Contents – Part II

Evolutionary Computing

Kernel Evolutionary Algorithm for Clustering. .............................. 3
   Xiangming Jiang, Jingjing Ma, and Chao Lei

A Multi-parent Crossover Based Genetic Algorithm for Bi-Objective
Unconstrained Binary Quadratic Programming Problem ............................. 10
   Chao Huo, Rongqiang Zeng, Yang Wang, and Mingsheng Shang

Unsupervised Image Segmentation Based on Watershed and Kernel
Evolutionary Clustering Algorithm .................................................. 20
   Chao Lei, Jingjing Ma, and Xiangming Jiang

Classification Based on Fireworks Algorithm ................................. 35
   Yu Xue, Binping Zhao, and Tinghuai Ma

Overlapping Community Detection in Network:
A Fuzzy Evaluation Approach ..................................................... 41
   Wei Zhao, Yangzhi Guo, Chao Lei, and Jianan Yan

Multifactorial Brain Storm Optimization Algorithm .......................... 47
   Xiaolong Zheng, Yu Lei, Maoguo Gong, and Zedong Tang

An Improved Heuristic Algorithm for UCAV Path Planning .................. 54
   Kun Zhang, Peipei Liu, Weiren Kong, Yu Lei, Jie Zou, and Min Liu

An Efficient Benchmark Generator for Dynamic Optimization Problems .... 60
   Changhe Li

Ensemble of Different Parameter Adaptation Techniques in Differential
Evolution ................................................................. 73
   Liang Wang and Wenyin Gong

Research on Multimodal Optimization Algorithm for the Contamination
Source Identification of City Water Distribution Networks ......................... 80
   Xuesong Yan, Jing Zhao, and Chengyu Hu

Visual Tracking by Sequential Cellular Quantum-Behaved Particle Swarm
Optimization Algorithm ............................................................. 86
   Junyi Hu, Wei Fang, and Wangtong Ding

An Improved Search Algorithm About Spam Firewall ........................... 95
   Kangshun Li, Lu Xiong, and Zhichao Wen
Differential Evolution Algorithm with the Second Order Difference Vector

Xinchao Zhao, Dongyue Liu, Xingquan Zuo, Huiping Liu, and Rui Li

**Multi-objective Optimization**

Biomimicry of Plant Root Foraging for Distributed Optimization: Models and Emergent Behaviors

Hanning Chen, Xiaodan Liang, Maowei He, and Weixing Su

Adaptive Bacterial Foraging Algorithm and Its Application in Mobile Robot Path Planning

Xiaodan Liang, Maowei He, and Hanning Chen

A Novel Hierarchical Artificial Bee Colony Optimizer and Its Application for Model-Based Prediction of Droplet Characteristic in 3D Electronic Printing

Maowei He and Hanning Chen

Research on Network-on-Chip Automatically Generate Method Based on Hybrid Optimization Mapping

Chao Li and Yuqiang Chen

Evolutionary Algorithms for Many-Objective Ground Station Scheduling Problem

Zhongshan Zhang, Lining Xing, Yuning Chen, and Pei Wang

Indicator-Based Multi-objective Bacterial Foraging Algorithm with Adaptive Searching Mechanism

Lianbo Ma, Xu Li, Tianhan Gao, Qiang He, Guangming Yang, and Ying Liu

Applying K-means Clustering and Genetic Algorithm for Solving MTSP

Zhanqing Lu, Kai Zhang, Juanjuan He, and Yunyun Niu

A Multi-objective Optimization Algorithm Based on Tissue P System for VRPTW

Wenbo Dong, Kang Zhou, Huaqing Qi, Cheng He, Jun Zhang, and Bosheng Song

The Subideal Version of the SOI-Algorithm and Its Application

Haifeng Sang and Qingchun Li

A Diversity Keeping Strategy for the Multi-objective Examination Timetabling Problem

Yu Lei, Jiao Shi, and Kun Zhang
A Grid-Based Decomposition for Evolutionary Multiobjective Optimization .......................................................... 316
   Zhiwei Mei, Xinye Cai, and Zhun Fan

Multi-objective Evolutionary Algorithm for Enhancing the Robustness of Networks ............................................. 322
   Zheng Li, Shanfeng Wang, and Wenping Ma

Multi-objective Optimization with Nonnegative Matrix Factorization for Identifying Overlapping Communities in Networks .......................................................... 328
   Hongmin Liu, Hao Li, and Wei Zhao

Magnetic Bacterial Optimization Algorithm for Mobile Robot Path Planning .......................................................... 334
   Hongwei Mo, Lifang Xu, and Chaomin Luo

Pattern Recognition

A Simple Deep Feature Representation for Person Re-identification .......................................................... 343
   Shengke Wang, Lianghua Duan, Yong Zhao, and Junyu Dong

