

Nurturing Nature and Biologically Inspired
Computing for the advancement of **Machine Intelligence**



**Fifth World Congress on
Nature and Biologically Inspired Computing (NaBIC 2013)**



Understanding Social Networks

**Fifth International Conference on
Computational Aspects of Social Networks (CASoN 2013)**

**Fargo, USA
August 12-14, 2013**

Technically Sponsored by:



Organized by

NDSU NORTH DAKOTA
STATE UNIVERSITY



Welcome from the NaBIC 2013 Chairs

Welcome to the 2013 Fifth World Congress on Nature and Biologically Inspired Computing (NaBIC'13). The Congress is organized to discuss the state-of-the-art as well as to address various issues with respect to building up of computers in man's image. The theme for NaBIC 2013 is "Nurturing Intelligent Computing Towards Advancement of Machine Intelligence". The congress will provide an excellent opportunity for scientists, academicians and engineers to present and discuss the latest scientific results and methods. The conference includes keynote address and contributed papers.

The papers were solicited in the following areas: Artificial Neural Networks, Biodegradability Prediction, Cellular Automata, Evolutionary Algorithms, Swarm Intelligence, Emergent Systems, Artificial Life, Lindenmayer Systems, Digital Organisms, Artificial Immune Systems, Membrane Computing, Simulated Annealing, Communication Networks and Protocols, Computing with Words, Common Sense Computing, Cognitive Modeling and Architecture, Connectionism, Metaheuristics, Hybrid Approaches, Quantum Computing, Nano Computing, Industrial Applications of Nature and Biologically Inspired Computing.

The aim is to bring together worldwide leading researchers, developers, practitioners and educators interested in advancing the state of the art in *Nature and Biologically Inspired Computing* for exchanging knowledge that encompasses a broad range of disciplines among various distinct communities. It is hoped that researchers will bring new prospects for collaboration across disciplines and gain ideas facilitating novel breakthrough.

The conference will provide an exceptional platform to the researchers to meet and discuss the utmost solutions, scientific results and methods in solving intriguing problems with people that are actively involved in these evergreen fields.

NaBIC 2013 received contributions from more than 27 countries. Each paper was sent to at least 5 reviewers from our International Program Committee in a standard peer-review evaluation and based on the recommendations 41 papers were included in the proceedings. NaBIC 2013 is Technically sponsored by IEEE Systems, Man and Cybernetics Society – Spain Chapter and Technically Supported by the IEEE SMC Technical Committee on Soft Computing. Many people have collaborated and worked hard to make NaBIC 2013 a success. First and foremost, we would like to thank all the authors for submitting their papers to the conference, for their presentations and discussions during the conference. Our thanks go to the Program Committee members and reviewers, who carried out the most difficult work by carefully evaluating the submitted papers.

We wish all NaBIC 2013 delegates an exciting conference and a pleasant stay in Fargo. Enjoy the Congress!

Simone Ludwig, North Dakota State University, USA

Patricia Melin, Tijuana Institute of Technology, Mexico

Ajith Abraham, Machine Intelligence Research Labs (MIR Labs), USA

Welcome from the CASoN 2013 Chairs

We are very pleased to welcome our colleagues to the 2013 Fifth International Conference on Computational Aspects of Social Networks (CASoN'13). Social networks provide a powerful abstraction of the structure and dynamics of diverse kinds of people or people-to-technology interaction. These social network systems are usually characterized by the complex network structures and rich accompanying contextual information. Recent trends also indicate the usage of complex networks as a key feature for next generation usage and exploitation of the Web.

CASoN'13 is focused on the foundations of social networks as well as case studies, empirical, and other methodological works related to the computational tools for the automatic discovery of Web-based social networks. The main topics cover the design and use of various computational intelligence tools and software, simulations of social networks, representation and analysis of social networks, use of semantic networks in the design and community-based research issues such as knowledge discovery, privacy and protection, and visualization.

CASoN'13 brings together an interdisciplinary venue for social scientists, mathematicians, computer scientists, engineers, computer users, and students to exchange and share their experiences, new ideas, and research results about all aspects (theory, applications and tools) of intelligent methods applied to Social Networks, and to discuss the practical challenges encountered and the solutions adopted.

CASoN'13 is Technically Sponsored by IEEE SMC Society – Spain Chapter and Technically Supported by the Technical Committee of Soft Computing of IEEE Systems Man and Cybernetics Society.

