



Computational Intelligence Society

Nature-Inspired Problem Solving • cis.ieee.org



IEEE CIS Newsletter, Issue 84, January 2020

2020

Happy New Year!

Welcome from the President

Happy New Year 2020 to all of you and your families!

I am honored and happy to serve as the President of the IEEE Computational Intelligence Society in 2020–2021. At the beginning of this year, let us wish that 2020 will be a remarkable year, especially for Computational Intelligence.

One century ago, in 1920, the word “robot” appeared, coined by Karel Čapek in his science fiction play R. U. R.¹ (Rossumovi univerzální roboti in Czech, translated as



CIS Conferences

- ★ [Conference Calendar \(2020-2021\)](#)
- ★ [2020 12th International Conference on Agents and Artificial Intelligence \(ICAART\)](#)
Valletta, Malta
22-24 Feb. 2020
- ★ [4th International Conference on Computational Intelligence and Networks \(CINE 2020\)](#)
Kolkata, India
27-29 Feb. 2020
- ★ [18th International Conference on Information Processing and](#)

Rossum's Universal Robots). 1920 is also the year when the writer Isaac Asimov was born and everyone knows his Three Laws of Robotics, which he first published in 1942 in the novel Runaround. This novel was the first in a long series of stories in which he explored relations between humans and artifacts and questioned the applicability of these rules to robots in real-life situations with humans. Runaround and other novels were published in 1950, in the collection I, Robot². It is also in 1950, seventy years ago, that Claude E. Shannon published his paper Programming a computer for playing chess³, the first paper proposing a computer program to play chess, a distant ancestor to AlphaGo. The same year, Alan Turing published Computing Machinery and Intelligence⁴ in which he proposed to consider the question "Can machines think?" and described the "imitation game", now known as the Turing test, a "big leap for mankind", from my point of view. The "giant leap" made by Neil Armstrong on the moon in 1969 was more spectacular and historical, but this success would not have been possible without robotic spacecrafts taking photos of the moon and studying physical characteristics of the lunar soil to prepare the mission. It is clear that Artificial Intelligence, and especially learning, neural, fuzzy and evolutionary methods at the core of Computational Intelligence will have a major role to play in the future of space exploration, not to mention the improvement of everyday life on earth.

I wish all researchers in Computational Intelligence a very fruitful year 2020, in the wake of all achievements in Artificial Intelligence, furthering the production of intelligent technologies and autonomous robots at the service of man, in an ethical environment. Together, women and men, students or experts, from industry or universities, we can advance smart world while making efforts to be environmentally friendly.

I hope that I can meet each of you in at least one of the ten conferences sponsored by the IEEE Computational Intelligence Society this year. In particular, I will be happy to see you in Glasgow, UK, for IEEE WCCI 2020, 19-24 July (wcci2020.org) or in Canberra, Australia, for IEEE SSCI 2020, 1-4 Dec. (ieeessci2020.org). Feel free to send me any suggestion or question at b.bouchon-meunier@ieee.org.

Bernadette Bouchon-Meunier
President of the IEEE Computational Intelligence Society

1. Karel Čapek, R.U.R., Rossumovi Univerzální Roboti, Aventinum, 1920.
2. Isaac Asimov, Runaround in I, Robot (The Isaac Asimov Collection ed.). New York City: Doubleday, 1950.
3. Claude E. Shannon, Programming a computer for playing chess, The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, Series 7, Volume 41, Issue 314, 256-275, 1950.
4. Alan M. Turing, Computing machinery and intelligence. Mind, 59, 433-460, 1950.

Management of Uncertainty in Knowledge-Based Systems (IPMU 2020)

Lisbon, Portugal

15-19 June 2020

(Submission: 31 Jan. 2020)

★ 5th South-East Europe Design Automation, Computer Engineering, Computer Networks and Social Media Conference (SEEDA CECNSM 2020)

Corfu, Greece

25-27 Sept. 2020

(Submission: 24 Apr. 2020)

★ 2020 IEEE Conference on Evolving and Adaptive Intelligent Systems (EAIS)

Bari, Italy

27-29 May 2020

★ 2020 IEEE International Conference on Computational Intelligence and Virtual Environments for Measurement Systems and Applications (CIVEMSA)

Tunis, Tunisia

22-24 June 2020

(Submission: 31 Jan. 2020)

★ 2020 IEEE World Congress on Computational Intelligence (WCCI)

Welcome from VP for Member Activities

This message is to welcome all our members to a very exciting year. Please visit our webpage at <https://cis.ieee.org/> to find out about the many benefits of your membership, which includes access to the major CIS publications (e.g., the *Computational Intelligence Magazine*), discounts at CIS sponsored conferences (e.g., the 2020 IEEE World Conference on Computational Intelligence (<https://wcci2020.org/>) to be held in Glasgow, UK, during 19-24 July, 2020), discounts at other CIS publications (e.g., the *IEEE Transactions on Games*), travel grants for CIS sponsored conferences, access to a variety of webinars as well as opportunities to participate in CIS Subcommittees and Task Forces and to organize a Summer School or a CIS local Chapter (or to bring a CIS Distinguished Lecturer in case you are already part of a CIS Chapter). The CIS also has a book series (<https://cis.ieee.org/publications/ieee-press-boo>) for which you are invited to submit proposals and offers a number of opportunities for networking with other researchers, practitioners and students. On our website, you will find additional information about these and the many other benefits of your membership.

