

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, Lancaster, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Friedemann Mattern

ETH Zurich, Zurich, Switzerland

John C. Mitchell

Stanford University, Stanford, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

C. Pandu Rangan

Indian Institute of Technology Madras, Chennai, India

Bernhard Steffen

TU Dortmund University, Dortmund, Germany

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max Planck Institute for Informatics, Saarbrücken, Germany

More information about this series at <http://www.springer.com/series/7409>

Hujun Yin · David Camacho
Paulo Novais · Antonio J. Tallón-Ballesteros (Eds.)

Intelligent Data Engineering and Automated Learning – IDEAL 2018

19th International Conference
Madrid, Spain, November 21–23, 2018
Proceedings, Part I

Editors

Hujun Yin 
University of Manchester
Manchester, UK

David Camacho 
Autonomous University of Madrid
Madrid, Spain

Paulo Novais 
Campus of Gualtar
University of Minho
Braga, Portugal

Antonio J. Tallón-Ballesteros
University of Seville
Seville, Spain

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-030-03492-4 ISBN 978-3-030-03493-1 (eBook)
<https://doi.org/10.1007/978-3-030-03493-1>

Library of Congress Control Number: 2018960396

LNCS Sublibrary: SL3 – Information Systems and Applications, incl. Internet/Web, and HCI

© Springer Nature Switzerland AG 2018

This work is subject to copyright. All rights are reserved 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, express 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

This year saw the 19th edition of the International Conference on Intelligent Data Engineering and Automated Learning (IDEAL), which has been playing an increasingly leading role in the era of big data and deep learning. As an established international forum, it serves the scientific communities and provides a platform for active, new, and leading researchers in the world to exchange the latest results and disseminate new findings. The IDEAL conference has continued to stimulate the communities and to encourage young researchers for cutting-edge solutions and state-of-the-art techniques on real-world problems in this digital age. The IDEAL conference attracts international experts, researchers, academics, practitioners, and industrialists from machine learning, computational intelligence, novel computing paradigms, data mining, knowledge management, biology, neuroscience, bio-inspired systems and agents, distributed systems, and robotics. It also continues to evolve to embrace emerging topics and trends.

This year IDEAL was held in one of most beautiful historic cities in Europe, Madrid. In total 204 submissions were received and subsequently underwent the rigorous peer-review process by the Program Committee members and experts. Only the papers judged to be of the highest quality were accepted and are included in the proceedings. This volume contains 125 papers (88 for the main rack and 37 for workshops and special sessions) accepted and presented at IDEAL 2018, held during November 21–23, 2018, in Madrid, Spain. These papers provided a timely sample of the latest advances in data engineering and automated learning, from methodologies, frameworks, and techniques to applications. In addition to various topics such as evolutionary algorithms, deep learning neural networks, probabilistic modeling, particle swarm intelligence, big data analytics, and applications in image recognition, regression, classification, clustering, medical and biological modeling and prediction, text processing and social media analysis. IDEAL 2018 also enjoyed outstanding keynotes from leaders in the field, Vincenzo Loia, Xin Yao, Alexander Gammerman, as well as stimulating tutorials from Xin-She Yang, Alejandro Martin-Garcia, Raul Lara-Cabrera, and David Camacho.

The 19th edition of the IDEAL conference was hosted by the Polytechnic School at Universidad Autónoma de Madrid (UAM), Spain. With more than 30,000 students, and 2,500 professors and researchers and a staff of over 1,000, the UAM offers a comprehensive range of studies in its eight faculties (including the Polytechnic School). UAM is also proud of its strong research commitment that is reinforced by its six university hospitals and the ten join institutes with CSIC, Spain's National Research Council.

We would like to thank all the people who devoted so much time and effort to the successful running of the conference, in particular the members of the Program Committee and reviewers, organizers of workshops and special sessions, as well as the authors who contributed to the conference. We are also very grateful to the hard work

by the local organizing team at Universidad Autónoma de Madrid, especially Victor Rodríguez, for the local arrangements, as well as the help from Yao Peng at the University of Manchester for checking through all the camera-ready files. The continued support and collaboration from Springer LNCS are also greatly appreciated.

September 2018

Hujun Yin
David Camacho
Paulo Novais
Antonio J. Tallón-Ballesteros

Organization

Honorary Chairs

Hojjat Adeli
Francisco Herrera

Ohio State University, USA
Granada University, Spain

General Chairs

David Camacho
Hujun Yin
Emilio Corchado

Universidad Autónoma de Madrid, Spain
University of Manchester, UK
University of Salamanca, Spain

Programme Co-chairs

Carlos Cotta
Antonio J. Tallón-Ballesteros
Paulo Novais

Universidad de Málaga, Spain
University of Seville, Spain
Universidade do Minho, Portugal

International Advisory Committee

Lei Xu (Chair)

