

2015 IEEE Symposium Series on Computational Intelligence

SSCI 2015

Table of Contents

Welcome Message from the General Chair of IEEE SSCI'15.....	xxviii
Welcome Message from the President of the IEEE Computational Intelligence Society.....	xxx
Organizing Committee.....	xxxi
Technical Program Committee.....	li
Plenary Talks.....	lv
2015 Frank Rosenblatt Award.....	lxxiv

CICA 2015 Session: 1: Fuzzy System Identification and Control

Self-Tuning Robust Stability Fuzzy Digital Controller	1
<i>Edson B.M. Costa and Ginalber L.O. Serra</i>	
Fuzzy Logic Control and Fault Detection in Centralized Chilled Water System	8
<i>Noor Asyikin Sulaiman, Mohd Fauzi Othman, and Hayati Abdullah</i>	
Novel Data Knowledge Representation with TSK-Type Preprocessed Collaborative Fuzzy Rule Based System	14
<i>Mukesh Prasad, Meng Joo Er, Chin Teng Lin, Om Kumar Prasad, Manoranjan Mohanty, and Jagendra Singh</i>	
Interval Type-2 Recursive Fuzzy C-Means Clustering Algorithm in the TS Fuzzy Model Identification	22
<i>Tanmoy Dam and Alok Kanti Deb</i>	

CIVTS 2015 Session: 1: Intelligent Transportation Systems

Efficacy of Interventions and Incentives to Achieve Speed Compliance in the Informal Public Transport Sector	30
<i>N.A. Ebot Eno Akpa, M.J. Booysen, and M. Sinclair</i>	
Cellular Network Based Real-Time Urban Road Traffic State Estimation Framework Using Neural Network Model Estimation	38
<i>Ayalew Belay Habtie, Ajith Abraham, and Dida Midekso</i>	
Multi-UAV Task Allocation: A Team-Based Approach	45
<i>T.K. Venugopalan, K. Subramanian, and S. Sundaram</i>	
Aircraft 4D Trajectories Planning Under Uncertainties	51
<i>Supatcha Chaimatanan, Daniel Delahaye, and Marcel Mongeau</i>	

CICS 2015 Session: 1

P2V: Effective Website Fingerprinting Using Vector Space Representations	59
<i>Khaled Alnaami, Gbadebo Ayoade, Asim Siddiqui, Nicholas Ruozzi, Latifur Khan, and Bhavani Thuraisingham</i>	
Quantum Based Neural Network Classifier and Its Application for Firewall to Detect Malicious Web Request	67
<i>Om Patel, Aruna Tiwari, Vikram Patel, and Ojas Gupta</i>	
Conversion of Decision Tree Into Deterministic Finite Automaton for High Accuracy Online SYN Flood Detection	75
<i>Marcin Luckner</i>	
Potentials of Using One-Class SVM for Detecting Protocol-Specific Anomalies in Industrial Networks	83
<i>Franka Schuster, Andreas Paul, René Rietz, and Hartmut Koenig</i>	

CCMB 2015 Session: 1

Artificial Mental Imagery in Cognitive Robots Interaction	91
<i>Alessandro Di Nuovo and Angelo Cangelosi</i>	
Robustness and Real-Time Performance of an Insect Inspired Target Tracking Algorithm Under Natural Conditions	97
<i>Zahra Bagheri, Steven D. Wiederman, Ben Cazzolato, Steven Grainger, and David C. O'Carroll</i>	
Combining CCA and CFP for Enhancing the Performance in the Hybrid BCI System	103
<i>Li-Wei Ko and S. Sai Kalyan Ranga</i>	
Empathic Interaction Using the Computational Emotion Model	109
<i>Zeeshan Rasool, Naoki Masuyama, Md. Nazrul Islam, and Chu Kiong Loo</i>	

RiiSS 2015 Session: 1: Informationally Structured Space

Development of Food Texture Sensor Using Two Magnetic Sensing Elements	117
<i>Hiroyuki Nakamoto, Daisuke Nishikubo, Futoshi Kobayashi, and Fumio Kojima</i>	
Invariant Perception for Grasping an Unknown Object Using 3D Depth Sensor	122
<i>Hiroyuki Masuta, Hun-Ok Lim, Tatsuo Motoyoshi, Ken'ichi Koyanagi, and Toru Oshima</i>	
Fuzzy Spiking Neural Network for Abnormality Detection in Cognitive Robot Life Supporting System	130
<i>Dalai Tang, Tiong Yew Tang, János Botzheim, Naoyuki Kubota, and Toru Yamaguchi</i>	
Behavior Pattern Extraction Based on Growing Neural Networks for Informationally Structured Space	138
<i>Takenori Obo, Habeebah Kakudi, Chu Kiong Loo, and Naoyuki Kubota</i>	

CIDM 2015 Session: 1: Classification I

Study on Index Model of Tropical Cyclone Intensity Change Based on Projection Pursuit and Evolution Strategy	145
<i>Huantong Geng, Jiaqing Sun, Wei Zhang, and Chao Huang</i>	
Classification Uncertainty of Multiple Imputed Data	151
<i>Tuomo Alasalmi, Heli Koskimäki, Jaakko Suutala, and Juha Rönning</i>	
Calibrating Probability with Undersampling for Unbalanced Classification	159
<i>Andrea Dal Pozzolo, Olivier Caelen, Reid A. Johnson, and Gianluca Bontempi</i>	
Multi-Strategy Multimodal Genetic Algorithm for Designing Fuzzy Rule Based Classifiers	167
<i>Vladimir Stanovov, Evgenii Sopov, and Eugene Semenkin</i>	
Classification Using Probabilistic Random Forest	174
<i>Rajhans Gondane and V. Susheela Devi</i>	

CIBIM 2015 Session: 1: Face And Skin Biometrics

Ensemble Methods for Robust 3D Face Recognition Using Commodity Depth Sensors	180
<i>Florin Schimbinschi, Lambert Schomaker, and Marco Wiering</i>	
Deep Convolutional Neural Networks and Support Vector Machines for Gender Recognition	188
<i>Jos Van De Wolfshaar, Mahir F. Karaaba, and Marco A. Wiering</i>	
Video Face Recognition From A Single Still Image Using an Adaptive Appearance Model Tracker	196
<i>M. Ali Akber Dewan, E. Granger, R. Sabourin, G.L. Marcialis, and F. Roli</i>	

