Porto (ISEP), Portugal
Syariffanor Hisham	Universiti Teknikal Malaysia Melaka, Malaysia
Thatiana C. Navarro Diniz	Federal Rural University of the Semi-arid Region, Brazil
Thiago Soares Marques	Federal University of Rio Grande do Norte, Brazil
Thomas Hanne	University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
Tzung-Pei Hong	National University of Kaohsiung, Taiwan
Wen-Yang Lin	National University of Kaohsiung, Taiwan
Wenbin Pei	Lanzhou University, China
Yibao Zhang	Lanzhou University, China
Youssef Ghanou	Moulay Ismail University of Meknes, Morocco
Zurina Saaya	Universiti Teknikal Malaysia Melaka, Malaysia

Contents

Open-Ended Automatic Programming Through Combinatorial Evolution 1
Sebastian Fix, Thomas Probst, Oliver Ruggli, Thomas Hanne, and Patrik Christen

Deep Face Mask Detection: Prevention and Mitigation of COVID-19 13
Sahar Dammak, Hazar Mliki, and Emna Fendri

Extracting Emotion and Sentiment Quotient of Viral Information Over Twitter 23
Pawan Kumar, Reiben Eappen Reji, and Vikram Singh

Maintaining Scalability in Blockchain 34
Anova Ajay Pandey, Terrance Frederick Fernandez, Rohit Bansal, and Amit Kumar Tyagi

Thoracic Disease Chest Radiographic Image Dataset: A Comprehensive Review 46
Priyanka Malhotra, Sheifali Gupta, Atef Zaguia, and Deepika Koundal

Batch Normalization and Dropout Regularization in Training Deep Neural Networks with Label Noise 57
Andrzej Rusiecki

Intelligent Software Engineering: The Significance of Artificial Intelligence Techniques in Enhancing Software Development Lifecycle Processes 67
Vaishnavi Kulkarni, Anurag Kolhe, and Jay Kulkarni

Honey Bee Queen Presence Detection from Audio Field Recordings Using Summarized Spectrogram and Convolutional Neural Networks . . . 83
Agnieszka Orlowska, Dominique Fourer, Jean-Paul Gavini, and Dominique Cassou-Ribehart

Formal Verification Techniques: A Comparative Analysis for Critical System Design 93
Rahul Karmakar

Investigating Drug Peddling in Nigeria Using a Machine Learning Approach 103
Oluwafemi Samson Balogun, Sunday Adewale Olaleye, Mazhar Moshin, Keijo Haataja, Xiao-Zhi Gao, and Pekka Toivanen

Selective Information Control and Layer-Wise Partial Collective Compression for Multi-Layered Neural Networks 121
Ryotaro Kamimura

Semantic Representation Driven by a Musculoskeletal Ontology for Bone Tumors Diagnosis 132
Mayssa Bensalah, Atef Boujelben, Yosr Hentati, Mouna Baklouti, and Mohamed Abid

Centrifugal Pump Fault Diagnosis Using Discriminative Factor-Based Features Selection and K-Nearest Neighbors 145
Zahoor Ahmad, Md. Junayed Hasan, and Jong-Myon Kim

Transfer Learning with 2D Vibration Images for Fault Diagnosis of Bearings Under Variable Speed 154
Zahoor Ahmad, Md Junayed Hasan, and Jong-Myon Kim

Performance Evaluation of Microservices Featuring Different Implementation Patterns 165
Leandro Costa and António Nestor Ribeiro

Lifetime Optimization of Sensor Networks with Mobile Sink and Solar Energy Supply 177
Mehdi Achour and Amine Boufaied

Counting Vehicle by Axes with High-Precision in Brazilian Roads with Deep Learning Methods 188
Adson M. Santos, Carmelo J. A. Bastos-Filho, and Alexandre M. A. Maciel

Imbalanced Learning for Robust Moving Object Classification in Video Surveillance Applications 199
Rania Rebai Boukhriss, Ikram Chaabane, Radhouane Guermazi, Emna Fendri, and Mohamed Hammami