CASoN'13 received papers from over 15 countries and each paper was peer reviewed by at least five program committee members and based on their recommendations, 14 papers were included in the conference proceedings. We would like to thank the CASoN'13 international program committee and the additional reviewers for providing the reviews in time. Our special thanks also go to the plenary speaker Prof. Manuel Graña, University of the Basque Country, Spain.

We wish all CASoN 2013 delegates an exciting meeting and a pleasant stay in Fargo. Enjoy the Conference!

Simone Ludwig, North Dakota State University, USA

Ajith Abraham, Machine Intelligence Research Labs (MIR Labs), USA

Vaclav Snasel, VSB-Technical University of Ostrava, Czech Republic

Welcome from the Dean of the College of Science and Mathematics

On behalf of the College of Science and Mathematics I would like to welcome participants in the 5th World Congress on Nature and Biologically Inspired Computing (NaBIC'13) and the 5th International Conference on Computational Aspects of Social Networks (CASoN'13). I note with pleasure that Fargo, North Dakota joins a small but select group of previous international hosts of these conferences. It is very appropriate that Fargo has been selected to host these conferences this year. Fargo has become an epicenter of computer science and engineering and related disciplines. The city is home to the largest Microsoft research and development campus in the U.S. outside of Redmond, Washington as well as a large number of smaller computationally based businesses. Equally importantly, NDSU has very strong academic and research programs in Computer Science, Computer Engineering, Mathematics, Statistics, and Biological Sciences. Four of five of these departments are housed in the College of Science and Mathematics! Across these departments we have particular strengths in Bioinformatics and Computational Biology and in Computation-Related Networks.

The technical program looks to be very “meaty” and interesting and I am confident that the conference will be successful. However, I hope you all will be able to take some time to see what Fargo and NDSU has to offer outside of the formal conference sessions. Fargo is one of North America’s best-kept secrets with many good restaurants offering a variety of cuisines and many interesting opportunities for nocturnal activity.

I would like to take this opportunity to acknowledge the efforts of NDSU’s own Simone Ludwig and her general and technical program committee co-chairs in the organization of these two conferences. I know from personal experience how much work conference organization can be.

Again, welcome to NDSU and Fargo and happy conferencing!

Dr. Scott A. Wood
Professor of Geochemistry
Dean of the College of Science and Mathematics

General Conference Information

Registration

The registration desk will be open on Monday, August 12 from 8:15-17:00, and on Tuesday, August 13 from 8:30-15:30.

Lunch and Coffee Breaks

The lunch and coffee breaks together with the poster sessions will take place in the Prairie-Rose room.

Internet Access

We are offering free wireless internet access to delegates. The connection will be for a limited time, and the login details can be found in the delegate bag.

Technical Sessions

The plenary talks on both days will be held in the Arikara room. The sessions of NaBIC will be held in the Arikara room, and the sessions of CASoN will take place in the Hidatsa room.