Chinese University of Hong Kong and Shanghai
Jiaotong University, China

Yaser Abu-Mostafa

CALTECH, USA

Shun-ichi Amari

RIKEN, Japan

Michael Dempster

University of Cambridge, UK

José R. Dorronsoro

Autonomous University of Madrid, Spain

Nick Jennings

University of Southampton, UK

Soo-Young Lee

KAIST, South Korea

Erkki Oja

Helsinki University of Technology, Finland

Latit M. Patnaik

Indian Institute of Science, India

Burkhard Rost

Columbia University, USA

Xin Yao

Southern University of Science and Technology,
China and University of Birmingham, UK

Steering Committee

Hujun Yin (Chair)

University of Manchester, UK

Laiwan Chan (Chair)

Chinese University of Hong Kong, Hong Kong,
SAR China

Guilherme Barreto

Federal University of Ceará, Brazil

Yiu-ming Cheung

Hong Kong Baptist University, Hong Kong,
SAR China

Emilio Corchado	University of Salamanca, Spain
Jose A. Costa	Federal University of Rio Grande do Norte, Brazil
Marc van Hulle	K. U. Leuven, Belgium
Samuel Kaski	Aalto University, Finland
John Keane	University of Manchester, UK
Jimmy Lee	Chinese University of Hong Kong, Hong Kong, SAR China
Malik Magdon-Ismail	Rensselaer Polytechnic Inst., USA
Peter Tino	University of Birmingham, UK
Zheng Rong Yang	University of Exeter, UK
Ning Zhong	Maebashi Institute of Technology, Japan

Publicity Co-chairs/Liaisons

Jose A. Costa	Federal University of Rio Grande do Norte, Brazil
Bin Li	University of Science and Technology of China, China
Yimin Wen	Guilin University of Electronic Technology, China

Local Arrangements Chairs

Antonio González Pardo	Raúl Lara Cabrera
Cristian Ramírez Atencia	Raquel Menéndez Ferreira
Víctor Rodríguez Fernández	F. Javier Torregrosa López
Alejandro Martín García	Ángel Panizo Lledot
Alfonso Ortega de la Puente	Marina de la Cruz

Programme Committee

Paulo Adeodata	Zoran Bosnic
Imtiaj Ahmed	Vicent Botti
Jesus Alcalá-Fdez	Edyta Brzykczyn
Richardo Aler	Andrea Burattin
Davide Anguita	Robert Burduk
Ángel Arcos-Vargas	José Luis Calvo Rolle
Romis Attux	Heloisa Camargo
Martin Atzmueller	Josep Carmona
Javier Bajo Pérez	Mercedes Carnero
Mahmoud Barhamgi	Carlos Carrascosa
Bruno Baruaque	Andre Carvalho
Carmelo Bastos Filho	Pedro Castillo
José Manuel Benitez	Luís Cavique
Szymon Bobek	Darryl Charles
Lordes Borrajo	Francisco Chavez

Richard Chbeir
Songcan Chen
Xiaohong Chen
Sung-Bae Cho
Stelvio Cimato
Manuel Jesus Cobo Martin
Roberto Confalonieri
Rafael Corchuelo
Juan Cordero
Oscar Cordon
Francesco Corona
Luís Correia
Paulo Cortez
Jose Alfredo F. Costa
Carlos Cotta
Raúl Cruz-Barbosa
Ernesto Cuadros-Vargas
Bogusław Cyganek
Ireneusz Czarnowski
Ernesto Damiani
Ajalmar Rêgo Darocha Neto
Javier Del Ser
Boris Delibašić
Fernando Díaz
Juan Manuel Dodero
Bernabe Dorronsoro
Jose Dorronsoro
Gérard Dreyfus
Adrião Duarte
Jochen Einbeck
Florentino Fdez-Riverola
Francisco Fernandez De Vega
Joaquim Filipe
Juan J. Flores
Pawel Forczmanski
Giancarlo Fortino
Felipe M. G. França
Dariusz Frejlichowski
Hamido Fujita
Marcus Gallagher
Ines Galvan
Matiaz Gams
Yang Gao
Jesus Garcia
Salvador Garcia
Pablo García Sánchez

Ana Belén Gil
María José Ginzo Villamayor
Fernando Gomide
Antonio Gonzalez-Pardo
Pedro González Calero
Marcin Gorawski
Juan Manuel Górriz
Manuel Graña
Maciej Grzenda
Jerzy Grzymala-Busse
Juan Manuel Górriz
Barbara Hammer
Richard Hankins
Ioannis Hatzilygeroudis
Francisco Herrera
Álvaro Herrero
J. Michael Herrmann
Ignacio Hidalgo
James Hogan
Jaakko Hollmén
Vasant Honavar
Wei-Chiang Samuelson Hong
Anne Håkansson
Iñaki Inza
Vladimir Ivančević
Dušan Jakovetić
Vahid Jalali
Dariusz Jankowski
Vicente Julian
Rushed Kanawati
Benjamin Klöpper
Mario Koeppen
Ilkka Kosunen
Miklós Krész
Raul Lara-Cabrera
Florin Leon
Bin Li
Clodoaldo Lima
Ivan Lukovic
Wenjian Luo
Mihai Lupu
M. Victoria Luzon
Felix Mannhardt
Alejandro Martin
José F. Martínez-Trinidad
Giancarlo Mauri