Mining Frequently Traveled Routes During COVID-19 210
George Obaido, Kehinde Aruleba, Oluwaseun Alexander Dada, and Ibomoiye Domor Mienye

Analysis of Performance Improvement for Speaker Verification by Combining Feature Vectors of LPC Spectral Envelope, MFCC and pLPC Pole Distribution 220
Haruki Shigeta, Kodai Komatsu, Shun Oyabu, Kazuya Matsuo, and Shuichi Kurogi

CASTA: Clinical Assessment System for Tuberculosis Analysis 231
Ramisetty Kavya, Jonathan Samuel, Gunjan Parihar, Y. Suba Joyce, Y. Bakthasingh Lazarus, Subhrakanta Panda, and Jabez Christopher

Bearing Fault Classification of Induction Motor Using Statistical Features and Machine Learning Algorithms 243
Rafia Nishat Toma and Jong-myon Kim

Evidential Spammers and Group Spammers Detection 255
Malika Ben Khalifa, Zied Elouedi, and Eric Lefèvre

NLP for Product Safety Risk Assessment 266
Michael Hellwig, Steffen Finck, Thomas Mootz, Andreas Ehe, and Florian Rein

Augmented Reality for Fire Evacuation Research: An A'WOT Analysis 277
El Mostafa Bourhim

Optimization of Artificial Neural Network: A Bat Algorithm-Based Approach 286
Tarun Kumar Gupta and Khalid Raza

ResD Hybrid Model Based on Resnet18 and Densenet121 for Early Alzheimer Disease Classification 296
Modupe Odusami, Rytis Maskeliūnas, Robertas Damaševičius, and Sanjay Misra

Quantum Ordering Points to Identify the Clustering Structure and Application to Emergency Transportation 306
Habiba Drias, Yassine Drias, Lydia Sonia Bendimerad, Naila Aziza Houacine, Djaafar Zouache, and Ilyes Khennak

Patterns for Improving Business Processes: Defined Pattern Categorization 316
Nesrine Missaoui and Sonia Ayachi Ghannouchi

SAX-Preprocessing Technique for Characters Recognition Using Gyroscope Data 326
Mariem Taktak and Slim Triki

Lower Limb Movement Recognition Using EMG Signals 336
Sali Issa and Abdel Rohman Khaled

A Model of Compactness-Homogeneity for Territorial Design 346
María Beatriz Bernábe-Loranca, Rogelio González-Velázquez, Carlos Guillen Galván, and Erika Granillo-Martínez

Automated Cattle Classification and Counting Using Hybridized Mask R-CNN and YOLOv3 Algorithms 358
R. Devi Priya, V. Devisurya, N. Anitha, N. Kalaivaani, P. Keerthana, and E. Adarsh Kumar

UTextNet: A UNet Based Arbitrary Shaped Scene Text Detector 368
Veronica Naosekpam, Sushant Aggarwal, and Nilkanta Sahu

VSim-AV: A Virtual Simulation Platform for Autonomous Vehicles . . . 379
Leila Haj Meftah and Rafik Braham

Image Segmentation Using Matrix-Variate Lindley Distributions 389
Zitouni Mouna and Tounsi Mariem

Improving Speech Emotion Recognition System Using Spectral and Prosodic Features 399
Adil Chakhtouna, Sara Sekkate, and Abdellah Adib

Spare Parts Sales Forecasting for Mining Equipment: Methods Analysis and Evaluation 410
Egor Nikitin, Alexey Kashevnik, and Nikolay Shilov

Data-Centric Approach to Hepatitis C Virus Severity Prediction 421
Aniket Sharma, Ashok Arora, Anuj Gupta, and Pramod Kumar Singh

Automatic Crack Detection with Calculus of Variations 432
Erika Pellegrino and Tania Stathaki

Deep Squeeze and Excitation-Densely Connected Convolutional Network with cGAN for Alzheimer's Disease Early Detection 441
Rahma Kadri, Mohamed Tmar, Bassem Bouaziz, and Faiez Gargouri

Recognition of Person Using ECG Signals Based on Single Heartbeat 452
Sihem Hamza and Yassine Ben Ayed