Poster Sessions

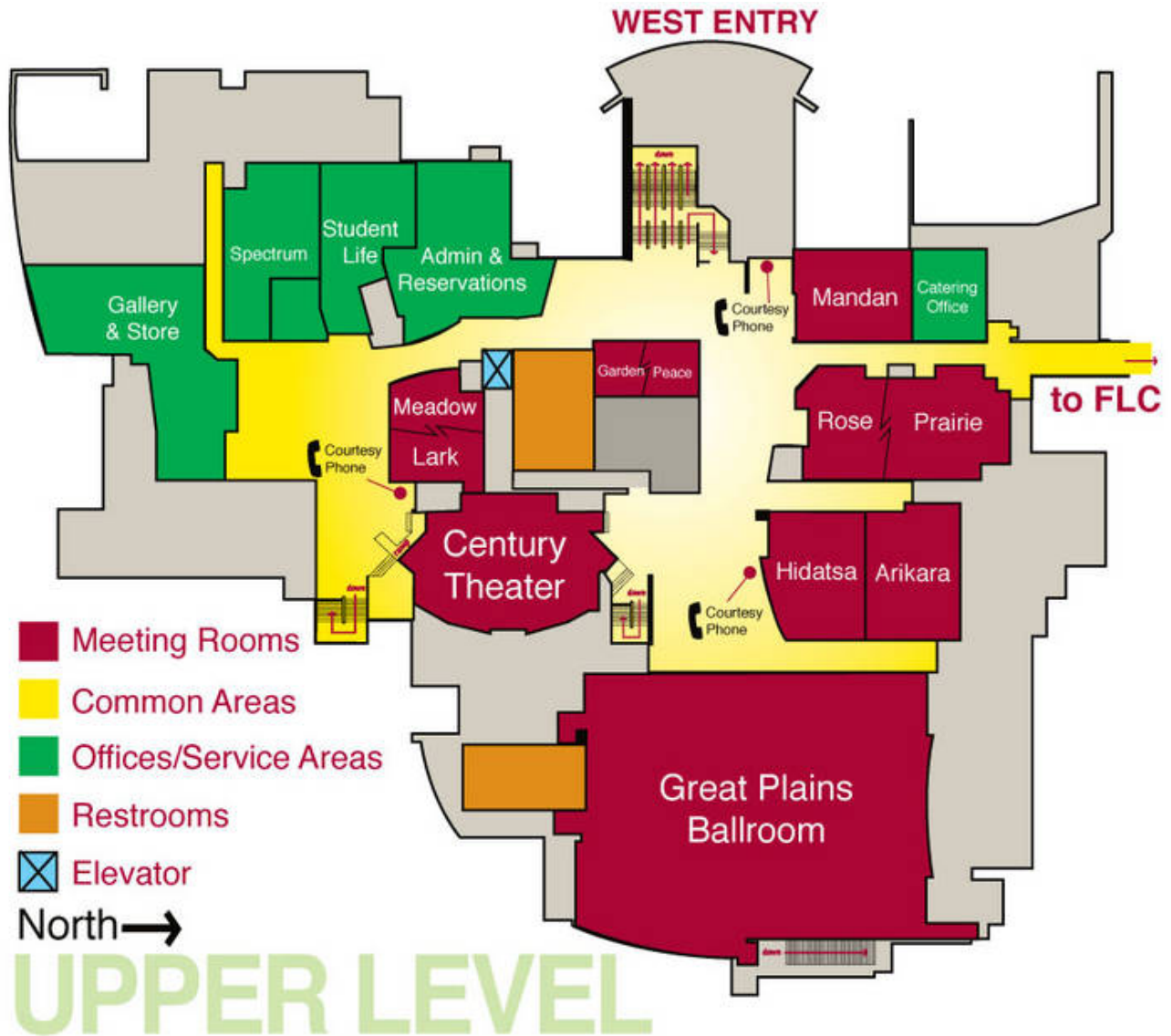
The maximum poster size is 3 ft x 5 ft (91 cm x 152 cm). Please hang your poster before or during the first coffee session on Monday, August 12.

Social Event and Dinner

The social event and dinner will take place on August 13. We are leaving the conference venue (right after the end of the afternoon session – around 17:00) by bus to go to Bonanzaville and afterwards to the Ramada for the dinner. The bus will drop the delegates off at their hotels after the dinner.

Meeting Rooms

The conferences take place at the Memorial Union at NDSU (North Dakota State University). When you enter the Memorial Union (main entrance is the West Entry), please go up the stairs on the right and you will see the registration desk and meeting rooms on the left.



Plenary Talk for NaBIC'13

Monday, August 12 from 9:00-10:00 in Arikara room.

Bruno Apolloni

Intentionality in living organisms

Abstract Intentionality looks to be a main distinguishing feature of the motion in any metric space that distinguishes animate from inanimate beings. Escaping the vagueness of this sentence, we characterize this feature at three levels through the modeling of specific phenomena: (1) from a kinematic perspective we analyze the flocking behavior in nature, ranging from the albatross flights to the mobility of people sharing a common goal, till epidemic phenomena. All the related trajectories denote a symmetry breaking in respect to Brownian motion that is formally captured by us through a new variant of the Pareto distribution law. (2) from a dynamic perspective we introduce a new neural network paradigm where neurons are allowed to move to find their best reciprocal positions with the aim of efficiently transmitting information. This gives rise to dynamics – in an extended metric space where neuron Euclidean coordinates merge with connection weights – that are ruled by a generalized Hamiltonian made of kinetic and cognitive components. (3) moving to a large scale we instantiate the above network in terms of social networks, where we analyze the clustering effects of these dynamics in view of forming interest groups with suitable properties. We study these effects in a rather abstract way by considering the two template instances of the “learning by gossips paradigm” and a cooperative training to recognize the digits of the MNIST database.

