Computational Intelligence Society
Nature-Inspired Problem Solving • cis.ieee.org

IEEE CIS Newsletter, Issue 75, April 2019

Call for CIS Award Nominations (30 Apr)

The IEEE Computational Intelligence Society (CIS) annually recognizes significant contributions and meritorious service in the field of computational intelligence. Recognizing volunteers and eminent colleagues is a key element to keep our Society alive and to promote research excellence in computational intelligence.

Please consider nominating well deserving colleagues for one of the following awards:

- Neural Networks Pioneer Award
- Fuzzy Systems Pioneer Award
- Evolutionary Computation Pioneer Award
- Meritorious Service Award
- Outstanding Chapter Award
- Outstanding Ph.D. Dissertation Award
- Outstanding Organization Award
- Outstanding Early Career Award

The completed nomination must be submitted by email to the Awards Soliciting Nominations Subcommittee Chair Prof. Sanaz Mostaghim and a copy to cis-info@ieee.org by **Apr 30, 2019 (strict deadline)** in a single, standalone pdf file. The nomination can be considered submitted only after acknowledgement of the Awards Soliciting Nominations Subcommittee Chair.

For more information, details and procedural aspects, please visit the awards website or contact the CIS Awards Committee Chair, Prof. Cesare Alippi.

Call for IEEE TNNLS Outstanding Paper Award Nomination (Apr 30)

We are accepting nominations for the IEEE TNNLS Outstanding Paper Award, a prestigious award in recognizing outstanding papers published in TNNLS. Here is the important information:

- For the current round of competition, any paper published in 2017 (Volume 28) of TNNLS is eligible for consideration.
- The nomination deadline is **April 30, 2019 (strict deadline)**.
- The complete nomination packet must include the following information: Nominator, Full Citation of the Nominated Paper (including author names, paper title, publication volume, issue, and page numbers), Basis for Nomination, Proposed Citation, 3 Reference Letters, and a Copy of the Nominated Paper.
- The complete nomination package should be submitted in a single PDF file by email to the Awards Soliciting Nominations Subcommittee Chair, Prof. Sanaz Mostaghim at sanaz.mostaghim@ovgu.de and a copy to cis-info@ieee.org and haibohe@uri.edu

The nomination cannot be considered complete until the submitted pack by the Chair of the Awards Soliciting Nominations Subcommittee.

Thank you for your participation and support!

Important Message

Call for 2019 CIS Summer School Proposals

You are encouraged to submit a proposal to hold a CIS summer school in Computational Intelligence (deadline **14 Apr**). The call for proposals can be found here. For more information, please contact Chang-Shing Lee.

Call for Nominations to EiC of IEEE CIM

We are calling for nominations to EiC of IEEE Computational Intelligence Magazine (deadline **26 Apr**). The call for nominations can be found here. For more information, please contact Jim Keller.

Proposals to Organize CIS Conferences

- Proposals for IEEE WCCI 2022 must be submitted by **15 Apr. 2019**

  Please inform Gary Fogel and Gary Yen 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.

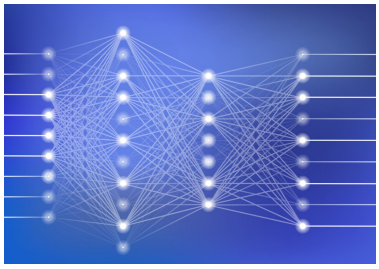
CIS Conferences

Conference Calendar (2019-2021)

for Financial Engineering & Economics (CIFEr)

Research Frontier

NullHop: A Flexible Convolutional Neural Network Accelerator Based on Sparse Representations of Feature Maps



Convolutional neural networks have become the state-of-the-art for solving many visual processing tasks. Even though graphical processing units are often used in training and deploying convolutional neural networks, their power efficiency is less than 10 GOp/s/W for single-frame runtime inference. This paper proposes a flexible and efficient convolutional neural network accelerator architecture called NullHop, which is useful for low-power and low-latency application scenarios. NullHop exploits the sparsity of neuron activations in convolutional neural networks to accelerate the computation and reduce memory requirements. The authors implemented the proposed architecture on a Xilinx Zynq field-programmable gate array (FPGA) platform and investigated it on five different convolutional neural networks, ranging from small ones up to the widely known large VGG16 and VGG19 convolutional neural networks. NullHop achieved an efficiency of 368%, maintained over 98% utilization of the multiply–accumulate units, and achieved a power efficiency of over 3 TOp/s/W in a core area of 6.3 mm2. As further proof of NullHop's usability, the authors also interfaced its FPGA implementation with a neuromorphic event camera for real-time interactive demonstrations.

