2011 Sixth International Conference on Bio-Inspired Computing: Theories and Applications

(BIC-TA 2011)

Penang, Malaysia
27-29 September 2011

Editors:

Rosni Abdullah
Ahamad Tajudin Khader
Ibrahim Venkat

Li-Pei Wong
K. G. Subramanian
Table of Contents

- Preface
- Conference Organization
- Technical Programme Committee
- Local Organizing Committee
- Steering Committee
- Reviewers
- Sponsors
- Keynote Abstracts
- Workshop Abstracts

Evolutionary Computing

<table>
<thead>
<tr>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolutionary Computing</td>
<td></td>
</tr>
<tr>
<td>Square Function for Population Size in Quantum Evolutionary Algorithm</td>
<td>3</td>
</tr>
<tr>
<td>and its Application in Fractal Image Compression</td>
<td></td>
</tr>
<tr>
<td><em>Amin Qorbani, Ali Nodehi, Ali Ahmadi, and Saeed Nodehi</em></td>
<td></td>
</tr>
<tr>
<td>An Improved Artificial Bee Colony for Course Timetabling</td>
<td>9</td>
</tr>
<tr>
<td>*Asaju La’aro Bolaji, Ahamad Tajudin Khader, Mohammed Azmi Al-betar,</td>
<td></td>
</tr>
<tr>
<td>and Mohammed A. Awadallah*</td>
<td></td>
</tr>
<tr>
<td>Evolving Neural Controllers Using GA for Warcraft 3-Real Time Strategy</td>
<td>15</td>
</tr>
<tr>
<td>Game</td>
<td></td>
</tr>
<tr>
<td><em>Chang Kee Tong, Chin Kim On, Jason Teo, and Aroland MConie Jilui Kiring</em></td>
<td></td>
</tr>
<tr>
<td>The Evolution of Gamebots for 3D First Person Shooter (FPS)</td>
<td>21</td>
</tr>
<tr>
<td><em>Chang Kee Tong, Ong Jia Hui, Jason Teo, and Chin Kim On</em></td>
<td></td>
</tr>
<tr>
<td>Parallel Communicating Graph Grammar</td>
<td>27</td>
</tr>
<tr>
<td><em>S. Jeya Bharathi, M. Saravana Vadivu, and K. Thiagarajan</em></td>
<td></td>
</tr>
<tr>
<td>Properties of NLC Languages Squeezed with Hypercube Graphs</td>
<td>33</td>
</tr>
<tr>
<td><em>S. Jeya Bharathi, M. Saravana Vadivu, and K. Thiagarajan</em></td>
<td></td>
</tr>
</tbody>
</table>
Neural Computing

Application of Self Organizing Map for Intelligent Machine Fault Diagnostics
Based on Infrared Thermography Images ..........................................................123
Achmad Widodo, Djoeli Satrijo, Muhammad Huda, Gang-Min Lim,
and Bo-Suk Yang

ANN Based on IncCond Algorithm for MPP Tracker ........................................129
Jinbang Xu, Anwen Shen, Cheng Yang, Wenpei Rao, and Xuan Yang

Echo State Networks Based Method for Harmonic Extraction in Shunt
Active Power Filters .........................................................................................135
Jinbang Xu, Jun Yang, Feng Liu, Zhixiong Zhang, and Anwen Shen

ANN-based Control Method Implemented in a Voltage Source Converter
for Industrial Micro-grid .................................................................................140
Jinbang Xu, Zhizhuo Wu, Xuan Yang, Jie Ye, and Anwen Shen

A Hybrid Neural Classifier for Dimensionality Reduction and Data
Visualization and Its Application to Fault Detection and Classification
of Induction Motors .......................................................................................146
Mahnoosh Nadjarpoorsiyahkaly and Chee Peng Lim

Local Positioning System Performance Evaluation with Cosine Correlation
Similarity Measure ...........................................................................................151
Sham Firdaus Md. Ali and Rosilah Hassan

Multiple Input-Single Output (MISO) Feedforward Artificial Neural Network
(FANN) Models for Pilot Plant Binary Distillation Column ............................157
Z. Abdullah, Z. Ahmad, and N. Aziz

DNA Computing

Bordered Factors of a Finite Word .................................................................163
V. Rajkumar Dare and C. Annal Deva Priya Darshini

Crossing-Preserved and Persistent Splicing Systems .................................167
Fariba Karimi, Nor Haniza Sarmin, and Fong Wan Heng

DNA Computing Model Based on Photoelectric Detection System
with Magnetic Beads .......................................................................................170
Fei Li, Zheng Li, and Jin Xu

Double Hexagonal Array Splicing System .....................................................176
S.M. Saroja Theerdus Kalavathy and P. Helen Chandra

Semigraph Structure on DNA Splicing System .........................................182
S. Jeya Bharathi, J. Padmashree, S. Sinthanai Selvi, and K. Thiagarajan

Double Cross - Over Circular Array Splicing .................................................188
S. Jeya Bharathi, J. Padmashree, and K. Thiagarajan