Robust Face Recognition by Computing Distances From Multiple Histograms of Oriented Gradients	203
<i>Mahir Karaaba, Olarik Surinta, Lambert Schomaker, and Marco A. Wiering</i>	
Identifying Critical Factors Influencing Quality of Blood Vessel Information in JPEG Compressed Skin Images	210
<i>Xiaojie Li and Adams Wai Kin Kong</i>	

SIS 2015 Session: 1: Particle Swarm Optimization I

An Improved Method for Comprehensive Learning Particle Swarm Optimization	218
<i>Zi-Jia Wang, Zhi-Hui Zhan, and Jun Zhang</i>	
A Subspace-Based Method for PSO Initialization	226
<i>Elre Van Zyl and A.P. Engelbrecht</i>	
Particle Swarm Optimization with Minimum Spanning Tree Topology for Multimodal Optimization	234
<i>Yu-Hui Zhang, Ying Lin, Yue-Jiao Gong, and Jun Zhang</i>	
The Effect of Probability Distributions on the Performance of Quantum Particle Swarm Optimization for Solving Dynamic Optimization Problems	242
<i>Kyle Harrison, Beatrice M. Ombuki-Berman, and Andries P. Engelbrecht</i>	
Frequency Distribution of Candidate Solutions in Angle Modulated Particle Swarms	251
<i>Barend J. Leonard and Andries P. Engelbrecht</i>	
Transistor Sizing Using Particle Swarm Optimisation	259
<i>Lyndon White, Lyndon White, Ben Deeks, and Farid Bousaid</i>	

RiiSS 2015 Session: 2: Intelligent Robotics

Evolving Snake Robot Controllers Using Artificial Neural Networks as an Alternative to a Physics-Based Simulator	267
<i>Grant W. Woodford, Mathys C. Du Plessis, and Christiaan J. Pretorius</i>	
Genetic Bayesian ARAM for Simultaneous Localization and Hybrid Map Building	275
<i>Wei Hong Chin, Chu Kiong Loo, Naoyuki Kubota, and Yuichiro Toda</i>	
Pareto-Dominance Based MOGP for Evolving Soccer Agents	280
<i>Christopher Lazarus</i>	
Interconnection Structure Optimization for Neural Oscillator Based Biped Robot Locomotion	288
<i>Azhar Aulia Saputra, Indra Adji Sulistijono, János Botzheim, and Naoyuki Kubota</i>	

Autonomous Viewpoint Selection of Robots Based on Aesthetic Composition Evaluation of a Photo	295
<i>Kai Lan and Kosuke Sekiyama</i>	

CIDM 2015 Session: 2a: Special Session: Mining of Human Centered Multimodal Data

Avoiding Bias in Classification Accuracy - A Case Study for Activity Recognition	301
<i>Heli Koskimäki</i>	
Fusion Mappings for Multimodal Affect Recognition	307
<i>Markus Kächele, Martin Schels, Patrick Thiam, and Friedhelm Schwenker</i>	
Data Mining in MEDLINE for Disease-Disease Associations Via Second Order Co-Occurrence	314
<i>Modest Von Korff, Bernard Deffarges, and Thomas Sander</i>	

CIDM 2015 Session: 2b: Ensemble Methods

Evaluation of Fusion Methods for Gamma-Divergence-Based Neural Network Ensembles	322
<i>Uwe Knauer, Andreas Backhaus, and Udo Seiffert</i>	
Improving Classification Performance by Merging Distinct Feature Sets of Similar Quality Generated by Multiple Initializations of mRMR	328
<i>Thomas Bottesch and Guenther Palm</i>	
Naïve Bayes Classification Ensembles to Support Modeling Decisions in Data Stream Mining	335
<i>Patricia E.N. Lutu</i>	

CIBIM 2015 Session: 2: Special Session: Machine Learning Techniques for Fingerprint Biometrics

Fusion of Palmprint and Finger-Knuckle-Print for Human Personal Recognition	341
<i>Aditya Nigam, Parvez Khan, and Phalguni Gupta</i>	
Distortion Analysis on Binary Representation of Minutiae Based Fingerprint Matching for Match-on-Card	349
<i>Cynthia Sthembile Mlambo and Meshack Bafana Shabalala</i>	
Automatic Classification of Acquisition Problems Affecting Fingerprint Images in Automated Border Controls	354
<i>Ruggero Donida Labati, Angelo Genovese, Enrique Munoz Ballester, Vincenzo Piuri, Fabio Scotti, and Gianluca Sforza</i>	
A Preliminary Study on Identifying Fabrication Material From Fake Fingerprint Images	362
<i>Ajita Rattani, Zahid Akhtar, and Gianluca Foresti</i>	

CICA 2015 Session: 2: System Identification and Learning with Applications

Interpretation and Analysis of Input Selection Approaches in Distance Space	367
<i>Tim Oliver Heinz and Oliver Nelles</i>	
Extended Deterministic Local Search Algorithm for Maximin Latin Hypercube Designs	375
<i>Tobias Ebert, Torsten Fischer, Julian Belz, Tim Oliver Heinz, Geritt Kampmann, and Oliver Nelles</i>	
Enhanced Anomaly Detection Via PLS Regression Models and Information Entropy Theory	383
<i>Harrou Fouzi and Ying Sun</i>	
Building Markov Decision Process Based Models of Remote Experimental Setups for State Evaluation	389
<i>Ananda Maiti, Alexander A. Kist, and Andrew D. Maxwell</i>	
GLRT Based Anomaly Detection for Sensor Network Monitoring	398
<i>Harrou Fouzi and Ying Sun</i>	
Multi-Document Extractive Summarization Using Window-Based Sentence Representation	404
<i>Yong Zhang, Meng Joo Er, and Rui Zhao</i>	

CIVTS 2015 Session: 2: Driver Behavior Detection and Vehicle Vision Systems

Real Time Drowsiness Detection Based on Lateral Distance Using Wavelet Transform and Neural Network	411
<i>Jiaqi Ma, Yi Lu Murphey, and Hong Zhao</i>	
A Comparison of Low-Cost Monocular Vision Techniques for Pothole Distance Estimation	419
<i>S. Nienaber, R.S. Kroon, and M.J. Booyesen</i>	
Performance Comparison of Dynamic Time Warping (DTW) and a Maximum Likelihood (ML) Classifier in Measuring Driver Behavior with Smartphones	427
<i>J. Engelbrecht, M.J. (Thinus) Booyesen, G.-J. van Rooyen, and F.J. Bruwer</i>	
Comparison of GPS and MEMS Support for Smartphone-Based Driver Behavior Monitoring	434
<i>Frederick J. Bruwer and Marthinus J. Booyesen</i>	
A Three-Step Vehicle Detection Framework for Range Estimation Using a Single Camera	442
<i>Ritesh Kanjee, Asheer K. Bachoo, and Johnson Carroll</i>	