Semantic Segmentation of Dog's Femur and Acetabulum Bones with Deep Transfer Learning in X-Ray Images 461
D. E. Moreira da Silva, Vitor Filipe, Pedro Franco-Gonçalo, Bruno Colaço, Sofia Alves-Pimenta, Mário Ginja, and Lio Gonçalves

Automatic Microservices Identification from Association Rules of Business Process 476
Malak Saidi, Mohamed Daoud, Anis Tissaoui, Abdelouahed Sabri, Djamal Benslimane, and Sami Faiz

Toward a Configurable Thing Composition Language for the SIoT . . . 488
Soura Boulaares, Salma Sassi, Djamal Benslimane, Zakaria Maamar, and Sami Faiz

Comparison of Different Processing Methods of Joint Coordinates Features for Gesture Recognition with a RNN in the MSRC-12 498
Júlia Schubert Peixoto, Anselmo Rafael Cukla, Daniel Welfer, and Daniel Fernando Tello Gamarra

Summary Generation Using Natural Language Processing Techniques and Cosine Similarity 508
Sayantan Pal, Maiga Chang, and Maria Fernandez Iriarte

An Approach for Constructing a Simulation Model for Dynamic Analysis of Information Security System 518
Ivan Gaidarski and Pavlin Kutinchev

Enhanced Prediction of Chronic Kidney Disease Using Feature Selection and Boosted Classifiers 527
Ibomoiye Domor Mienye, George Obaido, Kehinde Aruleba, and Oluwaseun Alexander Dada

An Adaptive-Backstepping Digital Twin-Based Approach for Bearing Crack Size Identification Using Acoustic Emission Signals 538
Farzin Piltan and Jong-Myon Kim

Implementation-Oriented Feature Selection in UNSW-NB15 Intrusion Detection Dataset 548
Mohammed M. Alani

Augmented Reality SDK's: A Comparative Study 559
El Mostafa Bourhim and Aziz Akhiate

Hybrid Neural Network for Hyperspectral Satellite Image Classification (HNN) 567
Maissa Hamouda and Med Salim Bouhlel

Implementation of the Business Process Model and Notation in the Modelling of Patient's Clinical Workflow in Oncology 576
Nassim Bout, Rachid Khazaz, Ali Azougaghe, Mohamed El-Hfid, Mounia Abik, and Hicham Belhadaoui

Mobile Cloud Computing: Issues, Applications and Scope in COVID-19 587
Hariket Sukesh Kumar Sheth and Amit Kumar Tyagi

Designing a Humanitarian Supply Chain for Pre and Post Disaster Planning with Transshipment and Considering Perishability of Products 601
Faeze Haghgoo, Ali Navaei, Amir Aghsami, Fariborz Jolai, and Ajith Abraham

Innovative Learning Technologies as Support to Clinical Reasoning in Medical Sciences: The Case of the "FEDERICO II" University 613
Oscar Tamburis, Fabrizio L. Ricci, Fabrizio Consorti, Fabrizio Pecoraro, and Daniela Luzi

Convolutional Neural Networks (CNN) Model for Mobile Brand Sentiment Analysis 624
Hamidah Jantan and Puteri Ika Shazereen Ibrahim

How Knowledge-Driven Class Generalization Affects Classical Machine Learning Algorithms for Mono-label Supervised Classification 637
Houcemeddine Turki, Mohamed Ali Hadj Taieb, and Mohamed Ben Aouicha

Deep Residual Network for Autonomous Vehicles Obstacle Avoidance 647
Leila Haj Meftah and Rafik Braham

Modeling Travelers Behavior Using FSQCA 657
Oumayma Labti and Ez-zohra Belkadi

AHP Approach for Selecting Adequate Big Data Analytics Platform . . . 667
Naima EL Haoud and Oumaima Hali

Combining Bert Representation and POS Tagger for Arabic Word Sense Disambiguation 676
Rakia Saidi and Fethi Jarray

Detection of Lung Cancer from CT Images Using Image Processing . . . 686
S. Lilly Sheeba and L. Gethsia Judin