Context-Free Systems with a Complementarity Relation .......................194
K.G. Subramanian, Ibrahim Venkat, and Kalpana Mahalingam
P Systems Based on Sticker Operations ................................................................. 199
  V. Masilamani, A.S. Prasanna Verkatesan, and D.G. Thomas

Analysis on Secure and Effective Applications of a DNA-Based Cryptosystem ................................................................. 205
  Miki Hirabayashi, Akio Nishikawa, Fumiaki Tanaka, Masami Hagiya,
  Hiroaki Kojima, and Kazuhiro Oiwa

Properties of Binding-Blocking Automata: A Study ........................................... 211
  M. Sakthi Balan

Parallel Communication Synchronized Pure Pattern Grammar Systems with Filters ................................................................. 216
  Sindhu J. Kumaar and P.J. Abisha

Simple Splicing Pattern and Pure Pattern Grammar Systems ................................................................. 220
  Sindhu J. Kumaar, P.J. Abisha, and D.G. Thomas

Clique-Detection Algorithm Using Clique-Self-Assembly .......................................... 225
  R. Rama, Suresh Badarla, and Kamala Krithivasan

Immune Systems Approaches for Cryptographic Algorithm ........................................ 231
  Suriyani Ariffin, Ramlan Mahmod, Azmi Jaafar,
  and Muhammad Rezal Kamel Ariffin

DNA Computing in Microreactors: A Solution to the Minimum Vertex Cover Problem ................................................................. 236
  Xuncai Zhang, Ying Niu, and Yanfeng Wang

DNA Tile Assembly Model for Bin Packing Problem ................................................ 241
  Yanfeng Wang, Weili Lu, and Guangzhao Cui

An Extension of DNA Splicing System ................................................................. 246
  Yuhani Yusof, Nor Haniza Sarmin, T. Elizabeth Goode, Mazri Mahmud,
  and Fong Wan Heng

Implementation of Maximum Independent Set Problem by Algorithmic Tile Self-Assembly ................................................................. 249
  Zhen Cheng and Jianhua Xiao

Membrane Computing

Segmentation of Peripheral Blood Smear Images Using Tissue-Like P Systems ................................................................. 257
  Feminna Sheeba, Robinson Thamburaj, Atulya K. Nagar,
  and Joy John Mammen

An Improved GPU Simulator for Spiking Neural P Systems .................................. 262
  Francis George C. Cabarle, Henry Adorna, and Miguel A. Martinez-del-Amor

Generation of Two Dimensional Arrays Using Parallel Insertion Scheme .................. 268
  S. Hemalatha and S. Revathi

Hyperedge Replacement Graph P System ............................................................ 272
  Meena Parvathy Sankar, N.G. David, and D.G. Thomas
Comparing Membrane Computing with Ordinary Differential Equation in Modeling a Biological Process in Liver Cell ................................................................. 278
   Ravie Chandren Muniyandi and Abdullah Mohd. Zin

P Systems Generating Self Similar Tilings .................................................. 284
   S. Jebasingh, T. Robinson, and Atulya K. Nagar

P Systems with 2D Picture Grammars .......................................................... 290
   Tao Song and Xiangxiang Zeng

Spiking Neural P Systems for Arithmetic Operations ................................... 296
   Xiangxiang Zeng, Tao Song, Linqiang Pan, and Xingyi Zhang

A Uniform Solution to Common Algorithmic Problem by Tissue P Systems with Cell Division .............................................................. 302
   Yunyun Niu, Linqiang Pan, and Mario J. Pérez-Jiménez

Complex Systems
The Novel Design for Global Stabilization of a Class of Complex Lower-Triangular Systems ................................................................. 309
   Bing Wang

Tuning of Auto-Disturbance Rejection Controller Based on the Invasive Weed Optimization .......................................................... 314
   Zhihua Chen, Shuo Wang, Zhonghua Deng, and Xuncal Zhang

Hybrid Workflow Net Based Architecture for Modeling Huntington’s Disease .............................................................. 319
   D. Neela and K. Rangarajan

Mathematical Modeling of a Complex System for MHD Flow in Hemodynamics ................................................................. 324
   D.S. Sankar, Nurul Aini Jaffar, Ahmad Izani Mohamed Ismail, and Atulya K. Nagar

A Study on Diminishing Cells Infinite Array .................................................. 329
   N. Jansirani and V. Rajkumar Dare

Apical Growth Filamentous and Branching PC Grammar Systems ......... 333
   J.D. Emerald

Application of Knowledge Discovery in Database to Blood Cell Counter Data to Improve Quality Control in Clinical Pathology ................................................................. 338
   D. Minnie and S. Srinivasan

Rule-Based and Example-Based Machine Translation from English to Arabic ................................................................. 343
   Mouiad Fadiel Alawneh and Tengku Mohd Sembok
Computational Neuroscience

Multi-class Support Vector Machine (SVM) Classifiers – An Application in Hypothyroid Detection and Classification .................................................................351
  Fereshteh Falah Chamasesmani and Yashwant Prasad Singh

Abduction in Neuro Symbolic Integration ...........................................................................357
  Saratha Sathasivam

Author Index ..........................................................................................................................362