# Contents

An Innovative Approach to Manage Heterogeneous Information Using Relational Database Systems ........................................... 1
Cosmin Sabo, Petrică C. Pop, Honoriu Vălean, and Daniela Dânciulescu

Reliable Attribute Selection Based on Random Forest (RASER) .... 11
Aboudi Noura, Hechmi Shili, and Lotfi Ben Romdhane

Estimating the Number of Clusters as a Pre-processing Step to Unsupervised Learning ....................................................... 25
Paulo Rogerio Nietto and Maria do Carmo Nicoletti

Agglomerative and Divisive Approaches to Unsupervised Learning in Gestalt Clusters ............................................................. 35
Rodrigo C. Camargos, Paulo R. Nietto, and Maria do Carmo Nicoletti

Improving Imputation Accuracy in Ordinal Data Using Classification... 45
Shafiq Alam, Gillian Dobbie, and XiaoBin Sun

GA-PSO-FASTSLAM: A Hybrid Optimization Approach in Improving FastSLAM Performance ........................................... 57
Alif Ridzuan Khairuddin, Mohamad Shukor Talib, Habibollah Haron, and Muhamad Yazid Che Abdullah

Three Case Studies Using Agglomerative Clustering ..................... 67
Rodrigo C. Camargos and Maria do Carmo Nicoletti

Historic Document Image De-noising Using Principal Component Analysis (PCA) and Local Pixel Grouping (LPG) .................... 77
Han-Yang Tang, Azah Kamilah Muda, Yun-Huoy Choo, Noor Azilah Muda, and Mohd Sanusi Azmi

A Robust and Optimally Pruned Extreme Learning Machine ........... 88
Ananda L. Freire and Ajalmar R. Rocha Neto
Investigating the Effect of Combining Text Clustering with Classification on Improving Spam Email Detection .......................... 99
Doaa Hassan

Radial Basis Function Neural Networks for Datasets with Missing Values ................................................................. 108
Diego P. Paiva Mesquita and João Paulo P. Gomes

Evaluation Method for an Adaptive Web Interface: GOMS Model ................ 116
Rebai Rim, Maalej Mohamed Amin, Mahfoudhi Adel, and Abid Mohamed

Diversification Strategies in Differential Evolution Algorithm to Solve the Protein Structure Prediction Problem ......................... 125
Pedro Henrique Narloch and Rafael Stubs Parpinelli

Using Cluster Barycenters for the Generalized Traveling Salesman Problem ................................................................. 135
Mehdi El Krari, Bélaïd Ahiod, and Bouazza El Benani

On Pollution Attacks in Fully Connected P2P Networks Using Trusted Peers ................................................................. 144
Cristóbal Medina-López, Ilshat Shakirov, L.G. Casado, and Vicente González-Ruiz

Certification Under Uncertainties of Control Methods for Multisource Elevators ................................................................. 154
Chloé Desdouits, Mazen Alamir, Rodolphe Giroudeau, and Claude Le Pape

Robust and Reliable Bionic Optimization of Nonlinear Control Problems ................................................................. 165
Lukas Haas and Rolf Steinbuch

Human Detection Using Biological Signals in Camera Images with Privacy Aware ................................................................. 175
Toshihiro Kitajima, Eduardo Arata Y. Murakami, Shunsuke Yoshimoto, Yoshihiro Kuroda, and Osamu Oshiro

Nuclei Malignancy Analysis Based on an Adaptive Bottom-Hat Filter ................................................................. 187
Tiia Ikonen, Ketjo Haataja, Pekka Toivanen, Teemu Tolonen, and Jorma Isola

Self-Organizing Maps and Fuzzy C-Means Algorithms on Gait Analysis Based on Inertial Sensors Data ........................................ 197
Rafael Caldas, Yabing Hu, Fernando Buarque de Lima Neto, and Bernd Markert
Age, Gender, Race and Smile Prediction Based on Social Textual and Visual Data Analyzing .................................................. 206
Onsa Lazzez, Wael Ouarda, and Adel M. Alimi

Test Suite Prioritization Using Nature Inspired Meta-Heuristic Algorithms .......................................................... 216
Daya Gupta and Vishal Gupta

A New Trajectory Optimization Approach for Safe Mobile Robot Navigation: A Comparative Study (Khepera II Mobile Robot) ........ 227
Walid Ellili, Abdelfetteh Lachtar, and Mounir Samet