CICS 2015 Session: 2

Information Warfare: Fighting Back Through the Matrix	449
<i>Ramzi A. Haraty, Sanaa Kaddoura, and Ahmed Zekri</i>	
Security Analysis of Smart Grid Cyber Physical Infrastructures Using Game Theoretic Simulation	455
<i>Robert K. Abercrombie and Frederick T. Sheldon</i>	
An Adaptive Approach Towards the Selection of Multi-Factor Authentication	463
<i>Abhijit Kumar Nag, Arunava Roy, and Dipankar Dasgupta</i>	
Histogram-Based Fast Text Paragraph Image Detection	473
<i>Devadeep Shyam, Yan Wang, and Alex C. Kot</i>	
Authenticating Super-Resolved Image and Enhancing Its PSNR Using Watermark	481
<i>Mehul S. Raval, Vaibhav B. Joshi, Dhruv Gupta, and Shubhalaxmi J. Kher</i>	

CIBD 2015 Session: 1

Attribute Selection Via Multi-Objective Evolutionary Computation Applied to Multi-Skill Contact Center Data Classification	488
<i>Fernando Jiménez, Enrico Marzano, Gracia Sánchez, Guido Sciavicco, and Nicola Vitacolonna</i>	
Big Data and Machine Learning for Applied Weather Forecasts: Forecasting Solar Power for Utility Operations	496
<i>Sue Ellen Haupt and Branko Kosovic</i>	
Using the Simulation of Ecological Systems to Explain the Wheel of Retailing	502
<i>Roderick Duncan, Terry Bossomaier, Steven D'Alessandro, Craig Johnson, and Kathryn French</i>	
Distributed, MapReduce-Based Nearest Neighbor and E-Ball Kernel k-Means	509
<i>Nikolaos Tsapanos, Anastasios Tefas, Nikos Nikolaidis, and Ioannis Pitas</i>	
Hierarchical Mahalanobis Distance Clustering Based Technique for Prognostics in Applications Generating Big Data	516
<i>R. Krishnan and S. Jagannathan</i>	
Fixed-Size Least Squares Support Vector Machines: Scala Implementation for Large Scale Classification	522
<i>Mandar Chandorkar, Raghvendra Mall, Oliver Lauwers, Johan A.K. Suykens, and Bart De Moor</i>	
Big Data Analytics of Financial Strategies	529
<i>Kabaji Egara and Yonghong Peng</i>	

Integrated Analysis of Gene Expression Data for Colon Cancer Biomarker Discovery	536
<i>Aamir Hassan, Masood U.H. Zaka, Demetres Kouvatso, and Yonghong Peng</i>	

ADPRL 2015 Session: 1

A Pdf-Free Change Detection Test for Data Streams Monitoring	542
<i>Li Bu, Dongbin Zhao, and Cesare Alippi</i>	
Learning an Optimal Control Policy for a Markov Decision Process Under Linear Temporal Logic Specifications	548
<i>Masaki Hiromoto and Toshimitsu Ushio</i>	
A Policy Gradient with Parameter-Based Exploration Approach for Zone-Heating	556
<i>Kevin Van Vaerenbergh, Yann-Michaël De Hauwere, Bruno Depraetere, Kristof Van Moffaert, and Ann Nowé</i>	
Temporal Difference Learning for the Game Tic-Tac-Toe 3D: Applying Structure to Neural Networks	564
<i>Michiel Van De Steeg, Madalina M. Drugan, and Marco Wiering</i>	
Bayesian Credible Intervals for Online and Active Learning of Classification Trees	571
<i>Timothé Collet and Olivier Pietquin</i>	
Bayesian Reinforcement Learning in Markovian and non-Markovian Tasks	579
<i>Adnane Ez-Zizi, Simon Farrell, and David Leslie</i>	
Distributed Adaptive Optimal Regulation of Uncertain Large-Scale Linear Networked Control Systems Using Q-Learning	587
<i>Vignesh Narayanan and S. Jagannathan</i>	
Correlated Gaussian Multi-Objective Multi-Armed Bandit Across Arms Algorithm	593
<i>Saba Q. Yahyaa and Madalina M. Drugan</i>	

IntECS 2015 Session: 1

Detecting Contaminants in Smart Buildings by Exploiting Temporal and Spatial Correlation	601
<i>G. Boracchi, M. Michaelides, and M. Roveri</i>	
Controlled-Accuracy Approximation of Nonlinear Functions for Soft Computing Applications: A High Performance Co-processor for Intelligent Embedded Systems	609
<i>Inés Del Campo, Javier Echanobe, Estibaliz Asua, and Raul Finker</i>	

Semantic Mediation in Smart Water Networks	617
<i>George M. Milis, Demetris G. Eliades, Christos G. Panayiotou, and Marios M. Polycarpou</i>	
Using Cultural Algorithms to Improve Wearable Device Gesture Recognition Performance	625
<i>Faisal Waris and Robert G. Reynolds</i>	
Optimal Defense and Control for Cyber-Physical Systems	634
<i>Haifeng Niu and S. Jagannathan</i>	
An Agent-Based Framework for Indoor Navigation in Blended Shopping	640
<i>Francesco Orcioli and Mimmo Parente</i>	

CIASG 2015 Session: 1: Forecasting, Prediction and Estimation

Short-Term Forecasting of Wind Power Generation Based on the Similar Day and Elman Neural Network	647
<i>Xiaoyu Zhang, Rui Wang, Tianjun Liao, Tao Zhang, and Yabin Zha</i>	
Prediction Interval Modeling Tuned by an Improved Teaching Learning Algorithm Applied to Load Forecasting in Microgrids	651
<i>Franka Veltman, Luis G. Marin, Doris Sáez, Leonel Guitierrez, and Alfredo Núñez</i>	
Electrical Energy Consumption Forecast Using External Facility Data	659
<i>Eugénia Vinagre, Luis Gomes, and Zita Vale</i>	
Electric Water Heater Energy Consumption Determination Using Outlet Temperature and Volumetric Estimation	665
<i>P.J.C. Nel, M.J. Booyesen, and B. Van Der Merwe</i>	
Frequency Prediction of Synchronous Generators in a Multi-Machine Power System with a Photovoltaic Plant Using a Cellular Computational Network	673
<i>Yawei Wei, Iroshani Jayawardene, Laboratory, and Ganesh Kumar Venayagamoorthy</i>	
Semantically-Enhanced Configurability in State Estimation Structures of Power Systems	679
<i>George M. Milis, Markos Asprou, Elias Kyriakides, Christos G. Panayiotou, and Marios M. Polycarpou</i>	
Detecting Wind Power Ramp with Random Vector Functional Link (RVFL) Network	687
<i>Ye Ren, Xueheng Qiu, P.N. Suganthan, and Gehan Amaratunga</i>	