Raquel Menéndez Ferreira
 José M. Molina
 Mati Mottus
 Valery Naranjo
 Susana Nascimento
 Tim Nattkemper
 Antonio Neme
 Ngoc-Thanh Nguyen
 Yusuke Nojima
 Fernando Nuñez
 Eva Onaindia
 Jose Palma
 Ángel Panizo Lledot
 Juan Pavón
 Yao Peng
 Carlos Pereira
 Sarajane M. Peres
 Costin Pribeanu
 Paulo Quaresma
 Juan Rada-Vilela
 Cristian Ramírez-Atencia
 Izabela Rejer
 Victor Rodriguez Fernandez
 Zoila Ruiz
 Luis Rus-Pegalajar
 Yago Saez

Jaime Salvador
 Jose Santos
 Matilde Santos
 Dragan Simic
 Anabela Simões
 Marcin Szpyrka
 Jesús Sánchez-Oro
 Ying Tan
 Ricardo Tanscheit
 Renato Tinós
 Stefania Tomasiello
 Pawel Trajdos
 Stefan Trausan-Matu
 Carlos M. Travieso-González
 Milan Tuba
 Turki Turki
 Eiji Uchino
 José Valente de Oliveira
 José R. Villar
 Lipo Wang
 Tzai-Der Wang
 Dongqing Wei
 Michal Wozniak
 Xin-She Yang
 Weili Zhang

Additional Reviewers

Mahmoud Barhamgi
 Gema Bello
 Carlos Camacho
 Carlos Casanova
 Laura Cornejo
 Manuel Dorado-Moreno
 Verónica Duarte
 Antonio Durán-Rosal
 Felix Fuentes
 Dušan Gajić
 Brunno Goldstein
 David Guijo

César Hervás
 Antonio López Herrera
 José Ricardo López-Robles
 José Antonio Moral Muñoz
 Eneko Osaba
 Zhisong Pan
 Pablo Rozas-Larraondo
 Sancho Salcedo
 Sónia Sousa
 Radu-Daniel Vatavu
 Fion Wong
 Hui Xue

Workshop on RiskTrack: Analyzing Radicalization in Online Social Networks

Organizers

Javier Torregrosa	Universidad Autónoma de Madrid, Spain
Raúl Lara-Cabrera	Universidad Autónoma de Madrid, Spain
Antonio González Pardo	Universidad Autónoma de Madrid, Spain
Mahmoud Barhamgi	Université Claude Bernard Lyon 1, France

Workshop on Methods for Interpretation of Industrial Event Logs

Organizers

Grzegorz J. Nalepa	AGH University of Science and Technology, Poland
David Camacho	Universidad Autónoma de Madrid, Spain
Edyta Brzychczy	AGH University of Science and Technology, Poland
Roberto Confalonieri	Smart Data Factory, Free University of Bozen-Bolzano, Italy
Martin Atzmueller	Tilburg University, The Netherlands

Workshop on the Interplay Between Human–Computer Interaction and Data Science

Organizers

Cristian Mihăescu	University of Craiova, Romania
Ilkka Kosunen	University of Tallinn, Estonia
Ivan Luković	University of Novi Sad, Serbia

Special Session on Intelligent Techniques for the Analysis of Scientific Articles and Patents

Organizers

Manuel J. Cobo	University of Granada, Spain
Pietro Ducange	eCampus University, Italy

Antonio Gabriel López-Herrera
Enrique Herrera-Viedma

University of Granada, Spain

University of Granada, Spain

Special Session on Machine Learning for Renewable Energy Applications

Organizers

Sancho Salcedo Sanz

Universidad de Alcalá, Spain

Pedro Antonio Gutiérrez

University of Cordoba, Spain

Special Session on Evolutionary Computing Methods for Data Mining: Theory and Applications

Organizers

Eneko Osaba

TECNALIA Research and Innovaton, Spain

Javier Del Ser

University of the Basque Country, Spain

Sancho Salcedo-Sanz

University of Alcalá, Spain

Antonio D. Masegosa

University of Deusto, Spain

Special Session on Data Selection in Machine Learning

Organizers

Antonio J. Tallón-Ballesteros

University of Seville, Spain

Ireneusz Czarnowski

Gdynia Maritime University, Poland

Simon James Fong

University of Macau, SAR China

Raymond Kwok-Kay Wong

University of New South Wales, Australia

Special Session on Feature Learning and Transformation in Deep Neural Networks

Organizers

Richard Hankins

University of Manchester, UK

Yao Peng

University of Manchester, UK

Qing Tian

Nanjing University of Information Science
and Technology, China

Hujun Yin

University of Manchester, UK

Special Session on New Models of Bio-inspired Computation for Massive Complex Environments