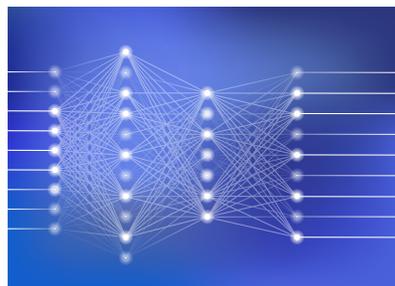
We wish you a wonderful 2020!

Carlos A. Coello Coello
VP for Member Activities

Research Frontier

Evolutionary Generative Adversarial Networks

Generative adversarial networks (GANs) have been effective for learning generative models for real-world data. However, accompanied with the generative tasks becoming more and more challenging, existing GANs (GAN and its variants) tend to suffer from different training problems such as instability and mode collapse. In this paper, we propose a novel GAN framework called evolutionary GANs (E-GANs) for stable GAN training and improved generative performance. Unlike existing GANs, which employ a predefined adversarial objective function alternately training a generator and a discriminator, we evolve a population of generators to play the adversarial game with the discriminator. Different adversarial training objectives are employed as mutation operations and each individual (i.e., generator candidature) are updated



Glasgow, UK
19-24 July 2020
(Submission: 15 Jan. 2020)

★ 2020 IEEE Conference on Games (CoG)
Higashiosaka, Japan
24-27 Aug. 2020

★ 2020 Joint IEEE 10th International Conference on Development and Learning and Epigenetic Robotics (ICDL-EpiRob)
Valparaíso, Chile
7-10 Sept. 2020
(Submission: 15 Mar. 2020)

★ 2020 International Conference on Process Mining (ICPM 2020)
Padua, Italy
5-8 Oct. 2020
(Submission: 24 June 2020)

★ 2020 IEEE 7th International Conference on Data Science and Advanced Analytics (DSAA 2020)
Sydney, Australia
6-9 Oct. 2020
(Submission: 24 May 2020)

★ 2020 IEEE International Conference on Computational Intelligence in Bioinformatics and

based on these mutations. Then, we devise an evaluation mechanism to measure the quality and diversity of generated samples, such that only well-performing generator(s) are preserved and used for further training. In this way, E-GAN overcomes the limitations of an individual adversarial training objective and always preserves the well-performing offspring, contributing to progress in, and the success of GANs. Experiments on several datasets demonstrate that E-GAN achieves convincing generative performance and reduces the training problems inherent in existing GANs.

IEEE Transactions on Evolutionary Computation, Dec. 2019

Manifold Criterion Guided Transfer Learning via Intermediate Domain Generation

In many practical transfer learning scenarios, the feature distribution is different across the source and target domains (i.e., nonindependent identical distribution). Maximum mean discrepancy (MMD), as a domain discrepancy metric, has achieved promising performance in unsupervised domain adaptation (DA). We argue that the MMD-based DA methods ignore the data locality structure, which, up to some extent, would cause the negative transfer



effect. The locality plays an important role in minimizing the nonlinear local domain discrepancy underlying the marginal distributions. For better exploiting the domain locality, a novel local generative discrepancy metric-based intermediate domain generation learning called Manifold Criterion guided Transfer Learning (MCTL) is proposed in this paper. The merits of the proposed MCTL are fourfold: 1) the concept of manifold criterion (MC) is first proposed as a measure validating the distribution matching across domains, and DA is achieved if the MC is satisfied; 2) the proposed MC can well guide the generation of the intermediate domain sharing similar distribution with the target domain, by minimizing the local domain discrepancy; 3) a global generative discrepancy metric is presented, such that both the global and local discrepancies can be effectively and positively reduced; and 4) a simplified version of MCTL called MCTL-S is presented under a perfect domain generation assumption for more generic learning scenario. Experiments on a number of benchmark visual transfer tasks demonstrate the superiority of the proposed MC guided generative transfer method, by comparing with the other state-of-the-art methods.

The source code is available at: <https://github.com/wangshanshanCQU/MCTL>.

