



Research Frontier

Is Evolutionary Computation Evolving Fast Enough?

Evolutionary Computation (EC) has been an active research area for over 60 years, yet its commercial/home uptake has not been as prolific as we might have expected. In this paper we provide a brief history of EC, recognizing the significant contributions that have been made by its pioneers. We focus on two methodologies (Genetic Programming and Hyper-heuristics), which have been proposed as being suitable for automated software development, and question why they are not used more widely by those outside of the academic community. We suggest that different research strands need to be brought together into one framework before wider uptake is possible. We hope that this position paper will serve as a catalyst for automated software development that is used on a daily basis by both companies and home users.



IEEE Computational Intelligence Magazine, May 2018

A Novel Time Series-Histogram of Features (TS-HoF) Method for Prognostic Applications

Data-driven prognostic methods typically make use of observer signals reflective of the system health combined with machine learning methods to predict the Remaining Useful Life (RUL) of the system. For most prognostic applications, the RUL is closely correlated with changes in data trend exhibited in the observer signals. Motivated by this phenomenon, this paper proposes a novel Time Series-Histogram of Features method, which extracts features describing the local degradation features exhibited by observer signals in a moving time window. The proposed method is illustrated via a case study on a benchmark simulated aero-engine dataset. Results indicate that the proposed methodology performs as well as or better than conventional feature extraction methods on the same time window of information. Furthermore, it is also shown that the proposed method extracts information complementary to conventional feature extraction techniques, thus resulting in superior performance by combining these feature extraction techniques.



IEEE Transactions on Emerging Topics in Computational Intelligence, Jun. 2018

Multicolumn RBF Network

This paper proposes the multicolumn RBF network (MCRN) as a method to improve the accuracy and speed of a traditional radial basis function network (RBFN). The MCRN mechanism is constructed based on dividing a dataset into smaller subsets using the k-d tree

Important Message

★ Nomination for Distinguished Lecturers

The IEEE CIS DLP committee invites all Society's Technical Committees Chairs, Chapter Chairs, EiCs, and AdCom / ExCom members to nominate Distinguished Lecturers (2019-2021). The nominations should be received by **Aug. 30. (Details)**

CIS Conferences

★ Conference Calendar (2018-2019)

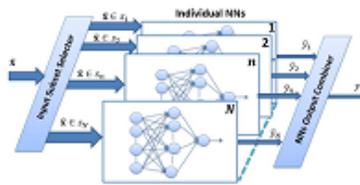
★ 2018 IEEE Conference on Computational Intelligence in Bioinformatics and Computational Biology (CIBCB 2018)
Missouri, USA
May 30-Jun. 2, 2018

★ 2018 IEEE International Conference on Computational Intelligence and Virtual Environments for Measurement Systems and Applications (CIVEMSA 2018)
Ottawa, Canada
Jun. 12-14, 2018

★ 2018 IEEE World Congress

Hio de Janeiro, Brazil
Jul. 8-13, 2018

algorithm. N resultant subsets are considered as separate training datasets to train N individual RBFNs. Those small RBFNs are stacked in parallel and bulged into the MCRN structure during testing. The MCRN is considered as a well-developed and easy-to-use parallel structure, because each individual ANN has been trained on its own subsets and is completely separate from the other ANNs.



This parallelized structure reduces the testing time compared with that of a single but larger RBFN, which cannot be easily parallelized due to its fully connected structure. Small informative subsets provide the MCRN with a regional experience to specify the problem instead of generalizing it. The MCRN has been tested on many benchmark datasets and has shown better accuracy and great improvements in training and testing times compared with a single RBFN.

IEEE Transactions on Neural Networks and Learning Systems, Apr. 2018

Bootstrapping Q-Learning for Robotics From Neuro-Evolution Results

Reinforcement learning (RL) problems are hard to solve in a robotics context as classical algorithms rely on discrete representations of actions and states, but in robotics both are continuous. It is proposed to define a process to make a robot build its own representation for an RL algorithm. The principle is to first use a direct policy search in the sensori-motor space, i.e., with no predefined discrete sets of states nor actions, and then extract from the corresponding learning traces discrete actions and identify the relevant dimensions of the state to estimate the value function. Once this is done, the robot can apply RL: 1) to be more robust to new domains and, if required and 2) to learn faster than a direct policy search. This approach allows to take the best of both worlds: first learning in a continuous space to avoid the need of a specific representation, but at a price of a long learning process and a poor generalization, and then learning with an adapted representation to be faster and more robust.