Organizers

Antonio González Pardo

Pedro Castillo

Antonio J. Fernández Leiva

Francisco J. Rodríguez

Universidad Autónoma de Madrid, Spain

Universidad de Granada, Spain

Universidad de Málaga, Spain

Universidad de Extremadura, Spain

Contents – Part I

Compound Local Binary Pattern and Enhanced Jaya Optimized Extreme Learning Machine for Digital Mammogram Classification	1
<i>Figlu Mohanty, Suwendu Rup, and Bodhisattva Dash</i>	
Support Vector Machine Based Method for High Impedance Fault Diagnosis in Power Distribution Networks	9
<i>K. Moloi, J. A. Jordaan, and Y. Hamam</i>	
Extended Min-Hash Focusing on Intersection Cardinality	17
<i>Hisashi Koga, Satoshi Suzuki, Taiki Itabashi, Gibran Fuentes Pineda, and Takahisa Toda</i>	
Deep-Learning-Based Classification of Rat OCT Images After Intravitreal Injection of ET-1 for Glaucoma Understanding	27
<i>Félix Fuentes-Hurtado, Sandra Morales, Jose M. Mossi, Valery Naranjo, Vadim Fedulov, David Woldbye, Kristian Klemp, Marie Torm, and Michael Larsen</i>	
Finding the Importance of Facial Features in Social Trait Perception	35
<i>Félix Fuentes-Hurtado, Jose Antonio Diego-Mas, Valery Naranjo, and Mariano Alcañiz</i>	
Effective Centralized Trust Management Model for Internet of Things	46
<i>Hela Maddar, Wafa Kammoun, and Habib Youssef</i>	
Knowledge-Based Solution Construction for Evolutionary Minimization of Systemic Risk	58
<i>Krzysztof Michalak</i>	
Handwritten Character Recognition Using Active Semi-supervised Learning	69
<i>Papangkorn Inkeaw, Jakramate Bootkrajang, Teresa Gonçalves, and Jeerayut Chaijaruwanich</i>	
Differential Evolution for Association Rule Mining Using Categorical and Numerical Attributes	79
<i>Iztok Fister Jr., Andres Iglesias, Akemi Galvez, Javier Del Ser, Eneko Osaba, and Iztok Fister</i>	
Predicting Wind Energy Generation with Recurrent Neural Networks	89
<i>Jaume Manero, Javier Béjar, and Ulises Cortés</i>	

Improved Architectural Redesign of MTree Clusterer in the Context of Image Segmentation	99
<i>Marius Andrei Ciurez and Marian Cristian Mihaescu</i>	
Exploring Online Novelty Detection Using First Story Detection Models	107
<i>Fei Wang, Robert J. Ross, and John D. Kelleher</i>	
A Fast Metropolis-Hastings Method for Generating Random Correlation Matrices	117
<i>Irene Córdoba, Gherardo Varando, Concha Bielza, and Pedro Larrañaga</i>	
Novel and Classic Metaheuristics for Tuning a Recommender System for Predicting Student Performance in Online Campus	125
<i>Juan A. Gómez-Pulido, Enrique Cortés-Toro, Arturo Durán-Domínguez, Broderick Crawford, and Ricardo Soto</i>	
General Structure Preserving Network Embedding.	134
<i>Sinan Zhu and Caiyan Jia</i>	
Intelligent Rub-Impact Fault Diagnosis Based on Genetic Algorithm-Based IMF Selection in Ensemble Empirical Mode Decomposition and Diverse Features Models	147
<i>Manjurul Islam, Alexander Prosvirin, and Jong-Myon Kim</i>	
Anomaly Detection in Spatial Layer Models of Autonomous Agents	156
<i>Marie Kiermeier, Sebastian Feld, Thomy Phan, and Claudia Linnhoff-Popien</i>	
Deep Learning-Based Approach for the Semantic Segmentation of Bright Retinal Damage	164
<i>Cristiana Silva, Adrián Colomer, and Valery Naranjo</i>	
Comparison of Local Analysis Strategies for Exudate Detection in Fundus Images	174
<i>Joana Pereira, Adrián Colomer, and Valery Naranjo</i>	
MapReduce Model for Random Forest Algorithm: Experimental Studies	184
<i>Barbara Bobowska and Dariusz Jankowski</i>	
Specifics Analysis of Medical Communities in Social Network Services	195
<i>Artem Lobantsev, Aleksandra Vatian, Natalia Dobrenko, Andrei Stankevich, Anna Kaznacheeva, Vladimir Parfenov, Anatoly Shalyto, and Natalia Gusarova</i>	
PostProcessing in Constrained Role Mining	204
<i>Carlo Blundo, Stelvio Cimato, and Luisa Siniscalchi</i>	