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

Intuitionistic Fuzzy Rough Set-Based Granular Structures and Attribute Subset Selection

Attribute subset selection is an important issue in data mining and information processing. However, most automatic methodologies consider only the relevance factor between samples while ignoring the diversity factor. This may not allow the utilization value of hidden information to be exploited. This paper proposes a hybrid model named intuitionistic fuzzy (IF) rough set to overcome this limitation. The model combines the technical advantages of rough set and IF set and can effectively consider the above-mentioned statistical factors. Numerical experiments were conducted on public datasets to examine the effectiveness and efficiency of the proposed algorithm in terms of the number of selected attributes, computational time, and classification accuracy. The results demonstrate that the proposed algorithm is effective in terms of dimensionality reduction, produces more acceptable computational time and obtained gains in classification results on most datasets, compared to existing methods.

IEEE Transactions on Fuzzy Systems, Mar. 2019

A Review of Features and Limitations of Existing Scalable Multiobjective Test Suites

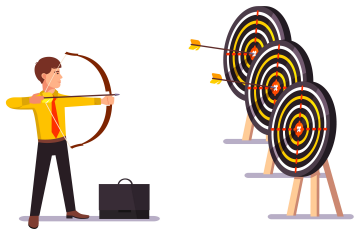
In multiobjective optimization, scalable test problems are problems that can be formulated for an arbitrary number of objectives. They should contemplate a wide variety of features allowing us to evaluate and judge specific components of many-objective evolutionary algorithms. In turn, this should promote the development of new strategies and/or methods in the design of many-objective optimization approaches. Therefore, the study of features and difficulties of this class of problems plays a salient role in the development of many-objective approaches. This paper presents a review of features and limitations of existing multiobjective test problems formulated in continuous and unconstrained search spaces. It also sumr features and recommendations that should be considered in the design multiobjective test instances. A review of the state-of-the-art scalable test suites, including their features and limitations according to the recommended guidelines is provided. Finally, some

Shenzhen, China
4-5 May 2019

- 2019 3rd International Symposium on Autonomous Systems (ISAS)
  Shanghai, China
  29-31 May 2019
- 2019 IEEE Colombian Conference on Applications in Computational Intelligence (ColCACI)
  Barranquilla, Colombia
  4-7 Jun. 2019
- 2019 IEEE Congress on Evolutionary Computation (IEEE CEC 2019)
  Wellington, New Zealand
  10-13 Jun. 2019
- 2019 IEEE International Conference on Computational Intelligence and Virtual Environments for Measurement Systems and Applications (CIVEMSA)
  Tianjin Shi, China
  14-16 Jun. 2019
- 2019 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE 2019)
  New Orleans, USA
  23-26 Jun. 2019
- 2019 International Conference on Process Mining (ICPM)
  Aachen, Germany
  24-26 Jun. 2019
- 2019 IEEE Conference on Computational Intelligence in Bioinformatics and
  Siena, Italy
  9-11 Jul. 2019

possible paths for future research in this area are discussed.

IEEE Transactions on Evolutionary Computation, Feb. 2019



Educational Activities

Call for Competition Participation

Consider submitting your entry for one of the IEEE Conference on Games (CoG 2019) competitions!

Overview of Competitions:
http://www.ieee-cog.org/competitions_conference/

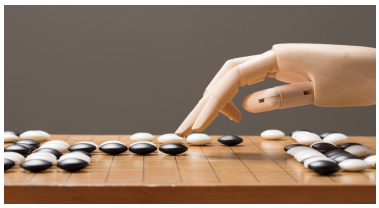
Content Generation Competitions:

- Angry Birds
- GVGAI

Game AI Competitions:

- Bot Bowl
- Fighting Game
- Geometry Friends
- GVGAI
- Hanabi
- Heartstone
- microRTS
- StarCraft
- Strategy Card Game
- TextWorld Problems

FML-based Machine Learning Competition Human and Smart Machine Co-Learning



With the success of AlphaGo, there has been a lot of interest among students and professionals to apply machine learning to gaming and in particular to the game of Go. Several conferences have held competitions human players vs. computer programs or computer programs against each other. While computer programs are already better than human players (even high-level professionals), machine learning still offers interesting prospects, both from the fundamental point of view 1) to even further know the limits of game playing (having programs playing against each other), 2) to better understand machine intelligence and compare it to human intelligence, and from the practical point of view 3) to enhance the human playing experience by coaching professionals to play better or training beginners. The latter prospect also raises interesting questions of the explainability of machine game play. This competition will evaluate the potential of learning machines to teach human players. The goal of this competition includes:

- Understand the basic concepts of an FML-based fuzzy inference system
- Use the FML intelligent decision tool to establish the knowledge
  the fuzzy inference system.
- Use the data predicted by Facebook AI Research (FAIR) Open Source Darkforest AI
  Bot as the training data.