A Common Strategy to Improve Community Detection Performance Based on the Nodes’ Property .......................................................... 355
   Wei Du and Xiaochen He

HVS-Inspired Dimensionality Reduction Model Based on Factor Analysis .......................................................... 362
   Zhigang Shang, Mengmeng Li, and Yonghui Dong

Human Face Reconstruction from a Single Input Image Based on a Coupled Statistical Model .......................................................... 373
   Yujuan Sun, Muwei Jian, and Junyu Dong

Research on Micro-blog New Word Recognition Based on MapReduce .......................................................... 379
   Chaoting Xiao, Jianhou Gan, Bin Wen, Wei Zhang, and Xiaochun Cao

A Memetic Kernel Clustering Algorithm for Change Detection in SAR Images .......................................................... 388
   Yangyang Li, Gao Lu, and Licheng Jiao

Collaborative Rating Prediction Based on Dynamic Evolutionary Heterogeneous Clustering .......................................................... 394
   Jianrui Chen, Uliji, Hua Wang, and Chunxia Zhao

Improving Sample Optimization with Convergence Speed Controller for Sampling-Based Image Matting .......................................................... 400
   Liang Lv, Han Huang, Zhaoquan Cai, and Yihui Liang
An Improved Extraction Algorithm About Disease Spots .......................... 407
   Lu Xiong, Dongbo Zhang, and Kangshun Li

Fine-Grained Image Categorization with Fisher Vector .......................... 413
   Xiaolin Tian, Xin Ding, and Licheng Jiao

Analysis of SNP Network Structure Based on Mutual Information of Breast
Cancer Susceptibility Genes ...................................................... 420
   Shudong Wang, Shanqiang Zhang, Shanshan Li, Xinzeng Wang,
   Sicheng He, Yan Zhao, Xiaodan Fan, Fayou Yuan, Xinjie Zhu,
   and Yun Jiang

Novel Image Deconvolution Algorithm Based on the ROF Model ............... 431
   Su Xiao

Nucleic Acid Secondary Structures Prediction with Planar Pseudoknots
Using Genetic Algorithm ....................................................... 441
   Zhang Kai, Li Shangyi, He Juanjuan, and Niu Yunyun

The Short-Term Traffic Flow Prediction Based on MapReduce .................... 448
   Suping Liu and Dongbo Zhang

Saliency Detection Model for Low Contrast Images Based on Amplitude
Spectrum Analysis and Superpixel Segmentation .................................. 454
   Hua Yang, Xin Xu, and Nan Mu

Memetic Image Segmentation Method Based on Digraph Coding .................. 461
   Tao Wu, Jiao Shi, and Yu Lei

Change Detection in Remote Sensing Images Based on Clonal Selection
Algorithm ............................................................................. 467
   Tao Wu, Yu Lei, and Maoguo Gong

Others

An Improved Algorithm for Constructing Binary Trees Using the Traversal
Sequences ............................................................................. 475
   Fangxiu Wang, Kang Zhou, Huaqing Qi, and Bosheng Song

Improved Multi-step Iterative Algorithms for the Fixed Points of Strongly
Pseudo-Contractive Mappings .................................................. 489
   Jiangrong Liu, Kang Zhou, Shan Zeng, Huaqing Qi, Bosheng Song,
   and Tingfang Wu

Grammar Automatic Checking System for English Abstract of Master’s
Thesis ................................................................................. 497
   Yueting Xu, Ziheng Wu, Han Huang, Tianxiong Yang, Pan Yu,
   and Erang Lu
Verified Error Bounds for Symmetric Solutions of Operator Matrix Equations.................................................. 507
    Qingchun Li, Ziyu Li, Haifeng Sang, and Panpan Liu

Immune Multipath Reliable Transmission with Fault Tolerance in Wireless Sensor Networks........................................... 513
    Hongbing Li, Dong Zeng, Liwan Chen, Qiang Chen, Mingwei Wang, and Chunjiiong Zhang

The Research of Solving Inverse Problems of Complex Differential Equations.................................................. 518
    Kangshun Li, Yan Chen, and Jun He

Fast Algorithms for Verifying Centrosymmetric Solutions of Sylvester Matrix Equations........................................... 524
    Ziyu Li, Haifeng Sang, and Ying Zhao

Research on Distributed Anomaly Traffic Detection Technology Based on Hadoop Platform........................................... 530
    Qiang Chen

Author Index .................................................................................................................................................. 537
Contents – Part I