An Overview of IoT-Based Architecture Model for Smart Home Systems 696
Odamboy Djumanazarov, Antti Väänänen, Keijo Haataja, and Pekka Toivanen

Real Time Tracking of Traffic Signs for Autonomous Driving Using Monocular Camera Images 707
Sneha Hegde, K and Srividhya Kannan

Metaheuristic Methods for Water Distribution Network Considering Routing Decision 723
Ahmad Hakimi, Reza Mahdizadeh, Hossein Shokri Garjan, Amir Khiabani, and Ajith Abraham

Prediction of Moroccan Stock Price Based on Machine Learning Algorithms 735
Abdelhadi Ifleh and Mounime El Kabbouri

R-DCNN Based Automatic Recognition of Indian Sign Language 742
S. Subhashini, S. Revathi, and S. Shanthini

VReason Grasp: An Ordered Grasp Based on Physical Intuition in Stacking Objects 754
Xiang Ji, Qiushu Chen, Tao Xiong, Tianyu Xiong, and Huiliang Shang

Comparative Evaluation of Genetic Operators in Cartesian Genetic Programming 765
Abdul Manazir and Khalid Raza

Prediction of Credibility of Football Player Rating Using Data Analytics 775
Manaswita Datta and Bhawana Rudra

DDoS Attack Detection on IoT Devices Using Machine Learning Techniques 787
Sunil Kumar, Rohit Kumar Sahu, and Bhawana Rudra

Functionality and Architecture for a Platform for Independent Learners: KEPLAIR 795
Stefano Ferilli, Domenico Redavid, Davide Di Pierro, and Liza Loop

Aircraft Conflict Resolution Using Convolutional Neural Network on Trajectory Image 806
Md Siddiqur Rahman, Laurent Lapasset, and Josiane Mothe

Evaluation of Techniques for Predicting a Build Up of a Seizure 816
Abir Hadriche, Ichrak ElBehy, Amira Hajjej, and Nawel Jmail

A Real-Time Stereoscopic Images Rectification and Matching Algorithm Based on Python 828
Elmehdi Adil, Mohammed Mikou, and Ahmed Mouhsen

Named Entities as a Metadata Resource for Indexing and Searching Information 838
Flavio Izo, Elias Oliveira, and Claudine Badue

Brazilian Mercosur License Plate Detection and Recognition Using Haar Cascade and Tesseract OCR on Synthetic Imagery 849
Cyro M. G. Sabóia and Pedro Pedrosa Rebouças Filho

Designing Scalable Intrusion Detection Systems with Stacking Based Ensemble Learning 859
A. Sujan Reddy, S. Akashdeep, S. Sowmya Kamath, and Bhawana Rudra

Retrofitting Stormwater Harvest System in Dispersing Reliable Water Supply in a Climate-Smart City 870
Bwija Mukome, Muhammed Seyam, and Oseni Amoo

Predicting and Analysis the Bitcoin Price Using Various Forecasting Model 879
E. M. Roopa Devi, R. Shanthakumari, R. Rajdevi, S. Dineshkumar, A. Dinesh, and M. Keerthana

Improved Sentence Similarity Measurement in the Medical Field Based on Syntactico-Semantic Knowledge 890
Wafa Wali and Bilel Gargouri

Analysis of the Brazilian Artisanal Cheese Market from the Perspective of Social Networks 900
Thallys da Silva Nogueira, Vitor Agostinho Mouro, Kennya Beatriz Siqueira, and Priscila V. Z. C. Goliatt

PONY: Predicting an Object's Next_Location Using YOLO 910
Aris E. Ignacio and Julian Antonio S. Laspoña

Role of Machine Learning in Authorship Attribution with Select Stylometric Features 920
Sumit Gupta, Tapas Kumar Patra, and Chitrita Chaudhuri

COVID Detection Using Chest X-Ray and Transfer Learning 933
Saksham Jain, Nidhi Sindhwani, Rohit Anand, and Ramani Kannan

ECFAR: A Rule-Based Collaborative Filtering System Dealing with Evidential Data 944
Nassim Bahri, Mohamed Anis Bach Tobji, and Boutheina Ben Yaghlane