Biography Bruno Apolloni is full professor in Computer Science at the Department of Computer Science of the Milan University, Italy. His main research interests are in the frontier area between probability, mathematical statistics and computer science, with special regard to statistical bases of learning, subsymbolic and symbolic learning processes, granular computing, analysis of biomedical data, and modeling of dynamical processes in biology. He introduced the Algorithmic Inference approach in statistics as a conceptual and methodological tool to solve modern computational learning problems with the massive use of computers. In particular, it provides a unifying theoretical framework to the various data analysis and management disciplines converging under the granular computing heading. He also introduced some non-markovian processes to model intentionality in a wide range of biological systems ranging from bacteria colonies to social communities. Apolloni is head of the Neural Networks Research Laboratory (LAREN) at the University of Milan, past President of the Italian Society for Neural Networks (SIREN), and member of the European Neural Network Society (ENNS) board. He is a member of the editorial board of many journals in the field, among which: Neural Networks, Neurocomputing, International Journal of Hybrid Intelligent Systems, International Journal of Information and Communication Technology, and International Journal of Computational Intelligence Studies. He is Scientific Leader in national and international research projects. He published around 160 papers.

Plenary Talk for CASoN'13

Tuesday, August 13 from 9:00-10:00 in Arikara room.

Manuel Graña

Instances of subconscious social intelligent computing

Abstract This talk presents several novel ideas on how to understand social interaction as an intelligent computing phenomena, proposing a taxonomy of social systems regarding intelligent behavior that may be useful to set the stage. A key distinction between unconscious and subconscious computing is drawn. Two instances of systems, which are in diverse stages of development, showing subconscious social intelligent computing are discussed.

Biography Manuel Graña is currently full professor at the Computer Science and Artificial Intelligence of the University of the Basque Country (UPV/EHU), in the Facultad de Informatica in San Sebastian, Spain. His research interests include Machine Learning and Patter Recognition, Medical Image Processing and Computer Aided Diagnosis systems, Mobile Robot Navigation, Multi-Agent Systems with natural inspiration, Social Network innovations via Computational Intelligence. The development of Lattice Computing approaches in those domains is his principled research endeavor. He is member of MIR Labs, IEEE and ACM. He has chaired three international conferences (IWANN 2007, HAI 2010, KES 2012). He has been editor of more than ten books. He has been advisor of more than twenty successful doctoral students. He has coauthored over one hundred papers in impact research journals.

Technical Program – NaBIC’13 / CASoN’13

Monday, August 12, 2013

8:45-9:00: Opening ceremony (Room: Arikara)

9:00-10:00: Plenary Talk (Room: Arikara)

Intentionality in living organisms
Bruno Apolloni

10:00-10:30: Coffee break – Poster session (Room: Prairie-Rose)

10:30-12:30: NaBIC - Session 1 (Session chair: Oscar Castillo, Room: Arikara)

Recentering, Reanchoring & Restarting an Evolutionary Algorithm
James Hughes, Sheridan Houghten and Daniel Ashlock

Parallelization and Virtualization of Genetic Algorithms for Sorting Permutations by Reversals
Jose Luis Soncco-Alvarez, Gabriel Marchesan Almeida, Juergen Becker and Mauricio Ayala-Rincon

Individualized Self-Adaptive Genetic Operators with Adaptive Tournament Selection in Genetic Programming
Jeannie Fitzgerald and Conor Ryan

Multi-objective Optimization of Building Envelopes by Bacterial Memetic Algorithms
Árpád Csik and János Botzheim

Genetic Algorithm for Instrument Placement in Smart Grid
Vahidhossein Khiabani, Ergin Erdem, Kambiz Farahmand and Kendall Nygard

12:30-13:30: Lunch (Room: Prairie-Rose)

13:30-15:00 NaBIC - Session 2 (Session chair: Patricia Melin, Room: Arikara)

The Detection of Temporally Distributed Network Attacks Using an Adaptive Hierarchical Neural Network
James Cannady

Synergy Between Extreme Learning Machine and Gaussian Artificial Immune System to Train Multilayer Perceptrons
Pablo A. D. Castro

Social insect inspired approach for identification and dynamic tracking of news stories on the Web
Stefan Sabo and Pavol Navrat

Evolving and Reusing Bin Packing Heuristic through Grammatical Differential Evolution
Marco Sotelo-Figueroa, Héctor J. Puga, Martin Carpio, Hector Joaquin Fraire Huacuja, Laura Cruz and Jorge Alberto Soria-Alcaraz