The Improvement of an Image Compression Approach Using Weber-Fechner Law .................................................. 239
Mourad Rahali, Habiba Loukil, and Mohamed Salim Bouhlel

A Minimal Rare Substructures-Based Model for Graph Database Indexing .......................................................... 250
Mehdi Azaouzi and Lotfi Ben Romdhane

Multibiometrics Enhancement Using Quality Measurement in Score Level Fusion .................................................. 260
Saliha Artabaz, Layth Sliman, Hachemi Nabil Dellys, Karima Benatchba, and Mouloud Koudil

Effects of Random Sampling on SVM Hyper-parameter Tuning .... 268
Tomáš Horváth, Rafael G. Mantovani, and André C.P.L.F. de Carvalho

Bayesian Networks for Identifying Semantic Relations in a Never-Ending Learning System .......................................................... 279
Edimilson Batista dos Santos, Massilon Lourenço Fernandes, Estevam R. Hruschka, Jr., and Maísa Cristina Duarte

Training a Spiking Neural Network to Generate Online Handwriting Movements .................................................. 289
Mahmoud Ltaief, Hala Bezine, and Adel M. Alimi

Using a Synthetic Character Database for Training Deep Learning Models Applied to Offline Handwritten Recognition ........ 299
Jorge Sueiras, Victoria Ruiz, Ángel Sánchez, and José F. Vélez

Cognitive Conversation Language - CCL ........................................ 309
Wesley Willy Oliveira de Souza, and Estevam Rafael Hruschka Júnior

A Genetic-Fuzzy Classification Approach to Improve High-Dimensional Intrusion Detection System .......................................................... 319
Imen Gaied, Farah Jemili, and Ouajdi Korbaa

A New Data Placement Approach for Scientific Workflows in Cloud Computing Environments .......................................................... 330
Hamdi Kchaou, Zied Kchaou, and Adel M. Alimi
A Novel Simulated Annealing-Based Learning Algorithm for Training Support Vector Machines ........................................... 341
Madson L. Dantas Dias and Ajalmar R. Rocha Neto

Fish School Search Variations and Other Metaheuristics in the Solution of Assembly Line Balancing Problems .................. 352
I.M.C. de Albuquerque, J.B.M. Filho, F.B.L. Neto, and A.M.O. Silva

Improved Search Mechanisms for the Fish School Search Algorithm ... 362
João Batista Monteiro Filho, Isabel Maria Carneiro Albuquerque, Fernando Buarque Lima Neto, and Filipe Vieira Silva Ferreira

A Survey on Outlier Detection in the Context of Stream Mining: Review of Existing Approaches and Recommendations ............. 372
Imen Souiden, Zaki Brahmi, and Hajer Toumi

Heuristic for Scheduling Intrees on $m$ Machines
with Non-availability Constraints ....................................... 384
Khaoula Ben Abdellafou, Hatem Hadda, and Ouajdi Korbaa

Network Intrusion Detection Using Danger Theory and Genetic Algorithms .......................................................... 394
João Lima Santanelli and Fernando Buarque de Lima Neto

M. Nordin A. Rahman, Abdullahi Nababa Saidu, M. Fadzil A. Kadir, Syadiah Nor Shamsudin, and Syarilla Iryani A. Saany

A Modified Naive Possibilistic Classifier for Numerical Data .......... 417
Karim Baati, Tarek M. Hamdani, Adel M. Alimi, and Ajith Abraham

Combinatorial Structural Clustering (CSC): A Novel Structural Clustering Approach for Large Scale Networks ........................ 427
Liang Chen, Hongbo Liu, Weishi Zhang, and Bo Zhang

Memetic Algorithms for the Automatic Discovery of Software Architectures ......................................................... 437
Aurora Ramírez, Rafael Barbudo, José Raúl Romero, and Sebastián Ventura

Multi-objective Dynamic Analysis Using Fractional Entropy ............ 448
E.J. Solteiro Pires, J.A. Tenreiro Machado, and P.B. de Moura Oliveira

Multi-agent Based Truck Scheduling Using Ant Colony Intelligence in a Cross-Docking Platform .................................... 457
Houda Zouhaier and Lamjed Ben Said

From Traditional Data Warehouse To Real Time Data Warehouse .... 467
Senda Bouaziz, Ahlem Nabli, and Faiez Gargouri
Intelligent Traffic Congestion Prediction System Based on ANN and Decision Tree Using Big GPS Traces ................................. 478
Wiam Elleuch, Ali Wali, and Adel M. Alimi