### DNA Computing

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNA Self-assembly Model to Solve Compound Logic Operators Problem</td>
<td>Shihua Zhou, Bin Wang, Xuedong Zheng, and Changjun Zhou</td>
<td>3</td>
</tr>
<tr>
<td>Model Checking Computational Tree Logic Using Sticker Automata</td>
<td>Weijun Zhu, Yanfeng Wang, Qinglei Zhou, and Kai Nie</td>
<td>12</td>
</tr>
<tr>
<td>Two-Digit Full Subtractor Logical Operation Based on DNA Strand Displacement</td>
<td>Junwei Sun, Xing Li, Chun Huang, Guangzhao Cui, and Yanfeng Wang</td>
<td>21</td>
</tr>
<tr>
<td>One-Bit Full Adder-Full Subtractor Logical Operation Based on DNA Strand Displacement</td>
<td>Yanfeng Wang, Xing Li, Chun Huang, Guangzhao Cui, and Junwei Sun</td>
<td>30</td>
</tr>
<tr>
<td>Logic Gate Based on Circular DNA Structure with Strand Displacement</td>
<td>Guangzhao Cui, Xi Wang, Xuncai Zhang, Ying Niu, and Hua Liu</td>
<td>39</td>
</tr>
<tr>
<td>The Working Operation Problem Based on Probe Machine Model</td>
<td>Jing Yang and Zhixiang Yin</td>
<td>47</td>
</tr>
<tr>
<td>Matrix Flat Splicing Systems</td>
<td>Rodica Ceterchi, Linqiang Pan, Bosheng Song, and K.G. Subramanian</td>
<td>54</td>
</tr>
<tr>
<td>A Universal Platform for Building DNA Logic Circuits</td>
<td>Zicheng Wang, Jian Ai, Yanfeng Wang, Guangzhao Cui, and Lina Yao</td>
<td>64</td>
</tr>
</tbody>
</table>

### Membrane Computing

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Hybrid “Fast-Slow” Convergent Framework for Genetic Algorithm Inspired by Membrane Computing</td>
<td>Zhongwei Li, Shengyu Xia, Yun Jiang, Beibei Sun, Yuezhen Xin, and Xun Wang</td>
<td>75</td>
</tr>
<tr>
<td>An Image Threshold Segmentation Algorithm with Hybrid Evolutionary Mechanisms Based on Membrane Computing</td>
<td>Shuo Liu, Kang Zhou, Shan Zeng, Huaqing Qi, and Tingfang Wu</td>
<td>85</td>
</tr>
<tr>
<td>K-Medoids-Based Consensus Clustering Based on Cell-Like P Systems with Promoters and Inhibitors</td>
<td>Xiyu Liu, Yuzhen Zhao, and Wenxing Sun</td>
<td>95</td>
</tr>
</tbody>
</table>
Fault Classification of Power Transmission Lines Using Fuzzy Reasoning

Spiking Neural P Systems .......................................................... 109
  Kang Huang, Gexiang Zhang, Xiaoguang Wei, Haina Rong,
  Yangyang He, and Tao Wang

Membrane Algorithm with Genetic Operation and VRPTW-Based Public
Optimization System ................................................................. 118
  Yingying Duan, Kang Zhou, Huaqing Qi, and Zhiqiang Zhang

An Immune Algorithm Based on P System for Classification ............... 133
  Lian Ye and Ping Guo

Simulation of Fuzzy ACSH on Membranes with Michaelis-Menten Kinetics ...
  J. Philomenal Karoline, P. Helen Chandra,
  S.M. Saroja Theerdus Kalavathy, and A. Mary Imelda Jayaseeli

A Family P System of Realizing RSA Algorithm .......................... 155
  Ping Guo and Wei Xu

A General Object-Oriented Description for Membrane Computing......... 168
  Xiyu Liu, Yuzhen Zhao, and Weping Wang

Matrix Representation of Parallel Computation for Spiking
Neural P Systems ........................................................................ 187
  Juan Hu, Guangchun Chen, Hong Peng, Jun Wang, Xiangnian Huang,
  and Xiaohui Luo

The Computational Power of Array P System with Mate Operation ....... 200
  P. Helen Chandra, S.M. Saroja T. Kalavathy, and M. Nithya Kalyani

The Computational Power of Watson-Crick Grammars: Revisited ....... 215
  Nurul Liyana Mohamad Zulkufli, Sherzod Turaev,
  Mohd Izzuddin Mohd Tamrin, and Azeddine Messikh

An Improvement of Small Universal Spiking Neural P Systems
with Anti-Spikes ........................................................................ 226
  Shuo Liu, Kang Zhou, Shan Zeng, Huaqing Qi, and Xing Chen

The Implementation of Membrane Clustering Algorithm Based on FPGA ...
  Yunying Yang, Jun Ming, Jun Wang, Hong Peng, Zhang Sun,
  and Weping Yu

Tools and Simulators for Membrane Computing-A Literature Review .... 249
  S. Raghavan and K. Chandrasekaran

Parallel Contextual Hexagonal Array P Systems ............................. 278
  James Immanuel Suseelan, D.G. Thomas, Robinson Thamburaj,
  Atulya K. Nagar, and S. Jayasankar
Superadiabatic STIRAP: Population Transfer and Quantum Rotation Gates ............................................. 299
Youssouf Hamidou Issoufa and Azeddine Messikh

