



Women in Computational Intelligence at IEEE WCCI 2018



IEEE CIS organized the Women in Computational Intelligence Reception on 12th July in Rio de Janeiro. We had three remarkable speakers (Bernadette Bouchon-Meunier, Simone Ludwig, and Mardé Helbig) speaking of the three top tips in WCI with Keeley Crockett as the emcee. There were several women and men attending the reception. Thanks to all participants who made this event a successful one. We hope you all benefit from this networking event. Look forward to seeing you again at the next reception during the SSCI 2018 in Bangalore!

Research Frontier

Transfer Learning-Based Dynamic Multiobjective Optimization Algorithms

In this paper, we propose an algorithmic framework, called transfer learning-based dynamic multiobjective evolutionary algorithm (EA), which integrates transfer learning and population-based EAs to solve the DMOPs. This approach exploits the transfer learning technique as a tool to generate an effective initial population pool via reusing past experience to speed up the evolutionary process, and at the same time any population-based multiobjective algorithms can benefit from this integration without any extensive modifications. To verify this idea, we incorporate the proposed approach into the development of three well-known EAs, nondominated sorting genetic algorithm II, multiobjective particle swarm optimization, and the regularity model-based multiobjective estimation of distribution algorithm. We employ 12 benchmark functions to test these algorithms as well as compare them with some chosen state-of-the-art designs. The experimental results confirm the effectiveness of the proposed design for DMOPs.



IEEE Transactions on Evolutionary Computation, Aug. 2018

Adaptive Robot Path Planning Using a Spiking Neuron Algorithm with Axonal Delays

Important Message

★ Proposals to Organize CIS Conferences in 2020

Proposals for the organization of IEEE SSCI in 2020 must be submitted by **Oct 15**.

Proposals for all other CIS sponsored conferences in 2020 must be submitted by **Dec. 15**. Please inform [Bernadette Bouchon-Meunier](#) and [Piero Bonissone](#) of your intention to prepare a bid as soon as you decide to do so. Policies, procedures and budget worksheet for such proposals are [available](#).

★ CIS Chapter Activity Promotion Grants

IEEE CIS has strategic plans to promote member activities through chapters and set up an activity promotion grant. Proposal submission is now open till **Oct. 31**. ([Details](#))

CIS Conferences

★ Conference Calendar (2018-2019)

★ 2018 Joint IEEE International Conference on Developmental Learning and Epigenetic Robotics (ICDL-EpiRob 2018)

Tokyo, Japan
Sep. 16-20, 2018

Conference on Data Science and Advanced

A path planning algorithm for outdoor robots, which is based on neuronal spike timing, is introduced. The algorithm is inspired by recent experimental evidence for experience-dependent plasticity of axonal conductance. Based on this evidence, we developed a novel learning rule that altered axonal delays corresponding to cost traversals and demonstrated its effectiveness on real-world environmental maps.

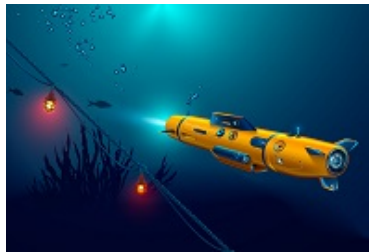


We implemented the spiking neuron path planning algorithm on an autonomous robot that can adjust its routes depending on the context of the environment. The robot demonstrates the ability to plan different trajectories that exploit smooth roads when energy conservation is advantageous, or plan the shortest path across a grass field when reducing distance traveled is beneficial.

IEEE Transactions on Cognitive and Developmental Systems, Jun. 2018

Biologically Inspired Self-Organizing Map Applied to Task Assignment and Path Planning of an AUV System

An integrated biologically inspired self-organizing map (SOM) algorithm is proposed for task assignment and path planning of an autonomous underwater vehicle (AUV) system in 3-D underwater environments with obstacle avoidance. The algorithm embeds the biologically inspired neural network (BINN) into the SOM neural networks. The task assignment and path planning aim to arrange a team of AUVs to visit all appointed target locations, while assuring obstacle avoidance without speed jump.



The SOM neuron network is developed to assign a team of AUVs to achieve multiple target locations in underwater environments. Then, in order to avoid obstacles and speed jump for each AUV that visits the corresponding target location, the BINN is utilized to update weights of the winner of SOM, and achieve AUVs path planning and effective navigation. The effectiveness of the proposed hybrid model is validated by simulation studies.

IEEE Transactions on Cognitive and Developmental Systems, Jun. 2018

Analysis and Design of Functionally Weighted Single-Input-Rule-Modules Connected Fuzzy Inference Systems

In this paper, to further enhance the performance of SIRM-FIS, a functionally weighted SIRM-FIS (FWSIRM-FIS), which adopts multivariable functional weights to measure the important degrees of the SIRMs, is presented. Then, in order to show the fundamental differences of the SIRMs methods, properties of the traditional SIRM-FIS, the type-2 SIRM-FIS (T2SIRM-FIS), the functional SIRM-FIS (FSIRM-FIS), the SIRMs model with single-variable functional weights (SIRM-FW), and FWSIRM-FIS are explored. These properties demonstrate that the proposed FWSIRM-FIS has more general and complex input-output mapping than the existing SIRMs methods. Such properties theoretically guarantee that better performance can be achieved by FWSIRM-FIS. Furthermore, based on the least-squares method, a novel data-driven optimization method is presented for the parameter learning of FWSIRM-FIS. It can also be used to optimize the parameters of SIRM-FIS, T2SIRM-FIS, FSIRM-FIS.



Due to the properties of the least-squares method, the proposed parameters can overcome the drawbacks of the gradients-based parameter learning methods and obtain both smallest training errors and smallest parameters.