Enhancing Photography Management Through Automatically Extracted Metadata 956
Pedro Carvalho, Diogo Freitas, Tiago Machado, and Paula Viana

A Machine Learning Framework for House Price Estimation 965
Adebayosoye Awonaike, Seyed Ali Ghorashi, and Rawad Hammaad

A Dedicated Temporal Erasable-Itemset Mining Algorithm 977
Tzung-Pei Hong, Hao Chang, Shu-Min Li, and Yu-Chuan Tsai

Denoising Hyperspectral Imageries with Split-Bregman Iteration Scheme 986
Satwinder Kaur, Bhawna Goyal, and Ayush Dogra

iWAD: An Improved Wormhole Attack Detection System for Wireless Sensor Network 1002
Virendra Dani, Radha Bhonde, and Ayesha Mandloi

Twitter People's Opinions Analysis During Covid-19 Quarantine Using Machine Learning and Deep Learning Models 1013
Wafa Alotaibi, Faye Alomary, and Raouia Mokni

Estimation and Aggregation Method of Open Data Sources for Road Accident Analysis 1025
Sergey Savosin and Nikolay Teslya

A Hybrid Approach for an Interpretable and Explainable Intrusion Detection System 1035
Tiago Dias, Nuno Oliveira, Norberto Sousa, Isabel Praça, and Orlando Sousa

An IoT Based Home Automation System VIA Hotspot 1046
Raihan Uddin

Genomic Variant Annotation: A Comprehensive Review of Tools and Techniques 1057
Prajna Hebbar and S. Kamath Sowmya

Age Estimation and Gender Recognition Using Biometric Modality . . . 1068
Amal Abbes, Randa Boukhris, and Yassine Ben Ayed

Towards a Historical Ontology for Arabic Language: Investigation and Future Directions 1078
Rim Laatar, Ahlem Rhayem, Chafik Aloulou, and Lamia Hadrich Belguith

Optimized Evidential AIRS with Feature Selection and Genetic Algorithm 1088
Rihab Abdelkhalek and Zied Elouedi

Predicting the Movement Intention and Controlling the Grip of a Myoelectrical Active Prosthetic Arm 1098
Jonatan Dellagostin, Anselmo Cukla, Fábio Bisogno, Raul Sales, Lucas Strapazzon, and Gregório Salvador

An Evolutionary Approach for Critical Node Detection in Hypergraphs. A Case Study of an Inflation Economic Network 1110
Noémi Gaskó, Mihai Suciu, Rodica Ioana Lung, and Tamás Képes

A Modified Technique Based on GOMASHIO Method for Mobile Nodes Localization in a WSN 1118
Omnia Mezghani

Attitude Prediction of In-service Teachers Towards Blended Learning Using Machine Learning During COVID-19 Pandemic 1129
Pooja Manghirmalani Mishra, Rabiya Saboowala, and Niketa Gandhi

Driver Behavior Analysis: Abnormal Driving Detection Using MLP Classifier Applied to Outdoor Camera Images 1142
Wictor Gomes de Oliveira, Pedro Pedrosa Rebouças Filho, and Elias Teodoro da Silva Junior

Supporting Reusability in the Scrum Process 1153
Oumaima Bhiri, Khaoula Sayeb, and Sonia Ayachi Ghannouchi

Arabic Automatic Essay Scoring Systems: An Overview Study 1164
Rim Aroua Machhout, Chiraz Ben Othmane Zribi, and Saoussen Mathlouthi Bouzid

Energy-Efficient Khalimsky-Based Routing Approach for K-Hop Clustered Wireless Multimedia Sensor Networks (WMSNs) 1177
Mahmoud Mezghani

Academic Venue Recommendation Based on Refined Cross Domain . . . 1188
Abir Zawali and Imen Boukhris

Typology of Data Inputs Imperfection in Collective Memory Model . . . 1198
Haithem Kharfia, Fatma Ghorbel, and Bilel Gargouri