15:00-15:30: Coffee break – Poster session (Room: Prairie-Rose)

15:30-17:00: NaBIC - Session 3 (Session chair: Pavel Kromer, Room: Arikara)

Bat Algorithm to propose a Financial Trust Forest

C. Alberto Ochoa-Zezatti and Julio Ponce

Meta Heuristics for Prime Factorization Problem

Pranav Dass, Harish Sharma, Jagdish Bansal and Kendall Nygard

A Hybrid Bees Swarm Optimization and Tabu Search Algorithm for Association Rule Mining

Youcef Djenouri, Habiba Drias and Amine Chemchem

Evolution of the Weight Vectors in Mahjong Non-Player Characters

Hisashi Handa

Improving Block Sorting Compression Using Simulated Annealing

Jan Platos

Tuesday, August 13, 2013

9:00-10:00: Plenary Talk (Room: Arikara)

Instances of subconscious social intelligent computing

Manuel Grana

10:00-10:30: Coffee break – Poster session (Room: Prairie-Rose)

10:30-12:30: NaBIC - Session 1 (Session chair: Pascal Bouvry, Room: Arikara)

Optimization of the Interval Type-2 Fuzzy C-Means using Particle Swarm Optimization

Elid Rubio and Oscar Castillo

Particle swarm optimization with dynamic parameter adaptation using interval type-2 fuzzy logic for benchmark mathematical functions

Frumen Olivas, Fevrier Valdez and Oscar Castillo

Fuzzy Decision Tree using Soft Discretization and a Genetic Algorithm based Feature Selection Method

Min Chen and Simone Ludwig

Optimization of type-2 Fuzzy Weight for Neural Network using Genetic Algorithm and Particle Swarm Optimization

Fernando Gaxiola, Patricia Melin, Fevrier Valdez and Oscar Castillo

Optimization of Interval Type-2 and Type-1 Fuzzy Integrators in Ensembles of ANFIS Models with Genetic Algorithms

Jesus Soto, Patricia Melin and Oscar Castillo

10:30-12:30: CASoN - Session 1 (Session chair: Juan Cruz Gomez, Room: Hidatsa)

Expert User Discovery in a Spontaneous Social Network: An approach using Knowledge Retrieval

Gustavo Freitas, Cristiano Costa, Jorge Barbosa, Rodrigo Righi and Adenauer Yamin

Finding Groups of Friends who are Significant across Multiple Domains in Social Networks

Syed Khairuzzaman Tanbeer, Fan Jiang, Carson K. Leung, Richard Kyle MacKinnon and Irish Medina

Evolution of Cooperative Strategies for Iterated Prisoner's Dilemma on Networks

Hisao Ishibuchi, Takahiko Sudo, Koichiro Hoshino and Yusuke Nojima

Extraction and Analysis Social Networks from Process Data

Martin Kopka, Jakub Stolfa, Milos Kudelka, Ondrej Kobersky and Vaclav Snasel

12:30-13:30: Lunch (Room: Prairie-Rose)

13:30-15:00 NaBIC - Session 2 (Session chair: Bruno Apolloni, Room: Arikara)

A Brief Survey of Advances in Particle Swarm Optimization on Graphic Processing Units

Pavel Kromer, Jan Platos and Vaclav Snasel

Savant: Automatic Parallelization of a Scheduling Heuristic with Machine Learning

Frederic Pinel, Bernabe Dorronsoro, Pascal Bouvry and Samee Khan

Common Tensor Discriminant Analysis for Human Brainwave Recognition Accelerated by Massive Parallelism

Petr Gajdos, Pavel Dohnalek and Pavel Bobrov

Scaling Genetic Programming for Data Classification using MapReduce Methodology

Nailah Al-Madi and Simone Ludwig

Convergence results on the stable states of a Gravitational Swarm solving the Graph Coloring Problem

Manuel Grana and Israel Carlos Rebollo

13:30-15:00 CASoN - Session 2 (Session chair: Manuel Grana, Room: Hidatsa)

Using Self-organizing Maps for Identification of Roles in Social Networks

Sarka Zehnalova, Zdenek Horak, Milos Kudelka and Vaclav Snasel

Information integration for detecting communities in attributed graphs

Juan David Cruz and Cecile Bothorel

Visualization of Social Network Dynamics using Sammon's Projection

Martin Radvansky, Milos Kudelka, Zdenek Horak and Vaclav Snasel

15:00-15:30: Coffee break – Poster session (Room: Prairie-Rose)