CIFer 2015 Session: 1: Forecasting & Predictive Modeling

Maximum Entropy Production Principle for Stock Returns	695
<i>Paweł Fiedor</i>	
Predicting Stock Price Movements Based on Different Categories of News Articles	703
<i>Yauheniya Shynkevich, T.M. McGinnity, Sonya Coleman, and Ammar Belatreche</i>	
Predicting Rainfall in the Context of Rainfall Derivatives Using Genetic Programming	711
<i>Sam Cramer, Michael Kampouridis, Alex A. Freitas, and Antonis Alexandridis</i>	
Predicting Credit Risk in Peer-to-Peer Lending: A Neural Network Approach	719
<i>Ajay Byanjankar, Markku Heikkilä, and Jozsef Mezei</i>	
Forecasting Financial Volatility Using Nested Monte Carlo Expression Discovery	726
<i>Tristan Cazenave and Sana Ben Hamida</i>	
High-Frequency Equity Index Futures Trading Using Recurrent Reinforcement Learning with Candlesticks	734
<i>Patrick Gabrielsson and Ulf Johansson</i>	
The Predictive Power of Volatility Pattern Recognition in Stock Market	742
<i>Yue Li and Khaldoun M. Khashanah</i>	

CIDM 2015 Session: 3: Clustering

An Alternating Optimization Approach Based on Hierarchical Adaptations of DBSCAN	749
<i>Alexander Dockhorn, Christian Braune, and Rudolf Kruse</i>	
Scalable Hierarchical Clustering: Twister Tries with a Posteriori Trie Elimination	756
<i>Michael Cochez and Ferrante Neri</i>	
Overlapping Community Detection in Social Network Using Disjoint Community Detection	764
<i>Jaswant Meena and V. Susheela Devi</i>	
An Enhanced Quantum-Inspired Evolutionary Fuzzy Clustering	772
<i>Neha Bharill, Om Prakash Patel, and Aruna Tiwari</i>	
Maximum Clusterability Divisive Clustering	780
<i>David Hofmeyr and Nicos Pavlidis</i>	
Collaborative Clustering: How to Select the Optimal Collaborators?	787
<i>Parisa Rastin, Guénaél Cabanes, Nistor Grozavu, and Younes Bennani</i>	

A Comparative Study of Markov Network Structure Learning Methods Over Data Streams	795
<i>Swarup Chandra, Vishal Karande, and Latifur Khan</i>	

CICARE 2015 Session: 1: Applications of Computational Intelligence and Informatics in Disease Diagnosis and Rehabilitation

Feature Reduction for Dimensional Emotion Recognition in Human-Robot Interaction	803
<i>Ntombikayise Banda, Andries Engelbrecht, and Peter Robinson</i>	
Smartphone-Based Tele-Rehabilitation System for Frozen Shoulder Using a Machine Learning Approach	811
<i>Kanmanus Ongvisatepaiboon, Jonathan H. Chan, and Vajirasak Vanijja</i>	
A Decision Tree-Based Approach for Cardiovascular Dysautonomias Diagnosis: A Case Study	816
<i>Ilham Kadi and Ali Idri</i>	
A Novel Ontology and Machine Learning Inspired Hybrid Cardiovascular Decision Support Framework	824
<i>Amir Hussain, Kamran Farooq, Bin Luo, and Warner Slack</i>	
Solar Powered Wheel Chair for Physically Challenged People Using Surface EMG Signal	833
<i>Shamim Kaiser, Zamshed I. Chowdhury, Shamim Mamun, Amir Hussain, and Mufti Mahmud</i>	

MCDM 2015 Session: 1

Comparative Study of Recent Multimodal Evolutionary Algorithms	837
<i>Romarc Pighetti, Denis Pallez, and Frederic Precioso</i>	
Using α -Dominance for Hidden and Degenerated Pareto-Fronts	845
<i>Heiner Zille and Sanaz Mostaghim</i>	
Concept-Based Evolutionary Multi-Criteria Exploration of Design Spaces Under Run-Time Limitation	853
<i>Alon Snir, Barak Samina, and Amiram Moshaiov</i>	
Relation Between Weight Vectors and Solutions in MOEA/D	861
<i>Hisao Ishibuchi, Ken Doi, Hiroyuki Masuda, and Yusuke Nojima</i>	
Approximative Pareto Front Identification	869
<i>Madalina M. Drugan</i>	
Enhancing State-of-the-Art Multi-Objective Optimization Algorithms by Applying Domain Specific Operators	877
<i>Seyyedeh Newsha Ghoreishi, Jan Corfixen Sørensen, and Bo Nørregaard Jørgensen</i>	

CIFer 2015 Session: 2: Systemic Risk & Sentiment Analysis & Macroeconomic Modeling

The Reconstruction of Financial Signals Using Fast ICA for Systemic Risk	885
<i>Kuan-Heng Chen and Khaldoun Khashanah</i>	
Detect & Describe: Deep Learning of Bank Stress in the News	890
<i>Samuel Rönnqvist and Peter Sarlin</i>	
An Extreme Firm-Specific News Sentiment Asymmetry Based Trading Strategy	898
<i>Qiang Song, Anqi Liu, Steve Y. Yang, Anil Deane, and Kaushik Datta</i>	
Learning Ordinary Differential Equations for Macroeconomic Modelling	905
<i>Zhivko Georgiev and Dimitar Kazakov</i>	
Sentiment Classification in the Financial Domain Using? SVM and Multi-Objective Optimisation	910
<i>Fan Sun, Ammar Belatreche, Sonya A. Coleman, Thomas Mcginnity, and Yuhua Li</i>	
Crisis Modeler: A Tool for Exploring Crisis Predictions	917
<i>Markus Holopainen and Peter Sarlin</i>	