Forecasting Using Elman Recurrent Neural Network .................... 488
Emna Krichene, Youssef Masmoudi, Adel M. Alimi, Ajith Abraham, and Habib Chabchoub

Multi-objective Particle Swarm Optimisation for Robust Dynamic Scheduling in a Permutation Flow Shop .................................. 498
Mohanad Al-Behadili, Djamila Ouelhadj, and Dylan Jones

Mining Perfectly Rare Itemsets on Big Data: An Approach Based on Apriori-Inverse and MapReduce ..................................... 508
F. Padillo, J.M. Luna, and S. Ventura

Patient-Specific Epilepsy Seizure Detection Using Random Forest Classification over One-Dimension Transformed EEG Data .............. 519
Marco A. Pinto-Orellana and Fabio R. Cerqueira

A New Approach to Human Activity Recognition Using Machine Learning Techniques ...................................................... 529
Leandro B. Marinho, A.H. de Souza Junior, and P.P. Rebouças Filho

Lung Segmentation in Chest Computerized Tomography Images Using the Border Following Algorithm ........................................... 539

Learner’s Profile Hierarchization in an Interoperable Education System ................................................................. 549
Leila Ghorbel, Corinne Amel Zayani, Ikram Amous, and Florence Sèdes

ACO-PSO Optimization for Solving TSP Problem with GPU Acceleration .............................................................. 559
Olfa Bali, Walid Elloumi, Ajith Abraham, and Adel M. Alimi

A Parallel Adaptive PSO Algorithm with Non-iterative Electrostatic Repulsion and Social Dynamic Neighborhood ..................... 570
Daniel Soto and Wilson Soto

Fishing Monitor System Data: A Naïve Bayes Approach .................. 582
Joao C. Ferreira, Serge Lage, Iola Pinto, and Nuno Antunes

Detection of Behavioral Patterns for Increasing Attentiveness Level ... 592
Dalila Durães, Sérgio Gonçalves, Davide Carneiro, Javier Bajo, and Paulo Novais
Contents

Evaluation of the Simulated Annealing and the Discrete Artificial Bee Colony in the Weight Tardiness Problem with Taguchi Experiments Parameterization ........................................... 718
André S. Santos, Ana M. Madureira, and Maria R. Varela

Industrial Plant Layout Analyzing Based on SNA ....................... 728
M.L.R. Varela, V.K. Manupati, K. Manoj, G.D. Putnik,
A. Araújo, and A.M. Madureira

A Genetic Neural Network Approach for Unusual Behavior Prediction in Smart Home .................................................. 738
Zaineb Liouane, Tayeb Lemlouma, Philippe Roose,
Frédéric Weis, and Hassani Messaoud

New Adaptive Resource Allocation Scheme in LTE-Advanced ........ 749
Radhia Khdhir, Kais Mnif, Aymen Belghith, and Lotfi Kamoun

An Approach for Measuring Flexibility of Business Processes Based on Distances Between Models and Their Variants .................. 760
Asma Mejri, Sonia Ayachi Ghannouchi, and Ricardo Martinho

Specification of an Architecture for Self-organizing Scheduling Systems ................................................................. 771
Ana Madureira, Ivo Pereira, and Bruno Cunha

Towards Better SWRL Rules Dependency Extraction ................... 781
Abir Boujelben, Tarak Chaari, and Ikram Amous

Clustering of Maintenance Tasks for the Danish Railway System ..... 791
Shahrzad M. Pour and Una Benlic

Evaluating the Quality of Business Process Models Based on Measures and Criteria in Higher Education: Developing a Framework for Continuous Quality Improvement ............................... 800
Fouzia Kahloun and Sonia Ayachi Ghannouchi

Age and Gender Classification from Finger Vein Patterns ............. 811
Wafa Damak, Randa Boukhris Trabelsi, Alima Damak Masmoudi,
Dorra Sellami, and Amine Nait-Ali

Coupling Event-B/ProB for the Analysis of the Software Architecture Evolution Described in PDDL ........................................... 821
Farah Fourati, Mohamed Taha Bhiri, and Riadh Robbana

Trust Intrusion Detection System Based on Location for Wireless Sensor Network ......................................................... 831
Hela Maddar, Wafa Kammoun, and Habib Youssef
Temporal Patterns Visualization for Knowledge Acquisition in Dynamic Decision-Making Environment ........................................... 841
Jihed Elouni, Hela Ltiifi, Mounir Ben Ayed, and Mohamed Masmoudi