Linguistic Features to Identify Extreme Opinions: An Empirical Study	215
<i>Sattam Almatarneh and Pablo Gamallo</i>	
Retinal Image Synthesis for Glaucoma Assessment Using DCGAN and VAE Models	224
<i>Andres Diaz-Pinto, Adrián Colomer, Valery Naranjo, Sandra Morales, Yanwu Xu, and Alejandro F. Frangi</i>	
Understanding Learner’s Drop-Out in MOOCs	233
<i>Alya Itani, Laurent Brisson, and Serge Garlatti</i>	
Categorical Big Data Processing	245
<i>Jaime Salvador-Meneses, Zoila Ruiz-Chavez, and Jose Garcia-Rodriguez</i>	
Spatial-Temporal K Nearest Neighbors Model on MapReduce for Traffic Flow Prediction	253
<i>Anton Agafonov and Alexander Yumaganov</i>	
Exploring the Perceived Usefulness and Attitude Towards Using Tesys e-Learning Platform	261
<i>Paul-Stefan Popescu, Costel Ionascu, and Marian Cristian Mihaescu</i>	
An ELM Based Regression Model for ECG Artifact Minimization from Single Channel EEG	269
<i>Chinmayee Dora and Pradyut Kumar Biswal</i>	
Suggesting Cooking Recipes Through Simulation and Bayesian Optimization	277
<i>Eduardo C. Garrido-Merchán and Alejandro Albarca-Molina</i>	
Assessment and Adaption of Pattern Discovery Approaches for Time Series Under the Requirement of Time Warping	285
<i>Fabian Kai-Dietrich Noering, Konstantin Jonas, and Frank Klawonn</i>	
Machine Learning Methods Based Preprocessing to Improve Categorical Data Classification	297
<i>Zoila Ruiz-Chavez, Jaime Salvador-Meneses, and Jose Garcia-Rodriguez</i>	
Crossover Operator Using Knowledge Transfer for the Firefighter Problem	305
<i>Krzysztof Michalak</i>	
Exploring Coclustering for Serendipity Improvement in Content-Based Recommendation	317
<i>Andrei Martins Silva, Fernando Henrique da Silva Costa, Alexandra Katiuska Ramos Diaz, and Sarajane Marques Peres</i>	

Weighted Voting and Meta-Learning for Combining Authorship Attribution Methods	328
<i>Smiljana Petrovic, Ivan Petrovic, Ileana Palesi, and Anthony Calise</i>	
On Application of Learning to Rank for Assets Management: Warehouses Ranking	336
<i>Worapol Alex Pongpech</i>	
Single-Class Bankruptcy Prediction Based on the Data from Annual Reports.	344
<i>Peter Drotár, Peter Gnip, Martin Zoričák, and Vladimír Gazda</i>	
Multi-dimensional Bayesian Network Classifier Trees	354
<i>Santiago Gil-Begue, Pedro Larrañaga, and Concha Bielza</i>	
Model Selection in Committees of Evolved Convolutional Neural Networks Using Genetic Algorithms	364
<i>Alejandro Baldominos, Yago Saez, and Pedro Isasi</i>	
Chatbot Theory: A Naïve and Elementary Theory for Dialogue Management	374
<i>Francisco S. Marcondes, José João Almeida, and Paulo Novaes</i>	
An Adaptive Anomaly Detection Algorithm for Periodic Data Streams	385
<i>Zirije Hasani, Boro Jakimovski, Goran Velinov, and Margita Kon-Popovska</i>	
Semantic WordRank: Generating Finer Single-Document Summarizations . . .	398
<i>Hao Zhang and Jie Wang</i>	
Exploratory Study of the Effects of Cardiac Murmurs on Electrocardiographic-Signal-Based Biometric Systems	410
<i>M. A. Becerra, C. Duque-Mejía, C. Zapata-Hernández, D. H. Peluffo-Ordóñez, L. Serna-Guarín, Edilson Delgado-Trejos, E. J. Revelo-Fuelagán, and X. P. Blanco Valencia</i>	
Improving the Decision Support in Diagnostic Systems Using Classifier Probability Calibration	419
<i>Xiaowei Kortum, Lorenz Grigull, Urs Muecke, Werner Lechner, and Frank Klawonn</i>	
Applying Tree Ensemble to Detect Anomalies in Real-World Water Composition Dataset	429
<i>Minh Nguyen and Doina Logofătu</i>	

A First Approach to Face Dimensionality Reduction Through Denoising Autoencoders	439
<i>Francisco J. Pulgar, Francisco Charte, Antonio J. Rivera, and María J. del Jesus</i>	
An Approximation to Deep Learning Touristic-Related Time Series Forecasting	448
<i>Daniel Trujillo Viedma, Antonio Jesús Rivera Rivas, Francisco Charte Ojeda, and María José del Jesus Díaz</i>	
CCTV Image Sequence Generation and Modeling Method for Video Anomaly Detection Using Generative Adversarial Network	457
<i>Wonsup Shin and Sung-Bae Cho</i>	
Learning Optimal Q-Function Using Deep Boltzmann Machine for Reliable Trading of Cryptocurrency	468
<i>Seok-Jun Bu and Sung-Bae Cho</i>	
Predicting the Household Power Consumption Using CNN-LSTM Hybrid Networks	481
<i>Tae-Young Kim and Sung-Bae Cho</i>	
Thermal Prediction for Immersion Cooling Data Centers Based on Recurrent Neural Networks	491
<i>Jaime Pérez, Sergio Pérez, José M. Moya, and Patricia Arroba</i>	
Detecting Intrusive Malware with a Hybrid Generative Deep Learning Model	499
<i>Jin-Young Kim and Sung-Bae Cho</i>	
Inferring Temporal Structure from Predictability in Bumblebee Learning Flight.	508
<i>Stefan Meyer, Olivier J. N. Bertrand, Martin Egelhaaf, and Barbara Hammer</i>	
Intelligent Wristbands for the Automatic Detection of Emotional States for the Elderly	520
<i>Jaime A. Rincon, Angelo Costa, Paulo Novais, Vicente Julian, and Carlos Carrascosa</i>	
Applying Cost-Sensitive Classifiers with Reinforcement Learning to IDS. . . .	531
<i>Roberto Blanco, Juan J. Cilla, Samira Briongos, Pedro Malagón, and José M. Moya</i>	
ATM Fraud Detection Using Outlier Detection	539
<i>Roongtawan Laimek, Natsuda Kaothanthong, and Thepchai Supnithi</i>	