CIDM 2015 Session: 4: Data Mining Applications

RBFN Networks-Based Models for Estimating Software Development Effort: A Cross-Validation Study	925
<i>Ali Idri, Aya Hassani, and Alain Abran</i>	
Visualization of Design-Space Constitution for Single-Stage Hybrid Rocket with Rigid Body in View of Extinction-Reignition	933
<i>Kazuhisa Chiba, Hideyuki Yoda, Shoma Ito, and Masahiro Kanazaki</i>	
Using Twitter for Next-Place Prediction, with an Application to Crime Prediction	941
<i>Mingjun Wang and Matthew S. Gerber</i>	
Genetic Clustering Algorithm for Extractive Text Summarization	949
<i>Sebastian Suarez Benjumea and Elizabeth León</i>	
Optimizing Seed Set for New User Cold Start	957
<i>He-Da Wang and Ji Wu</i>	
Collaborative Filtering of Call for Papers	963
<i>He-Da Wang and Ji Wu</i>	

FOCI 2015 Session: 1: Fuzzy Logic

Omega-Algebras	971
<i>Branimir Šešelja and Andreja Tepavčević</i>	

RBFN Networks-based Models for Estimating Software Development Effort: A Cross-validation Study	976
<i>Ali Idri, Aya Hassani, and Alain Abran</i>	
A Normal Form for Fuzzy Functional Dependencies	984
<i>J.M. Rodríguez-Jiménez, E. Rodríguez-Lorenzo, P. Cordero, M. Enciso, and A. Mora</i>	
On Fuzzy Preordered Sets and Monotone Galois Connections	990
<i>F. García-Pardo, I.P. Cabrera, P. Cordero, and M. Ojeda-Aciego</i>	
Designing Lattices of Truth Degrees for Fuzzy Logic Programming Environments	995
<i>Juan Guerrero, María Del Señor Martínez, Gines Moreno, and Carlos Vázquez</i>	

CIPLS 2015 Session: 1:

A Collaborative Lot-Sizing Problem with Production Limitations	1005
<i>Mario Ziebuhr, Tobias Buer, and Herbert Kopfer</i>	
Adaptive IDEA for Robust Multiobjective Optimization, Application to the r-TSALBP-m/A	1013
<i>Manuel Chica, Joaquin Bautista, Sergio Damas, and Oscar Cordon</i>	
The Influence of the Picking Times of the Components in Time and Space Assembly Line Balancing Problems: An Approach with Evolutionary Algorithms	1021
<i>Emanuel F. Alsina, Nicola Capodiecì, Giacomo Cabri, and Alberto Regattieri</i>	
Component Analysis Based Approach to Support the Design of Meta-Heuristics for MLCLSP Providing Guidelines	1029
<i>Luis Filipe de Araujo Pessoa, Carolin Wagner, Bernd Hellingrath, and Fernando Buarque de Lima Neto</i>	

ICES 2015 Session: 1: Evolvable Robotic Systems

Evolving Robust Robot Team Morphologies for Collective Construction	1039
<i>James Watson and Geoff Nitschke</i>	
The Benefits of Adaptive Behavior and Morphology for Cooperation	1047
<i>Jamie Hewland and Geoff Nitschke</i>	
Evolution, Individual Learning, and Social Learning in a Swarm of Real Robots	1055
<i>Jacqueline Heinerman, Massimiliano Rango, and A.E. Eiben</i>	
Evolving Robotic Neuro-Controllers Using Gene Expression Programming	1063
<i>J. Mwaura and Ed Keedwell</i>	
A Multi-Agent System for Autonomous Adaptive Control of a Flapping-Wing Micro Air Vehicle	1073
<i>Garrison Greenwood, Michal Podhradsky, John Gallagher, and Eric Matson</i>	

EEE ALIFE 2015 Session: 1

Study of Normalization and Aggregation Approaches for Consensus Network Estimation	1081
<i>Pau Bellot, Philippe Salembier, Albert Oliveras, and Patrick E. Meyer</i>	
An Ansatz for a Theory of Living Systems	1087
<i>Dominique Chu and David J. Barnes</i>	
Effects of Several Bioinspired Methods on the Stability of Coevolutionary Complexification	1094
<i>Benjamin Inden and Jürgen Jost</i>	
Flora Robotica - Mixed Societies of Symbiotic Robot-Plant Bio-Hybrids	1102
<i>Heiko Hamann, Mostafa Wahby, Thomas Schmickl, Payam Zahadat, Daniel Hofstadler, Kasper Stoy, Sebastian Risi, Andres Faina, Frank Veenstra, Serge Kernbach, Igor Kuksin, Olga Kernbach, Phil Ayres, and Przemyslaw Wojtaszek</i>	
The Impact of Obstruction on a Model of Competitive Exclusion in Plants	1110
<i>Jeffrey Tsang and Daniel Ashlock</i>	

SIS 2015 Session: 2: Ant Colony Optimization

A Comparative Study for Efficient Synchronization of Parallel ACO on Multi-core Processors in Solving QAPs	1118
<i>Shigeyoshi Tsutsui and Noriyuki Fujimoto</i>	
Towards a Network Interpretation of Agent Interaction in Ant Colony Optimization	1126
<i>Pavel Krömer, Petr Gajdoš, and Ivan Zelinka</i>	
A Gradient-Guided ACO Algorithm for Neural Network Learning	1133
<i>Ashraf M. Abdelbar and Khalid M. Salama</i>	
Ant Colony Optimization for First-Order Rule Discovery	1141
<i>Rafael Ramirez</i>	
Investigating Evaluation Measures in Ant Colony Algorithms for Learning Decision Tree Classifiers	1146
<i>Khalid M. Salama, Ashraf M. Abdelbar, and Fernando E.B. Otero</i>	

CIComms 2015 Session: 1a: Special Session: Nature-Inspired Antenna Systems

Surrogate-Assisted Optimization of Metamaterial Devices for Advanced Antenna Systems	1154
<i>Lorenza Tenuti, Marco Salucci, Giacomo Oliveri, Paolo Rocca, and Andrea Massa</i>	
Role of Boundary Dynamics in Improving Efficiency of Particle Swarm Optimization on Antenna Problems	1157
<i>Pragnan Chakravorty and Durbadal Mandal</i>	
Optimization of Antenna Arrays for SLL Reduction Towards Pareto Objectivity Using GA Variants	1164
<i>Sudipta Das, Gopi Ram Hardel, Pragnan Chakravorty, Durbadal Mandal, Rajib Kar, and Dr. Sakti Prasad Ghoshal</i>	
Optimizing an Antenna Array for Satellite Communications	1170
<i>Randy Haupt</i>	