IEEE Transactions on Neural Networks and Learning Systems, Dec. 2019

Computational Biology (CIBCB)

Viña del Mar, Chile

27-29 Oct. 2020

(Submission: 1 May 2020)

★ 2020 IEEE Symposium Series on Computational Intelligence (IEEE SSCI 2020)

Canberra, Australia

1-4 Dec. 2020

(Submission: 7 Aug 2020)

★ 2021 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE 2021)

Luxembourg

Jul 11-14, 2021

★ 2022 IEEE World Congress on Computational Intelligence (IEEE WCCI 2022)

Padua, Italy

Jul 11-16, 2022

Editor

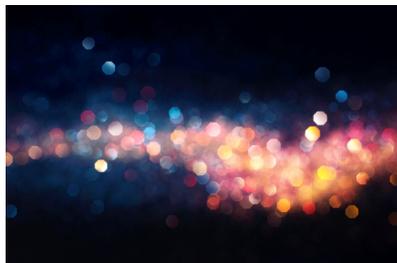
Leandro L. Minku

University of Birmingham, UK

Email: l.l.minku@cs.bham.ac.uk

Concise Fuzzy System Modeling Integrating Soft Subspace Clustering and Sparse Learning

The superior interpretability and uncertainty modeling ability of Takagi-Sugeno-Kang fuzzy system (TSK FS) make it possible to describe complex nonlinear systems intuitively and efficiently. However, classical TSK FS usually adopts the whole feature space of the data for model construction, which can result in lengthy rules for high-dimensional data and lead to degeneration in interpretability. Furthermore, for highly nonlinear modeling task, it is usually



necessary to use a large number of rules which further weaken the clarity and interpretability of TSK FS. To address these issues, an enhanced soft subspace clustering (ESSC) and sparse learning (SL) based concise zero-order TSK FS construction method, called ESSC-SL-CTSK-FS, is proposed in this paper by integrating the techniques of ESSC and SL. In this method, ESSC is used to generate the antecedents and various sparse subspaces for different fuzzy rules, whereas SL is used to optimize the consequent parameters of the fuzzy rules based on which the number of fuzzy rules can be effectively reduced. Finally, the proposed ESSC-SL-CTSK-FS method is used to construct concise zero-order TSK FS that can explain the scenes in high-dimensional data modeling more clearly and easily. Experiments are conducted on various real-world datasets to confirm the advantages.

IEEE Transactions on Fuzzy Systems, Nov. 2019

Educational Activities

IEEE CIS Fraud Detection Challenge Achieves Huge Success

IEEE CIS held its first ([Technical Challenge on Fraud Detection](#)) this year. In this technical challenge, IEEE partnered with the world's leading payment service company, [Vesta Corporation](#) in seeking the best solutions for the fraud prevention industry. The dataset consisted of large-scale real-world e-commerce transactions, provided by Vesta Corporation. The competition was launched on 15 July 2019 using the Kaggle platform and was closed on 3 Oct. 2020, while attracting 126,000 submissions from 6,381 teams with 7,400+ competitors from 104 countries. The competition awarded a total of US\$20,000 with a First Prize of US\$10,000, second prize of US\$7,000, and a 3rd prize of US\$3,000. The first place team is FraudSquad by Chris Deotte from USA and Konstantin Yakovlev from Portugal. The second place team is 2 Uncles and 3 Puppies by Sergey Bryansky from Russia, Mikhail Beshkarev

from Russia, Anton Popov from Russia, Gilberto Titericz from Brazil and Jean-Francois Puget from France. The third place team is Young For You by Shichao Luo from China, Zhongwei Yao from China and Yongyao Chao from USA.

Call for Applications: 2020 Graduate Student Research Grants (15 Mar.)

The IEEE Computational Intelligence Society (CIS) funds scholarships for undergraduate, graduate and PhD students who need financial support to carry out their research during an academic break period. The primary intent of these scholarships is to cover the expenses related to a visit to another university, institute or research agency for collaboration with an identified researcher in the field of interest of the applicant. Funds can be used to cover travel expenses as well as certain living expenses (such as housing). The field of interest of applicants is open, but should be connected with identifiable component of the CIS (neural networks, fuzzy systems, or evolutionary computation).

The call for the next round of applications has a deadline for submission of 15 Mar. 2020. Submissions should be made via [EasyChair](#).

More information on the scheme, including past projects, can be found on the [CIS Graduate Student Research Grants webpage](#).

Call for Papers (Journal)

- [IEEE TFS Special Issue on Type-2 Fuzzy Model Based Control and its Applications \(1 Feb.\)](#)
 - [IEEE TFS Special Issue on Applications of Fuzzy Systems in Data Science and Big Data \(1 Mar.\)](#)
-

Call for Papers (Conference)

- [The 8th International Workshop on Realizing Artificial Intelligence Synergies in Software Engineering \(RAISE 2020\) \(22 Jan.\)](#)
 - [The 16th International Conference on Predictive Models and Data Analytics in Software Engineering \(PROMISE 2020\) \(30 June\)](#)
-

5/13/2020

IEEE Master email

{{my.Comm Preferences:default=edit me}}

[Website](#) | [Privacy Policy](#) | [Contact](#) | [Unsubscribe](#)

© 2020 IEEE– All rights reserved.