Machine Learning for Drugs Prescription	548
<i>P. Silva, A. Rivolli, P. Rocha, F. Correia, and C. Soares</i>	
Intrusion Detection Using Transfer Learning in Machine Learning Classifiers Between Non-cloud and Cloud Datasets	556
<i>Roja Ahmadi, Robert D. Macredie, and Allan Tucker</i>	
Concatenating or Averaging? Hybrid Sentences Representations for Sentiment Analysis.	567
<i>Carlotta Orsenigo, Carlo Vercellis, and Claudia Volpetti</i>	
ALoT: A Time-Series Similarity Measure Based on Alignment of Textures. . .	576
<i>Hasan Oğul</i>	
Intelligent Agents in a Blockchain-Based Electronic Voting System	586
<i>Michał Pawlak, Aneta Poniszewska-Marañda, and Jakub Guziur</i>	
Signal Reconstruction Using Evolvable Recurrent Neural Networks.	594
<i>Nadia Masood Khan and Gul Muhammad Khan</i>	
A Cluster-Based Prototype Reduction for Online Classification.	603
<i>Kemilly Dearo Garcia, André C. P. L. F. de Carvalho, and João Mendes-Moreira</i>	
Reusable Big Data System for Industrial Data Mining - A Case Study on Anomaly Detection in Chemical Plants	611
<i>Reuben Borrison, Benjamin Klöpper, Moncef Chioua, Marcel Dix, and Barbara Sprick</i>	
Unsupervised Domain Adaptation for Human Activity Recognition.	623
<i>Paulo Barbosa, Kemilly Dearo Garcia, João Mendes-Moreira, and André C. P. L. F. de Carvalho</i>	
Data Set Partitioning in Evolutionary Instance Selection.	631
<i>Mirosław Kordos, Łukasz Czepielik, and Marcin Blachnik</i>	
Identification of Individual Glandular Regions Using LCWT and Machine Learning Techniques	642
<i>José Gabriel García, Adrián Colomer, Valery Naranjo, Francisco Peñaranda, and M. Á. Sales</i>	
Improving Time Series Prediction via Modification of Dynamic Weighted Majority in Ensemble Learning.	651
<i>Marek Łóderer, Peter Pavlík, and Viera Rozinajová</i>	

Generalized Low-Computational Cost Laplacian Eigenmaps	661
<i>J. A. Salazar-Castro, D. F. Peña, C. Basante, C. Ortega, L. Cruz-Cruz, J. Revelo-Fuelagán, X. P. Blanco-Valencia, G. Castellanos-Domínguez, and D. H. Peluffo-Ordóñez</i>	
Optimally Selected Minimal Learning Machine.	670
<i>Átilla N. Maia, Madson L. D. Dias, João P. P. Gomes, and Ajalmar R. da Rocha Neto</i>	
Neural Collaborative Filtering: Hybrid Recommendation Algorithm with Content Information and Implicit Feedback	679
<i>Li Ji, Guangyan Lin, and Huobin Tan</i>	
Overlap-Based Undersampling for Improving Imbalanced Data Classification	689
<i>Pattaramon Vuttipittayamongkol, Eyad Elyan, Andrei Petrovski, and Chrisina Jayne</i>	
Predicting Online Review Scores Across Reviewer Categories	698
<i>Michela Fazzolari, Marinella Petrocchi, and Angelo Spognardi</i>	
Improving SeNA-CNN by Automating Task Recognition.	711
<i>Abel Zacarias and Luís A. Alexandre</i>	
Communication Skills Personal Trainer Based on Viola-Jones Object Detection Algorithm	722
<i>Álvaro Pardo Pertierra, Ana B. Gil González, Javier Teira Lafuente, and Ana de Luis Reboredo</i>	
Optimizing Meta-heuristics for the Time-Dependent TSP Applied to Air Travels.	730
<i>Diogo Duque, José Aleixo Cruz, Henrique Lopes Cardoso, and Eugénio Oliveira</i>	
Compositional Stochastic Average Gradient for Machine Learning and Related Applications	740
<i>Tsung-Yu Hsieh, Yasser EL-Manzalawy, Yiwei Sun, and Vasant Honavar</i>	
Instance-Based Stacked Generalization for Transfer Learning	753
<i>Yassine Baghoussi and João Mendes-Moreira</i>	
Combined Classifier Based on Quantized Subspace Class Distribution.	761
<i>Paweł Ksieniewicz</i>	
A Framework for Form Applications that Use Machine Learning	773
<i>Guilherme Aguiar and Patrícia Vilain</i>	