CIComms 2015 Session: 1b

An Adaptive Congestion Control and Fairness Scheduling Strategy for Wireless Mesh Networks	1174
<i>Sajid Sheikh, Riaan Wolhuter, and Herman A. Engelbrecht</i>	
A Dec-POMDP Model for Congestion Avoidance and Fair Allocation of Network Bandwidth in Rate-Adaptive Video Streaming	1182
<i>Mahdi Hemmati, Abdulsalam Yassine, and Shervin Shirmohammadi</i>	
Physics-Based Performance Enhancement in Computational Electromagnetics: A Review	1190
<i>Alireza Baghai-Wadji</i>	

ICES 2015 Session: 2: Applications of Evolvable Systems

Social-Insect-Inspired Networking for Autonomous Fault Tolerance	1198
<i>Matthew Rowlings, Andy Tyrrell, and Martin Trefzer</i>	
Neuromorphic Hardware Accelerated Adaptive Authentication System	1206
<i>Manan Suri, Vivek Parmar, Akshay Singla, Rishabh Malviya, and Surag Nair</i>	
Evolution of Non-Cryptographic Hash Function Pairs for FPGA-Based Network Applications	1214
<i>Roland Dobai and Jan Korenek</i>	
An Investigation of Underlying Physical Properties Exploited by Evolution in Nanotubes Materials	1220
<i>Stefano Nichele, Odd Rune Lykkebø, and Gunnar Tufte</i>	

Modelling Epigenetic Mechanisms to Capture Dynamical Topological Morphology: Applications in Edge Detection	1229
<i>Alexander P. Turner, Martin A. Trefzer, and Andy M. Tyrrell</i>	
Simultaneous Improvement to Signal Integrity and Electromagnetic Interference in High-Speed Transmission Lines	1236
<i>Moritoshi Yasunaga, Yusuke Kuribara, Hirofumi Inoue, and Ikuo Yoshihara</i>	

CIASG 2015 Session: 2: Simulation, Operations and Control

Co-Simulation Platform for Characterizing Cyber Attacks in Cyber Physical Systems	1244
<i>Mohammad Ashraf Hossain Sadi, Mohd Hasan Ali, Dipankar Dasgupta, Robert K. Abercrombie, and Shubhalaxmi Kher</i>	
Stochastic Optimization for Combined Economic and Emission Dispatch with Renewables	1252
<i>Mehdi Rahmani-Andebili and Ganesh K. Venayagamoorthy</i>	
VPP Energy Resources Management Considering Emissions: The Case of Northern Portugal 2020 to 2050	1259
<i>João Soares, Nuno Borges, Cristina Lobo, and Zita Vale</i>	
Stochastic Model Predictive Control Based Economic Dispatch for Hybrid Energy System Including Wind and Energy Storage Devices	1267
<i>Yan Zhang, Rui Wang, Tao Zhang, Tianjun Liao, Yajie Liu, and Bo Guo</i>	
Development of Optimal PI Controllers for a Grid-Tied Photovoltaic Inverter	1272
<i>Ali Arzani, Paranietharan Arunagirinathan, and Ganesh Kumar. Venayagamoorthy</i>	
Multi-Machine Power System Stabilizer Design Based on Population Based Incremental Learning	1280
<i>Dereck A. Dombo and Komla Folly</i>	

SIS 2015 Session: 3: Particle Swarm Optimization II

Dynamic Vector-Evaluated PSO with Guaranteed Convergence in the Sub-Swarms	1286
<i>Mardé Helbig and Andries Engelbrecht</i>	
Co-operative Vector-Evaluated Particle Swarm Optimization for Multi-objective Optimization	1294
<i>Justin Maltese, Beatrice Ombuki-Berman, and Andries Engelbrecht</i>	
High-Dimensional Multi-Objective Optimization Using Co-operative Vector-Evaluated Particle Swarm Optimization with Random Variable Grouping	1302
<i>Justin Maltese, Andries Engelbrecht, and Beatrice M. Ombuki-Berman</i>	

A Parallel Implementation of Multiobjective Particle Swarm Optimization Algorithm Based on Decomposition	1310
<i>Jin-Zhou Li, Wei-Neng Chen, Jun Zhang, and Zhi-Hui Zhan</i>	
On the Performance of Particle Swarm Optimization Algorithms in Solving Cheap Problems	1318
<i>Abdullah Al-Dujaili, M. R. Tanweer, and S. Suresh</i>	

CICARE 2015 Session: 2: Applications of Computational Intelligence in eHealth and Therapy

Real Time Identification of Heart Sounds Using Selectional Regional Correlation of the Time Frequency Domain	1326
<i>David Fourie and M. J. (Thinus) Booysen</i>	
Automatic Diagnosis of Voiding Dysfunction From Sound Signal	1331
<i>Petr Hurtík, Michal Burda, Jan Krhut, Peter Zvara, and Libor Lunáček</i>	
Efficient Bone Detector and Geometric Descriptor for X-Ray Imaging	1337
<i>Jakub Romanowski, Marcin Korytkowski, and Rafał Scherer</i>	
Fuzzy Set-Based Detection of Hypotension Episodes for Predicting Leaks in Sleeve Gastrectomy	1343
<i>J. B. R. Visser, A. M. Wilbik, U. Kaymak, and S. W. Nienhuijs</i>	
A Note on the Evaluation of Mutation Prioritization Algorithms	1351
<i>Dusan Popovic, Jesse Davis, Alejandro Sifrim, and Bart De Moor</i>	

CIDM 2015 Session: 5a: Special Session: Process Mining

Constructing Probable Explanations of Nonconformity: A Data-Aware and History-Based Approach	1358
<i>Mahdi Alizadeh, Massimiliano De Leoni, and Nicola Zannone</i>	
Efficient Process Discovery From Event Streams Using Sequential Pattern Mining	1366
<i>Marwan Hassani, Sergio Siccha, Florian Richter, and Thomas Seidl</i>	
The Analysis of a Real Life Declarative Process	1374
<i>Søren Debois and Tijs Slaats</i>	

CIDM 2015 Session: 5b: Classification II

Improving SVM Training Sample Selection Using Multi-Objective Evolutionary Algorithm and LSH	1383
<i>Romario Pighetti, Denis Pallez, and Frédéric Precioso</i>	
Subclass Marginal Fisher Analysis	1391
<i>Anastasios Maronidis, Anastasios Tefas, and Ioannis Pitas</i>	