15:30-17:00: NaBIC - Session 3 (Session chair: Jan Platos, Room: Arikara)

Datamining Techniques for Problem Solving: Application to SAT

Habiba Drias, Célia Hirèche and Ameer Douib

A Digital Goniometer Based on Encoders for Measuring Knee-Joint Position in an Orthosis

Gonzalo Dominguez, Eladio Cardiel, Sandra Arias and Pablo Rogeli

A Dual Mutation Strategy Embedded Evolutionary Programming for Continuous Optimization

Md. Tanvir Alam Anik, Sabbir Ahmed, Abu Saleh Md Noman and K. M. Rakibul Islam

15:30-17:00: CASoN - Session 3 (Session chair: Milos Kudelka, Room: Hidatsa)

Hippocratic Social Network

Rajnishkaur Bedi, Nitinkumar Gove and Vijay Wadhai

Triads, Transitivity, and Social Effects in User Interactions on Facebook

Derek Doran, Huda Alhazmi and Swapna Gokhale

Instances of subconscious social intelligent computing

Manuel Grana and Israel Carlos Rebollo

17:00-19:00: Social Event at Bonanzaville

19:00-21:00: Conference Dinner at Ramada

NaBIC Posters

Fractional Order PID Controller Design for Speed Control of Chopper Fed DC Motor Drive Using Artificial Bee Colony Algorithm

Anguluri Rajasekhar, Shantanu Das and Ajith Abraham

The Adaptive Chemotactic Foraging with Differential Evolution algorithm

Yosra Jarraya, Souhir Bouaziz, Adel M. Alimi and Ajith Abraham

Hybrid Harmony Search algorithm for Global Optimization

Marwa Ammar, Bouaziz Souhir, Adel Alimi and Ajith Abraham

An Optimal Design of Coordinated PI based PSS with TCSC Controller using Modified Teaching Learning Based Optimization

Sreenivas Theja Bagepalli, Rajasekhar Anguluri and Abraham Ajith

Blend of Local and Global Variant of PSO in ABC

Tarun Kumar Sharma, Millie Pant and Ajith Abraham

Towards Scheduling Optimization through Artificial Bee Colony Approach

Ana Madureira, Ivo Pereira and Ajith Abraham

Niche-Clearing-based Variable Mesh Optimization for Multimodal Problems

Ricardo Navarro, Rafael Bello, Rafael Falcon and Ajith Abraham

Forecasting FTSE Bursa Malaysia KLCI Trend with Hybrid Particle Swarm Optimization and Support Vector Machine Technique

Zhong Zhen Lee, Choo Yun-Huoy, Azah Muda and Ajith Abraham

A Novel Application of ACO to Price Transmission Rights in Electricity Markets

Sameer K. Singh, Ruppa Thulasiram and Parimala Thulasiraman

Bio-Inspired Machine Learning Based Wireless Sensor Network Security

Heena Rathore

Design and Simulation of an Active Bilateral Orthosis for Paraplegics

Brian Cano, Eladio Cardiel, Gonzalo Dominguez, Sandra Arias and Pablo Rogeli

Optimum Resource Allocation in OFDM Systems using FRBS and Particle Swarm Optimization

Atta Rahman

Genetic Optimization of Ensemble Neural Networks with Type-2 Fuzzy Response Integration for Predicting the Mackey-Glass Time Series

Martha Pulido, Patricia Melin and Oscar Castillo

Clustering using chemical and colonial odors of real ants

Nesrine Masmoudi, Hanane Azzag, Mustapha Lebbah and Cyrille Bertelle

On the Use of Ant Programming for Mining Rare Association Rules

Juan Luis Olmo Ortiz, Jose-Raul Romero and Sebastián Ventura

CASoN Posters

Chinese SNS Blog Classification Using Semantic Similarity

Chenye Shi, Jianhua Li, Xiuzhen Chen and Jieyuan Chen

Implementing Quasi-Parallel Breadth-First Search in MapReduce for Large-Scale Social Network Mining

Lianghong Qian, Lei Fan and Jianhua Li

Distributed Port-Scan Attack in Cloud Environment

Prachi Deshpande, Aditi Agrawal, S. C. Sharma, P. Sateeshkumar and Ajith Abraham

An Opinion Mining Approach for Web User Identification and Clients' Behaviour Analysis

Grzegorz Dzikowski, Katarzyna Wegrzyn-Wolska and Lamine Bougueroua