IEEE Transactions on Cognitive and Developmental Systems, Mar. 2018

★ 2018 IEEE Conference on Computational Intelligence and Games (CIG 2018)
Maastricht, The Netherlands
Aug. 14-17, 2018

★ 2018 Joint IEEE International Conference on Developmental Learning and Epigenetic Robotics (ICDL-EpiRob 2018)
Tokyo, Japan
Sep. 17-20, 2018

★ 2018 IEEE International Conference on Data Science and Advanced 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
(Submission: Jun. 15)

★ 2019 IEEE Congress on Evolutionary Computation (CEC 2019)
Wellington, New Zealand
Jun. 10-13, 2019

5 Minutes with Prof. Gary Yen

IEEE CIS Student Activities Subcommittee invites you to get to know the pioneers and experts in the Computational Intelligence. This month "5 minutes with..." focuses on pioneer **Prof. Gary Yen**.



1. What is your title, full name, and place of work?
Hi, my name is Gary Yen and I am currently a Regents Professor at the School of Electrical and Computer Engineering, Oklahoma State University in Stillwater, Oklahoma, USA.
2. What grade of member in CIS are you?
I am an IEEE Fellow, class of 2009 with the citation of "For the contribution in the Intelligent Systems and Control."
3. How long have you been a member of CIS?
Well, from its very beginning. I was sent as a representative in the Council AdCom, first from Robotics and Automation Society from 1995-1998 and then Control Systems Society from 1999-2000. In 2001, when Neural Networks Council

Editor

was transformed into Neural Networks Society, I have been a loyal member since then.

4. One reason why you are a member of CIS:

It is my belief from the very beginning knowing our field of interest would change the world. Mixed with a sense of pride and hope for a better future, I have continued been a member of CIS.

5. What was your service pathway in the Computational Intelligence Society?

From early time as AdCom Representatives and a key player in assisting Herbert Rauch to lay solid foundation for TNN, my services span into Publication Activities (initiated NNC Newsletter in 2000 and printed newsletter, IEEE coNNectionS, in 2003 to serve as founding editor-in-chief for IEEE Computational Intelligence Magazine, 2006-2009; Associate Editor for TNN, TEVC, and TETCI), Membership Activities (initiated Tour de China in 2006; developed new chapters in China, India, Brazil and Southeast Asia), Conferences Activities (chaired 2006 WCCI and 2016 WCCI, both in Vancouver; served as Invited Sessions Chair for WCCI 2008 in Hong Kong, Finance Chair for WCCI 2012 in Brisbane, Plenary Sessions Chair for WCCI 2014 in Beijing, and now Conference Chair for CEC 2018 under WCCI 2018 in Rio, member of ConfCom and chair of TCS Subcommittee), Technical Activities (chaired NNTC, 2000-2002 and VP Technical Activities, 2004-2005), Education Activities (initiated Youtube video clip competition to outreach younger generations) and Administrative Activities (served as President, 2009-2010, chaired awards committee, 2008-2009, 2014-2015, chaired fellows committee, 2016-2017, chaired strategic planning committee in 2010). A healthy professional society called for numerous talents and diversity experiences and background to extend its service to its membership. I have been a beneficiary of my beloved society.

6. What is your typical working day?

Well, from as early as 9am to as late as 9pm, I suppose, Monday to Friday and more often than not, Saturday and Sunday as well. You probably need to ask my wife to get an accurate answer.

7. What is your ideal weekend?

My dream weekend will be a breakfast in bed, a relaxing morning exercise, an afternoon in baseball park, and a nice dinner with my family. In between many hours of uninterrupted readings.