Multivariate Time Series Classification Using Dynamic Time Warping Template Selection for Human Activity Recognition	1399
<i>Skyler Seto, Wenyu Zhang, and Yichen Zhou</i>	
Evolving Workflow Graphs Using Typed Genetic Programming	1407
<i>Tomáš Ken, Martin Pilát, and Roman Neruda</i>	

FOCI 2015 Session: 2: Evolutionary Computation and Machine Learning

Improving Convergence in Cartesian Genetic Programming Using Adaptive Crossover, Mutation and Selection	1415
<i>Roman Kalkreuth, Günter Rudolph, and Jörg Krone</i>	
Measuring Saturation in Neural Networks	1423
<i>Anna Rakitianskaia and Andries Engelbrecht</i>	
Hybrid Approach for TSP Based on Neural Networks and Ant Colony Optimization	1431
<i>Dr. Carsten Mueller and Niklas Kiehne</i>	
An Evolutionary Approach to the Discovery of Hybrid Branching Rules for Mixed Integer Solvers	1436
<i>Kjartan Brjánn Pétursson and Thomas Philip Runarsson</i>	
Population-Based Incremental Learning with Immigrants Schemes in Changing Environments	1444
<i>Michalis Mavrovouniotis and Shengxiang Yang</i>	
Graph Embedding Exploiting Subclasses	1452
<i>Anastasios Maronidis, Anastasios Tefas, and Ioannis Pitas</i>	
Towards A Generic Computational Intelligence Library: Preventing Insanity	1460
<i>Gary Pamparà and A.P. Engelbrecht</i>	

CIHLI 2015 Session: 1:

RoboCHAIR: Creative Assistant for Question Generation and Ranking	1468
<i>Senja Pollak, Borut Lesjak, Janez Kranjc, Vid Podpečan, Martin Žnidaršič, and Nada Lavrač</i>	
Enhancing Environmental Surveillance Against Organised Crime with Radial Basis Neural Networks	1476
<i>Christian Napoli, Emiliano Tramontana, and Marcin Woźniak</i>	
A New Two-Stage Approach to the Multiaspect Text Categorization	1484
<i>Sławomir Zadrozny, Janusz Kacprzyk, and Marek Gajewski</i>	

ICES 2015 Session: 3: Evolvable Digital Systems

An Evolutionary Strategy Based State Assignment for Area-Minimization Finite State Machines	1491
<i>Yanyun Tao, Lijun Zhang, and Yuzhen Zhang</i>	
Designing Polymorphic Circuits with Periodical Weight Adjustment	1499
<i>Houjun Liang, Rui Xie, and Liang Chen</i>	
Investigation of Replicating Tiles in Cellular Automata Designed by Evolution Using Conditionally Matching Rules	1506
<i>Michal Bidlo</i>	

SDE 2015 Session: 1: Algorithmic Aspects of Differential Evolution

A Population Adaptation Mechanism for Differential Evolution Algorithm	1514
<i>Johanna Aalto and Jouni Lampinen</i>	
Network Visualization of Population Dynamics in the Differential Evolution	1522
<i>Petr Gajdoš, Pavel Kromer, and Ivan Zelinka</i>	
Continuous Parameter Pools in Ensemble Differential Evolution	1529
<i>Giovanni Iacca, Fabio Caraffini, and Ferrante Neri</i>	

CIASG 2015 Session: 3: Demand Response

Demand Response Shifting Management Applied to Distributed Generation and Pumping	1537
<i>Diogo Boldt, Pedro Faria, and Zita Vale</i>	
Economic Impact of Demand Response in the Scheduling of Distributed Energy Resources	1545
<i>João Spínola, Pedro Faria, and Zita Vale</i>	
Quantum Particle Swarm Optimization Applied to Distinct Remuneration Approaches in Demand Response Programs	1553
<i>Fabio Pereira, João Soares, Pedro Faria, and Zita Vale</i>	
An Open Source Matlab/Simulink Toolbox for Interval Type-2 Fuzzy Logic Systems	1561
<i>Ahmet Taskin and Tufan Kumbasar</i>	

CIDM 2015 Session: 6: Advanced Data Mining Techniques

On Accelerated Gradient Approximation for Least Square Regression with L1-Regularization	1569
<i>Yongquan Zhang and Jianyong Sun</i>	
Multi-Objective Genetic Programming for Dataset Similarity Induction	1576
<i>Jakub Šmíd, Martin Pilát, Klára Pešková, and Roman Neruda</i>	
On Perturbations of Multisets	1583
<i>Maciej Krawczak and Grayna Szkatua</i>	

CIDM 2015 Session: 7: Special Session: Analysis and Visualization of High Dimensional and Complex Data

Model-Based Outlier Detection for Object-Relational Data	1590
<i>Fatemeh Riahi and Oliver Schulte</i>	
Inferring Feature Relevances From Metric Learning	1599
<i>Alexander Schulz, Bassam Mokbel, Michael Biehl, and Barbara Hammer</i>	
Multiple Graph-Kernel Learning	1607
<i>Fabio Aioli, Michele Donini, Nicolò Navarin, and Alessandro Sperduti</i>	

CIES 2015 Session: 1

What is the Right Context for an Engineering Problem: Finding Such a Context is NP-Hard	1615
<i>Martine Ceberio, Vladik Kreinovich, Hung T. Nguyen, Songsak Sriboonchitta, and Rujira Oncharoen</i>	
In Engineering Classes, How to Assign Partial Credit: From Current Subjective Practice to Exact Formulas (Based on Computational Intelligence Ideas)	1621
<i>Joe Lorkowski, Vladik Kreinovich, and Olga Kosheleva</i>	

CIHLI 2015 Session: 2

A Computational Logic Approach to Human Spatial Reasoning	1627
<i>Emmanuelle-Anna Dietz, Steffen Hölldobler, and Raphael Höps</i>	
A Novel Approach Toward X-RAY Images Classifier	1635
<i>Marcin Woźniak, Dawid Połap, Leon Kośmider, Christian Napoli, and Emiliano Tramontana</i>	
Risk-Aware Project Scheduling for Projects with Varied Risk Levels	1642
<i>Karol Waldzik, Jacek Madziuk, and Sawomir Zadrony</i>	
Design Methodology for Rough Neuro-Fuzzy Classification with Missing Data	1650
<i>Robert K. Nowicki, Marcin Korytkowski, Bartosz A. Nowak, and Rafal Scherer</i>	

CIEL 2015 Session: 1:

Upper Limb Motor Skills Evaluation in Patients with Early Multiple Sclerosis Using the IDEA System	1658
<i>Alexandros Pino, Georgios Kouroupetroglou, Nikolaos Papatheodorou, Elisabeth Andreadou, and Charalambos Papageorgiou</i>	
Metric-Based Heuristic Space Diversity Management in a Meta-Hyper-Heuristic Framework	1665
<i>Jacomine Grobler and Andries Engelbrecht</i>	
Evolving Non-Linear Stacking Ensembles for Prediction of Go Player Attributes	1673
<i>Josef Moudřík and Roman Neruda</i>	
Acoustic Event Classification Using Ensemble of One-Class Classifiers for Monitoring Application	1681
<i>Achyut Tripathi, Diganta Baruah, and Rashmi Dutta Baruah</i>	
Block Sparse Representations in Modified Fuzzy C-Regression Model Clustering Algorithm for TS Fuzzy Model Identification	1687
<i>Tanmoy Dam and Alok Deb</i>	

SDE 2015 Session: 2: Problem Oriented Design and Applications of Differential Evolution

Engineering Fitness Inheritance and Co-operative Evolution Into State-of-the-Art Optimizers	1695
<i>Aboubakar Hameed, Anna Kononova, and David Corne</i>	
Improved Constructive Cooperative Coevolutionary Differential Evolution for Large-Scale Optimisation	1703
<i>Emile Glorieux, Bo Svensson, Fredrik Danielsson, and Bengt Lennartson</i>	
DE vs. PSO: A Performance Assessment for Expensive Problems	1711
<i>Abdullah Al-Dujaili, M. R. Tanweer, and S. Suresh</i>	
Adaptive Differential Evolution Applied to Point Matching 2D GIS Data	1719
<i>Noel Khan, Ferrante Neri, and Samad Ahmadi</i>	
Optimisation of Water Management Systems Using a GPU-Accelerated Differential Evolution	1727
<i>Jiri Jaros, Jan Marek, and Pavel Mensik</i>	

CIPLS 2015 Session: 2

Hybrid PACO with Enhanced Pheromone Initialization for Solving the Vehicle Routing Problem with Time Windows	1735
<i>Wei Shi, Thomas Weise, P.R. Raymond Chiong, and Bülent Çatay</i>	
Comparing a Weiszfeld's-Based Procedure and (1+1)-es for Solving the Planar Single-Facility Location-Routing Problem	1743
<i>Pepijn Van Heiningen, Edgar Reehuis, and Thomas Bäck</i>	
Crew Constrained Home Care Routing Problem with Time Windows	1751
<i>Başak Tozlu, Rebi Daldal, Tonguç Ünlüyurt, and Bülent Çatay</i>	
An Integrated Matching and Partitioning Problem with Applications in Intermodal Transport	1758
<i>Erwin Pesch, Dominik Kress, and Sebastian Meiswinkel</i>	

CIFEr 2015 Session: 3: Portfolio Optimization & Hedging Strategies & The Bitcoin Market

Constraint Handling Methods for Portfolio Optimization Using Particle Swarm Optimization	1766
<i>Stuart G. Reid and Katherine M. Malan</i>	
Order Routing and Arbitrage Opportunities in a Multi-Market Trading Simulation	1774
<i>Andrew Todd, Peter Beling, and William Scherer</i>	
Bitcoin Market Return and Volatility Forecasting Using Transaction Network Flow Properties	1778
<i>Steve Y. Yang and Jinhyoung Kim</i>	
Discrete-Time Quadratic-Optimal Hedging Strategies for European Contingent Claims	1786
<i>Easwar Subramanian and Sanjay P. Bhat</i>	
Winning in Retail Market Games: Relative Profit and Logit Demand	1794
<i>Jasper Hoogland, Mathijs M. De Weerd, and Han La Poutré</i>	

CIDM 2015 Session: 8: Special Session: Partially Supervised Learning

Ensembles of Support Vector Data Description for Active Learning Based Annotation of Affective Corpora	1801
<i>Patrick Thiam, Markus Kächele, Friedhelm Schwenker, and Guenther Palm</i>	
Self-Configuring Ensemble of Neural Network Classifiers for Emotion Recognition in the Intelligent Human-Machine Interaction	1808
<i>Evgenii Sopov and Ilia Ivanov</i>	

Applying Interval Type-2 Fuzzy Rule Based Classifiers Through a Cluster-Based Class Representation	1816
<i>J. Navarro and C. Wagner and U. Aickelin</i>	

CIES 2015 Session: 2

Computational Intelligence for Efficient Numerical Design of Structures with Uncertain Parameters	1824
<i>Wolfgang Graf, Marco Götz, Ferenc Leichsenring, and Michael Kaliske</i>	
Acceptance-Based Software Architecture Deployment for Improvement of Existing Applications	1832
<i>Hannes Klee, Michael Buchholz, Torben Materna, and Klaus Dietmayer</i>	
A Clustering Approach to a Major-Accident Data Set: Analysis of Key Interactions to Minimise Human Errors	1838
<i>Raphael Moura, Christoph Doell, Michael Beer, and Rudolf Kruse</i>	
Computational Intelligence for Structural Identifications	1844
<i>Abdullah Al-Hussein and Achintya Haldar</i>	
Fault Diagnosis and Evaluation of the Performance of the Overcurrent Protection in Radial Distribution Networks Based on Wavelet Transform and Rule-Based Expert System	1852
<i>Helton Do Nascimento Alves</i>	

SIS 2015 Session: 4: Other Swarm Intelligence Algorithms

A Swarm-Based Approach to Learning Phase-Type Distributions for Continuous Time Bayesian Networks	1860
<i>Logan J. Perreault, Monica Thornton, Rollie Goodman, and John W. Sheppard</i>	
Differential Evolution with Random Walk Mutation and an External Archive for Multimodal Optimization	1868
<i>Yu-Hui Zhang, Meng-Ting Li, Yue-Jiao Gong, and Jun Zhang</i>	
The Impact of Subcultures in Cultural Algorithm Problem Solving	1876
<i>Robert G. Reynolds, Yousof A. Gawasmeh, and Areej Salaymeh</i>	
A Modified Chaotic Firefly Algorithm for Solving Discrete Logarithm Problem and Analysis	1885
<i>Mohit Mishra, Varanasi, Utkarsh Chaturvedi, Varanasi, K.K. Shukla, and R.V. Yampolskiy</i>	
Author Index	1893