How Latest Computer Science Research Copes with COVID-19? 1207
Leila Bayoudhi, Najla Sassi, and Wassim Jaziri

Using Machine Learning Approaches to Identify Exercise Activities from a Triple-Synchronous Biomedical Sensor 1216
Yohan Mahajan, Jahnavi Pinnamraju, John L. Burns, Judy W. Gichoya, and Saptarshi Purkayastha

Intelligent Image Captioning Approach with Novel Ensembled Recurrent Neural Network Model 1227
L. Agilandeeswari, Kuhoo Sharma, and Saurabh Srivastava

Analysis of Six Different GP-Tree Neighborhood Structures 1237
Souhir Elleuch and Bassem Jarboui

Ensemble Learning for Data-Driven Diagnosis of Polycystic Ovary Syndrome 1250
Subrato Bharati, Prajoy Podder, M. Rubaiyat Hossain Mondal, V. B. Surya Prasath, and Niketa Gandhi

Tree Species Detection Using MobileNet – An Approach 1260
L. Agilandeeswari, Aayush Jha, and Dhruv Gupta

Dimensional Reduction Methods Comparison for Clustering Results of Indonesian Language Text Documents 1271
Siti Inayah Rizki Hasanah, Muhammad Ihsan Jambak, and Danny M. Saputra

Gun Model Classification Based on Fired Cartridge Case Head Images with Siamese Networks 1281
Sérgio Valentim, Tiago Fonseca, João Ferreira, Tomás Brandão, Ricardo Ribeiro, and Stefan Nae

Image-based Android Malware Detection Models using Static and Dynamic Features 1292
Hemant Rathore, B. Raja Narasimhan, Sanjay K. Sahay, and Mohit Sewak

A Fuzzy Logic Based Optimal Network System for the Delivery of Medical Goods via Drones and Land Transport in Remote Areas 1306
Shio Gai Quek, Ganeshsree Selvachandran, Rohana Sham, Ching Sin Siau, Mohd Hanif Mohd Ramli, and Noorsiah Ahmad

The Menu Planning Problem: A Systematic Literature Review 1313
Dorra Kallel, Ines Kanoun, and Diala Dhouib

Comparative Study on Deep Learning Methods for Apple Ripeness Estimation on Tree 1325
Raja Hamza and Mohamed Chtourou

Neuro-Fuzzy Systems for Learning Analytics 1341
Gabriella Casalino, Giovanna Castellano, and Gianluca Zaza

Prediction of COVID-19 Active Cases Using Polynomial Regression and ARIMA Models 1351
Neji Neily, Boulbaba Ben Ammar, and Habib M. Kammoun

Land Use/Land Cover Classification Using Machine Learning and Deep Learning Algorithms for EuroSAT Dataset – A Review 1363
Agilandeeswari Loganathan, Suri Koushmitha, and Yerru Nanda Krishna Arun

A Dynamic Rain Detecting Car Wiper 1375
Andebotum Roland, John Wejin, Sanjay Misra, Mayank Mohan Sharma, Robertas Damaševičius, and Rytis Maskeliūnas

Crude Oil Price Prediction Using Particle Swarm Optimization and Classification Algorithms 1384
Emmanuel Abidemi Adeniyi, Babatunde Gbadamosi, Joseph Bamidele Awotunde, Sanjay Misra, Mayank Mohan Sharma, and Jonathan Oluranti

An Efficient Thyroid Disease Detection Using Voting Based Ensemble Classifier 1395
L. Agilandeeswari, Ishita Khatri, Jagruta Advani, and Syed Mohammad Nihal

A Cross-Entropy Based Feature Selection Method for Binary Valued Data Classification 1406
Zhipeng Wang and Qiuming Zhu

Effective Music Suggestion Using Facial Recognition 1417
A. P. Ponselvakumar, S. Anandamurugan, K. Lokeshwaran, Suganneshan, Zubair, and Gokula Kannan

A Survey on SLA Management Using Blockchain Based Smart Contracts 1425
Nawel Hamdi, Chiraz El Hog, Raoudha Ben Djemaa, and Layth Sliman

Author Index 1435