8. Give one interesting fact about yourself:

I think "a strong commitment to everything I want to accomplish..."

9. What are you reading, watching or listening to at the moment:

I like Bruno Mars music for exercising and I enjoy in reading Dan Brown's novels. I am reading "Origin" lately. If time permits, I am watching "Supernatural" and it has been thirteen seasons running now.

10. Favorite place:

New Zealand would top the list for me, if you ask. I think anywhere will be a favorite place for me if I am accompanied by someone I love or someone I care.

11. Person you would most like to meet – past or present, real or fictional:

With the flurry of Marvel's Heroes movies, it would be really cool to have a unique power myself (how about means to communicate with mind power) and meet my fellow super heroes.

12. What items would you take on a deserted island and why:

A couple nice journal papers to keep me entertaining... heck, I had brought some journal papers into delivery room when my wife delivered our first baby. Sean is now 26 years old.

13. Can you share with us one success story that will motivate young members and provide useful guidelines for their careers?

It is the personal touches I believe that would make the true difference in life. To our younger professionals who are in their early career, they need to believe that they are in a technical area that would make the differences of our every day's

life and Computational Intelligence is the darling of our generation, a match in heaven with the real-world problems at hand and computing/data resources at our disposal.

Members Activities

CIS Industry Liaison Committee Is Soliciting Job Opportunity Information from the Industry

We encourage all CIS members, especially industry members, to provide information. These job positions may be from any company or country. The job information will be posted on the CIS website on the [Industry Liaison](#) page. If you have any information or feedback, please contact the Chair of the Industry Liaison Committee [Catherine Huang](#).



Events at IEEE WCCI 2018

- Joint Reception for Young Professionals and Students (Jul 9, 8pm)
- Panel Discussion for Women in Computational Intelligence (Jul 12, 7pm)



Webinars

- **Challenging the Stigma Surrounding the Role of Women in Technology, a Journey from Combinatorial Optimization to IBM**
Speaker: Dr. Amy Khalfay
Date & Time: Jun 8, 15:00 BST
- **Knowledge Discovery with Genetic Programming Based Symbolic Regression**
Speaker: Prof. Qi Chen
Date & Time: Jun 11, 09:00 BST



More information can be found at [CIS Webinars](#).

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 TETCI Special Issue on New Advances in Deep-Transfer Learning \(Jun 30\)](#)
- [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 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 \(CEC 2019\)](#)
- [International Conference on Neural Information Processing \(ICONIP 2018\) \(Jun 1\)](#)
- [Australasian Joint Conference on Artificial Intelligence \(AI 2018\) \(Jul 1\)](#)
- [International Conference on Intelligent Control and Information Processing \(ICICIP 2018\) \(Jul 15\)](#)
- [International Conference on Advanced Computational Intelligence \(ICACI2019\) \(Jan 1\)](#)

Call for Participation

- [IEEE World Congress on Computational Intelligence \(IEEE WCCI 2018\), Rio de Janeiro, Brazil \(Jul 8-13\)](#)
- [General Video Game AI Competition at IEEE WCCI 2018 \(Jun 6\)](#)
- [IEEE Conference on Computational Intelligence and Games \(CIG 2018\), Maastricht, The Netherlands \(Aug 14-17\)](#)
- [Competitions at IEEE CIG 2018 \(Jul 15\)](#)
- [IEEE International Conference on Computational Intelligence and Virtual Environments for Measurement Systems and Applications \(CIVEMSA 2018\), Ottawa, Canada \(Jun 12-14\)](#)
- [International Summer Camp on AI, Hefei, China \(Jul 1-14\)](#)

Career Opportunities

- [Two Postdoctoral Fellow Positions in Ishibuchi Lab, SUSTech, China \(Jun 15\)](#)

[Privacy & Opting Out of Cookies](#) | [Terms & Conditions](#) | [Nondiscrimination Policy](#) | [Subscribe](#) | [Unsubscribe](#)

A non-profit organization, IEEE is the world's largest professional association for the advancement of technology.

© Copyright 2018 IEEE - All rights reserved. Use of this newsletter site signifies your agreement to the terms and conditions.