CGLAD: Using GLAD in Crowdsourced Large Datasets	783
<i>Enrique G. Rodrigo, Juan A. Aledo, and Jose A. Gamez</i>	
Extending Independent Component Analysis for Event Detection on Online Social Media	792
<i>Hoang Long Nguyen and Jason J. Jung</i>	
Framework for the Training of Deep Neural Networks in TensorFlow Using Metaheuristics	801
<i>Julián Muñoz-Ordóñez, Carlos Cobos, Martha Mendoza, Enrique Herrera-Viedma, Francisco Herrera, and Siham Tabik</i>	
New Fuzzy Singleton Distance Measurement by Convolution	812
<i>Rodrigo Naranjo and Matilde Santos</i>	
Peak Alpha Based Neurofeedback Training Within Survival Shooter Game. . .	821
<i>Radu AbuRas, Gabriel Turcu, Ilkka Kosunen, and Marian Cristian Mihaescu</i>	
Taking e-Assessment Quizzes - A Case Study with an SVD Based Recommender System	829
<i>Oana Maria Teodorescu, Paul Stefan Popescu, and Marian Cristian Mihaescu</i>	
Towards Complex Features: Competitive Receptive Fields in Unsupervised Deep Networks	838
<i>Richard Hankins, Yao Peng, and Hujun Yin</i>	
Deep Neural Networks with Markov Random Field Models for Image Classification	849
<i>Yao Peng, Menyu Liu, and Hujun Yin</i>	
Author Index	861

Contents – Part II

Workshop on RiskTrack: Analyzing Radicalization in Online Social Networks

Ontology Uses for Radicalisation Detection on Social Networks	3
<i>Mahmoud Barhamgi, Raúl Lara-Cabrera, Djamal Benslimane, and David Camacho</i>	
Measuring Extremism: Validating an Alt-Right Twitter Accounts Dataset. . . .	9
<i>Joshua Thorburn, Javier Torregrosa, and Ángel Panizo</i>	
RiskTrack: Assessing the Risk of Jihadi Radicalization on Twitter Using Linguistic Factors	15
<i>Javier Torregrosa and Ángel Panizo</i>	
On Detecting Online Radicalization Using Natural Language Processing	21
<i>Mourad Oussalah, F. Faroughian, and Panos Kostakos</i>	

Workshop on Methods for Interpretation of Industrial Event Logs

Automated, Nomenclature Based Data Point Selection for Industrial Event Log Generation	31
<i>Wolfgang Koehler and Yanguo Jing</i>	
Monitoring Equipment Operation Through Model and Event Discovery.	41
<i>Sławomir Nowaczyk, Anita Sant'Anna, Ece Calikus, and Yuantao Fan</i>	
Creation of an Event Log from a Low-Level Machinery Monitoring System for Process Mining Purposes	54
<i>Edyta Brzychczy and Agnieszka Trzcionkowska</i>	
Causal Rules Detection in Streams of Unlabeled, Mixed Type Values with Finit Domains	64
<i>Szymon Bobek and Kamil Jurek</i>	
On the Opportunities for Using Mobile Devices for Activity Monitoring and Understanding in Mining Applications.	75
<i>Grzegorz J. Nalepa, Edyta Brzychczy, and Szymon Bobek</i>	
A Taxonomy for Combining Activity Recognition and Process Discovery in Industrial Environments	84
<i>Felix Mannhardt, Riccardo Bovo, Manuel Fradinho Oliveira, and Simon Julier</i>	

Mining Attributed Interaction Networks on Industrial Event Logs 94
Martin Atzmueller and Benjamin Kloepper

Special Session on Intelligent Techniques for the Analysis of Scientific Articles and Patents

Evidence-Based Systematic Literature Reviews in the Cloud 105
Iván Ruiz-Rube, Tatiana Person, José Miguel Mota, Juan Manuel Dodero, and Ángel Rafael González-Toro

Bibliometric Network Analysis to Identify the Intellectual Structure and Evolution of the Big Data Research Field 113
J. R. López-Robles, J. R. Otegi-Olaso, I. Porto Gomez, N. K. Gamboa-Rosales, H. Gamboa-Rosales, and H. Robles-Berumen

A New Approach for Implicit Citation Extraction 121
Chaker Jebari, Manuel Jesús Cobo, and Enrique Herrera-Viedma

Constructing Bibliometric Networks from Spanish Doctoral Theses 130
V. Duarte-Martínez, A. G. López-Herrera, and M. J. Cobo