Analytics (DSAA 2018)

Turin, Italy

Oct. 1-4, 2018

★ 2018 IEEE Smart World Congress (SmartWorld 2018)

Guangzhou, China

Oct. 8-12, 2018

★ 2018 IEEE Latin American Conference on Computational Intelligence (LA-CCI 2018)

Guadalajara, Mexico

Nov. 7-9, 2018

★ 2018 IEEE Symposium Series on Computational Intelligence (SSCI 2018)

Bangalore, India

Nov. 18-21, 2018

★ 2019 IEEE Congress on Evolutionary Computation (CEC 2019)

Wellington, New Zealand

Jun. 10-13, 2019

(SS Proposal: Oct. 26)

Editor

Chuan-Kang Ting

National Tsing Hua University

Taiwan

Email: ckting@pme.nthu.edu.tw

Educational Activities

IEEE CIG 2018 Short Video Competition

The first [IEEE CIS Short Video Competition](#) took place as one of the competitions for IEEE CIG 2018 in Maastricht on August 15th. The aim is to run these short video competitions in conjunction with all IEEE CIS sponsored conferences, as a way to provide source of interesting videos showcasing CI.



The videos were presented in a plenary session, with the audience voting to deciding the ranking. Congratulations to the winner, runners up and indeed all the entrants for their excellent videos. The results were:

1. [Evolving Mario Levels in the Latent Space of a Deep Convolutional Generative Adversarial Network](#) by Vanessa Volz
2. [Automated Curriculum Learning by Rewarding Temporally Rare Events](#) by Niels Justesen and Sebastian Risi
3. [General Win Prediction: CIG 2018 Short Video Competition](#) by Raluca Gaina and Diego Perez-Liebana

Other entries (no particular order):

- [Coupled Empowerment Maximisation for Adaptive, Believable Game Characters](#) by Christian Guckelsberger
- [Overview on the shallow decision-making analysis in GVGAI](#) by Ivan Bravi
- [Tilt](#) by Giovanni Rubino, Simon Colton, and Joan Casas-Roma
- [Reusability of Evolved MCTS Tree Policies for General Video Game Playing](#) by Ivan Bravi
- [Showcase of AI techniques in StarCraft](#) by Martin Rooijackers

Call for Papers (Journal)

- [IEEE CIM Special Issue on Deep Reinforcement Learning and Games \(Oct 1\)](#)
- [IEEE CIM Special Issue on CI for Internet of Things in the Big Data Era \(Dec 31\)](#)
- [IEEE TEVC Special Issue on Theoretical Foundations of Evolutionary Computation \(Oct 1\)](#)
- [IEEE TEVC Special Issue on Parallel Evolution for Large Scale Optimization \(Nov 1\)](#)
- [IEEE TFS Special Issue on Deep Fuzzy Models \(Oct 1\)](#)
- [IEEE TETCI Special Issue on Computational Intelligence for Cellular/Wireless Communications and Sensing \(Oct 1\)](#)
- [IEEE TETCI Special Issue on Big Data and Computational Intelligence for Agile Wireless IoT \(Oct 15\)](#)
- [IEEE TETCI Special Issue on Privacy and Security in Computational Intelligence \(Nov 30\)](#)

Call for Papers (Conference)

- IEEE Congress on Evolutionary Computation (CEC 2019) (Jan 7)
 - IEEE CEC 2019 Special Session on Memetic Computing
 - IEEE CEC 2019 Special Session on Data-Driven Evolutionary Optimization of Computationally Expensive Problems
 - IEEE CEC 2019 Special Session on Evolutionary Computation for Automated Algorithm Design
 - IEEE CEC 2019 Special Session on Games
 - IEEE CEC 2019 Special Session on Evolutionary Computation for Music, Art, and Creativity
 - IEEE CEC 2019 Special Session on Multimodal Multiobjective Optimization
 - IEEE CEC 2019 Special Session on Brain Storm Optimization Algorithms
 - IEEE CEC 2019 Special Session on Evolutionary Computation and Neural Network for Combating Cybercrime
 - IEEE CEC 2019 Special Session on Evolutionary Computation in Healthcare and Biomedical Data
 - IEEE CEC 2019 Special Session on Pigeon-Inspired Optimization
 - IEEE CEC 2019 Special Session on Evolutionary Scheduling and Combinatorial Optimization
 - IEEE CEC 2019 Special Session on Many-objective Optimization
 - IEEE CEC 2019 Special Session on Evolutionary Computation in Healthcare Industry
 - IEEE CEC 2019 Special Session on Evolutionary Computation for Service and Cloud Computing
 - IEEE CEC 2019 Special Session on New Directions in Evolutionary Machine Learning
 - IEEE CEC 2019 Special Session on When Evolutionary Computation Meets Data Mining
 - IEEE CEC 2019 Special Session on Evolutionary Computation for Smart Grid and Sustainable Energy Systems
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Call for Participation

- IEEE International Conference on Developmental Learning and Epigenetic Robotics (ICDL-EpiRob 2018), Tokyo, Japan (Sep 16-20)
 - IEEE International Conference on Data Science and Advanced Analytics (DSAA 2018), Turin, Italy (Oct 1-4)
 - International Workshop on Semantic and Social Media Adaptation and Personalization (SMAP 2018), Zaragoza, Spain (Sep 6-7)
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Career Opportunities

- 10 PhD Scholarships at KIOS Research and Innovation Center of Excellence, University of Cyprus (Sep 14)
 - PhD and Postdoc Positions on Exploring Duality for Future Data-driven Modelling at KU Leuven, Belgium (Sep 17)
 - Research Associate at Trusted Autonomy Lab, UNSW-Canberra, Australia (Sep 19)
 - Assistant/Associate Professors (various roles), School of Computer Science, University of Nottingham, UK (Sep 30)
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