Image Segmentation Using Membrane Computing: A Literature Survey ........... 314
Rafaa I. Yahya, Siti Mariyam Shamsuddin, Salah I. Yahya, Shafatunnur Hasan, Bisan Al-Salibi, and Ghada Al-Khafaji

Integrated Membrane Computing Framework for Modeling Intrusion Detection Systems .................................... 336
Rufai Kazeem Idowu, Ravie Chandren Muniyandi, and Zulaiha Ali Othman

Neural Computing

A Deep Learning Model of Automatic Detection of Pulmonary Nodules Based on Convolution Neural Networks (CNNs) ......................... 349
Xiaojiao Xiao, Yan Qiang, Juanjuan Zhao, and Pengfei Zhao

A Study on the Recognition and Classification Method of High Resolution Remote Sensing Image Based on Deep Belief Network ..................... 362
Guanyu Chen, Xiang Li, and Ling Liu

Classification Based on Brain Storm Optimization Algorithm ..................... 371
Yu Xue, Tao Tang, and Tinghuai Ma

Stacked Auto-Encoders for Feature Extraction with Neural Networks ............ 377
Shuanglong Liu, Chao Zhang, and Jinwen Ma

Fault Diagnosis of Power Systems Based on Triangular Fuzzy Spiking Neural P Systems ...................................................... 385
Chengyu Tao, Wenping Yu, Jun Wang, Hong Peng, Ke Chen, and Jun Ming

A Recognition Method of Hand Gesture with CNN-SVM Model ................ 399
Miao Ma, Zuxue Chen, and Jie Wu

Cross-Media Information Retrieval with Deep Convolutional Neural Network .................................................. 405
Liang Bai, Tianyuan Yu, Jinlin Guo, Zheng Yang, and Yuxiang Xie

Exploration of the Critical Diameter in Networks ................................. 411
Haifeng Du, Jingjing Wang, Xiaochen He, and Wei Du

Image Compression Based on Genetic Algorithm and Deep Neural Network ................................................. 417
Haisheng Deng, Hongying Liu, Feixiang Wang, Zhi Wang, and Yikai Wang
DNN-Based Joint Classification for Multi-source Image Change Detection . . . 425
   Wenping Ma, Zhizhou Li, Puzhao Zhang, and Tianyu Hu

Differencing Neural Network for Change Detection in Synthetic Aperture Radar Images ......................................................... 431
   Feng Chen, Jiao Shi, and Maoguo Gong

Change Detection in Synthetic Aperture Radar Images Based on Fuzzy Restricted Boltzmann Machine ........................................... 438
   Na Li, Jiao Shi, and Maoguo Gong

Machine Learning

Decision Variable Analysis Based on Distributed Computing .................. 447
   Zhao Wang, Maoguo Gong, and Tian Xie

A Multi-task Learning Approach by Combining Derivative-Free and Gradient Methods ................................................................. 456
   Yiqi Hu and Yang Yu

A Collaborative Learning Model in Teaching-Learning-Based Optimization: Some Numerical Results ..................................................... 466
   Bei Dong, Xiaojun Wu, and Yifei Sun

Incremental Learning with Concept Drift: A Knowledge Transfer Perspective .................................................................................. 473
   Yu Sun and Ke Tang

Visual Tracking Based on Ensemble Learning with Logistic Regression ........ 480
   Xiaolin Tian, Sujie Zhao, and Licheng Jiao

A New Optimal Neuro-Fuzzy Inference System for MR Image Classification and Multiple Scleroses Detection ............................. 487
   Hakima Zouaoui, Abdelouahab Moussaoui, Abdemalik Taleb-Ahmed, and Mourad Oussalah

The Influence of Diversification Strategy on Capital Structure .................. 494
   Xuefeng Li

An Improved Hybrid Bat Algorithm for Traveling Salesman Problem ......... 504
   Wedad Al-sorori, Abdulqader Mohsen, and Walid Aljoby ßer

Design of Selecting Security Solution Using Multi-objective Genetic Algorithm .................................................................................. 512
   Yunghee Lee, Jaehun Jung, and Chang Wook Ahn
A Multi-agent System for Creating Art Based on Boids with Evolutionary and Neural Networks ......................................................... 518

Tae Jong Choi, Jaehun Jeong, and Chang Wook Ahn

Author Index ................................................................. 525
Bio-inspired Computing – Theories and Applications
11th International Conference, BIC-TA 2016, Xi’an, China, October 28-30, 2016, Revised Selected Papers, Part II
Gong, M.; Pan, L.; Song, T.; Zhang, G. (Eds.)
2016, XIX, 540 p. 152 illus., Softcover