Measuring the Impact of the International Relationships of the Andalusian Universities Using Dimensions Database 138
P. García-Sánchez and M. J. Cobo

Special Session on Machine Learning for Renewable Energy Applications

Gaussian Process Kernels for Support Vector Regression in Wind Energy Prediction 147
Víctor de la Pompa, Alejandro Catalina, and José R. Dorronsoro

Studying the Effect of Measured Solar Power on Evolutionary Multi-objective Prediction Intervals 155
R. Martín-Vázquez, J. Huertas-Tato, R. Aler, and I. M. Galván

Merging ELMs with Satellite Data and Clear-Sky Models for Effective Solar Radiation Estimation 163
L. Cornejo-Bueno, C. Casanova-Mateo, J. Sanz-Justo, and S. Salcedo-Sanz

Distribution-Based Discretisation and Ordinal Classification Applied to Wave Height Prediction 171
David Guijo-Rubio, Antonio M. Durán-Rosal, Antonio M. Gómez-Orellana, Pedro A. Gutiérrez, and César Hervás-Martínez

Wind Power Ramp Events Ordinal Prediction Using Minimum Complexity Echo State Networks	180
<i>M. Dorado-Moreno, P. A. Gutiérrez, S. Salcedo-Sanz, L. Prieto, and C. Hervás-Martínez</i>	

**Special Session on Evolutionary Computing Methods for Data Mining:
Theory and Applications**

GELAB - A Matlab Toolbox for Grammatical Evolution	191
<i>Muhammad Adil Raja and Conor Ryan</i>	
Bat Algorithm Swarm Robotics Approach for Dual Non-cooperative Search with Self-centered Mode	201
<i>Patricia Suárez, Akemi Gálvez, Iztok Fister, Iztok Fister Jr., Eneko Osaba, Javier Del Ser, and Andrés Iglesias</i>	
Hospital Admission and Risk Assessment Associated to Exposure of Fungal Bioaerosols at a Municipal Landfill Using Statistical Models	210
<i>W. B. Morgado Gamero, Dayana Agudelo-Castañeda, Margarita Castillo Ramirez, Martha Mendoza Hernandez, Heidy Posso Mendoza, Alexander Parody, and Amelec Vilorio</i>	

Special Session on Data Selection in Machine Learning

Novelty Detection Using Elliptical Fuzzy Clustering in a Reproducing Kernel Hilbert Space	221
<i>Maria Kazachuk, Mikhail Petrovskiy, Igor Mashechkin, and Oleg Gorohov</i>	
Semi-supervised Learning to Reduce Data Needs of Indoor Positioning Models	233
<i>Maciej Grzenda</i>	
Different Approaches of Data and Attribute Selection on Headache Disorder	241
<i>Svetlana Simić, Zorana Banković, Dragan Simić, and Svetislav D. Simić</i>	
A Study of Fuzzy Clustering to Archetypal Analysis	250
<i>Gonçalo Sousa Mendes and Susana Nascimento</i>	
Bare Bones Fireworks Algorithm for Medical Image Compression	262
<i>Eva Tuba, Raka Jovanovic, Marko Beko, Antonio J. Tallón-Ballesteros, and Milan Tuba</i>	
EMnGA: Entropy Measure and Genetic Algorithms Based Method for Heterogeneous Ensembles Selection	271
<i>Souad Taleb Zouggar and Abdelkader Adla</i>	

Feature Selection and Interpretable Feature Transformation: A Preliminary Study on Feature Engineering for Classification Algorithms	280
<i>Antonio J. Tallón-Ballesteros, Milan Tuba, Bing Xue, and Takako Hashimoto</i>	
Data Pre-processing to Apply Multiple Imputation Techniques: A Case Study on Real-World Census Data.	288
<i>Zoila Ruiz-Chavez, Jaime Salvador-Meneses, Jose Garcia-Rodriguez, and Antonio J. Tallón-Ballesteros</i>	
Imbalanced Data Classification Based on Feature Selection Techniques	296
<i>Paweł Ksieniewicz and Michał Woźniak</i>	
Special Session on New Models of Bio-inspired Computation for Massive Complex Environments	
Design of Japanese Tree Frog Algorithm for Community Finding Problems	307
<i>Antonio Gonzalez-Pardo and David Camacho</i>	
An Artificial Bee Colony Algorithm for Optimizing the Design of Sensor Networks.	316
<i>Ángel Panizo, Gema Bello-Orgaz, Mercedes Carnero, José Hernández, Mabel Sánchez, and David Camacho</i>	
Community Detection in Weighted Directed Networks Using Nature-Inspired Heuristics	325
<i>Eneko Osaba, Javier Del Ser, David Camacho, Akemi Galvez, Andres Iglesias, Iztok Fister Jr., and Iztok Fister</i>	
A Metaheuristic Approach for the α -separator Problem	336
<i>Sergio Pérez-Peló, Jesús Sánchez-Oro, and Abraham Duarte</i>	
Author Index	345