Cloudlets Architecture for Wireless Sensor Network .................. 852
Hela Maddar, Wafa Kammoun, and Habib Youssef

Data Fusion Classification Method Based on Multi Agents System. . 863
Elhoucine Ben Boussada, Mounir Ben Ayed, and Adel M. Alimi

Community Detection in Bipartite Networks Using a Noisy Extremal Optimization Algorithm ................................................. 871
Noémi Gaskó, Rodica Ioana Lung, and Mihai Alexandru Suciu

An Approach for Incorporating the Usability Optimization Process into the Model Transformation ............................................. 879
Marwa Hentati, Lassaad Ben Ammar, Abdelwaheb Trabelsi, and Adel Mahfoudhi

An ILS Heuristic for the Waste Collection Vehicle Routing Problem with Time Windows ......................................................... 889
Alba A. Campos and José Elias C. Arroyo

An NLP-Based Ontology Population for Intentional Structure ........ 900
Noura Labidi, Tarak Chaari, and Rafik Bouaziz

Metaheuristics Parameter Tuning Using Racing and Case-Based Reasoning in Scheduling Systems ............................................. 911
Ivo Pereira, Ana Madureira, and Bruno Cunha

A Branch-and-Price Algorithm for the Double Vehicle Routing Problem with Multiple Stacks and Heterogeneous Demand ........ 921
Jonatas B.C. Chagas and André G. Santos

BigDimETL: ETL for Multidimensional Big Data .......................... 935
Hana Mallek, Faiza Ghozzi, Olivier Teste, and Faiez Gargouri

Knowledge Integration in Collaborative Environments Using Supervised Ontological Alignment .............................................. 945
Leandro Pupo Natale and Nizam Omar

A General VNS Heuristic for a Three-Stage Assembly Flow Shop Scheduling Problem ................................................................. 955
Saulo C. Campos, José Elas C. Arroyo, and Ricardo G. Tavares

Towards NoSQL Graph Data Warehouse for Big Social Data Analysis .......................................................... 965
Hajer Akid and Mounir Ben Ayed
A Contribution of Dynamical Systems Theory and Epidemiological
Modeling to a Viral Marketing Campaign .................................. 974
João N.C. Gonçalves, Helena Sofia Rodrigues, and M. Teresa T. Monteiro

Developing an Ambient Intelligent-Based Decision Support System
for Production and Control Planning ........................................ 984
Marco Gomes, Fábio Silva, Filipa Ferraz, António Silva, Cesar Analide,
and Paulo Novais

CobWeb Multidimensional Model: Visualizing OLAP Query Results
Using Tag-Cloud Operators .................................................. 995
Omar Khrouf, Kaïs Khrouf, and Jamel Feki

A Time Delay Neural Network for Online Arabic
Handwriting Recognition ..................................................... 1005
Ramzi Zouari, Houcine Boubaker, and Monji Kherallah

A Proposal to Model Knowledge Dimension in Sensitive
Business Processes ............................................................. 1015
Mariam Ben Hassen, Mohamed Turki, and Faïez Gargouri

Using Intelligent Systems to Improve Case Flow in Court Systems .... 1031
Ana Lúcia Martins

Similarity and Trust Metrics Used in Recommender Systems:
A Survey ................................................................. 1041
Maryam Jallouli, Sonia Lajmi, and Ikram Amous

Analysing the Performance of a Tomographic Reconstructor
with Different Neural Networks Frameworks .......................... 1051
Sergio Luis Suárez Gómez, Carlos González Gutiérrez,
Jesús Daniel Santos Rodríguez, María Luisa Sánchez Rodríguez,
Fernando Sánchez Lasheras, and Francisco Javier de Cos Juez

Robot Swarms Theory Applicable to Seek and Rescue Operation .... 1061
Jose León, Gustavo A. Cardona, Andres Botello, and Juan M. Calderón

Linguistic Representation by Fuzzy Formal Concept and Interval
Type-2 Feature Selection .................................................. 1071
Sahar Cherif, Nesrine Baklouti, Adel M. Alimi, and Vaclav Snasel

Author Index ......................................................... 1083
Intelligent Systems Design and Applications
16th International Conference on Intelligent Systems
Design and Applications (ISDA 2016) held in Porto,
Portugal, December 16-18, 2016
Madureira, A.M.; Abraham, A.; Gamboa, D.; Novais, P.
(Eds.)
2017, XXI, 1086 p. 395 illus., Softcover
ISBN: 978-3-319-53479-4