- 2019 International Joint Conference on Neural Networks (IJCNN 2019)
  Budapest, Hungary
  14-19 Jul. 2019
- 2019 Joint IEEE International Conference on Developmental Learning and Epigenetic Robotics (ICDL-EpiRob 2019)
  Oslo, Norway
  19-22 Aug. 2019
- 2019 IEEE Conference on Games (IEEE CoG 2019)
  London, UK
  20-23 Aug. 2019
- 2019 IEEE International Conference on Data Science and Advanced Analytics (DSAA)
  Washington, DC USA
  5-8 Oct. 2019
  (Submission: 2 May)
- 2019 Third International Conference on Intelligent Computing in Data Sciences (ICDS)
  Marrakech, Morocco
  28-30 Oct. 2019
  (Submission: Apr. 30)
- 2019 IEEE Symposium Series on Computational Intelligence (IEEE SSCI 2019)
  Xiamen, China
  6-9 Dec. 2019
  (Submission: 10 Jul.)
- 2020 IEEE World Congress on Computational Intelligence (IEEE WCCI 2020)
  Glasgow, UK

Editor

- Use the data predicted by Facebook AI Research (FAIR) Open Source ELF OpenGo AI Bot as the desired output of the training data.
- Optimize the FML knowledge base and rule base through the methodologies of evolutionary computation and machine learning in order to develop a regression model based on FML-based fuzzy inference system.

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University of Birmingham, UK
Email: l.l.minku@cs.bham.ac.uk

Deadline for submission of applications is **May 10, 2019**. More information and application details can be found here.

Technical Activities

Call for submissions -- Late Breaking Research for FUZZ-IEEE

Got Some “Hot-Off-The-Press” Research Results?
But missed the FUZZ-IEEE 2019 submission deadline?
Want feedback on your ideas/results?

Try out Late Breaking Research for FUZZ-IEEE! For FUZZ-IEEE 2019, we are inviting you to submit an abstract about your newest research. After it is checked out by the program committee, you can then participate in the conference and present your research in the poster session. The feedback during the poster session and conversations at the conference should help you clarify your ideas. The abstract will be made available to all participants in Whova, but there will be no publication in the Proceedings. You can talk to people about your research, get some feedback, and then work on a publication for FUZZ-IEEE 2020 or the Transactions on Fuzzy Systems.

Submit your abstract by 20 April 2019
Send them to the program chairs at programfuzzieee2019@gmail.com. Acceptance notification by 25 April 2019. Still in time to make early bird registration. Register and bring your poster to FUZZ-IEEE 2019. More details at: http://sites.ieee.org/fuzzieee-2019/late-breaking-research/

Computational Finance and Economics Technical Committee (CFETC)

A number of our TC members have been organizing the IEEE Conference on Computational Intelligence for Financial Engineering and Economics (CIFEr 2019) to be held in Shenzhen, China, 4-5 May 2019. The submission deadline was the end of December 2018 and we received 40 submissions of which 25 were accepted after review. CIFEr'19 focuses on the theme of powering financial industries with AI an dwill be unique in its connecting international computational intelligence communities with many booming Fintech companies with AI innovative applications and more than 8,000 hedge funds with AUM Ten Trillions of Chinese Yuan in Shenzhen and other cities in China. Participation and sponsorship is sincerely welcome to CIFEr 2019. For more information, please visit http://www.ieee-cifer.org.

The Symposium on Computational Intelligence for Financial Engineering and Economics (CIFEr 2020), the flagship event of IEEE CFETC, will be held under the aegis of the 2020 IEEE Symposium Series on Computational Intelligence (IEEE SSCI 2020). IEEE SSCI is one among the two flagship events of IEEE Computational Intelligence Society (IEEE CIS), which co-locates several symposia dedicated to specific topics in the domain of Computational Intelligence and its allied fields, under one roof. CIFEr 2020 will align with IEEE SSCI 2020, which will be held in Canberra, Australia during December 1-4, 2020.

Member Activities

Women in Computer Science

Our member, Daniela López De Luise is organizing an event at Historical Museum Sarniento regarding STEAM (Science, Technology, Engineering, Art and Mathematics), where she will lecture on how metrics for STEAM are designed by using Computationa

The event STEAM NEXUM will take place on 17 July 2019 at Museo Histórico Sarmiento Cuba 2070.

Organizers: Museo Histórico Sarmiento, IEEE CIS Argentina, Sociedad Científica Argentina

We look forward to hearing your comments and suggestions for future activities of WCI. Please email them to Vesna Šešum-Čavić, Chair, IEEE Computational Intelligence Society Women in Computational Intelligence Sub-committee 2019.

Upcoming Webinar

"Automated Profiling of Individual Traits: Modelling Learning Styles with Oscar Conversational Intelligent Tutoring System" by Dr Annabel Latham
Date and Time: 8 April 2019 (3pm – 4pm GMT)
Registration URL: https://attendee.gotowebinar.com/register/6228784346626541571

Abstract: Use of computational intelligence methods for automated user profiling have been widely publicised recently following the Cambridge Analytica / FaceBook scandal, with implications for the ethics and governance of tracking data held on social media and other platforms. Debate over the validity of psychological models of personality and learning styles is not new, however adaptive and targeted online advertisements that rely on such models are big business. This webinar explores the application of intelligent systems to user profiling in the online learning domain. It will describe research to develop methods for profiling individual traits in a learning context, introducing a Conversational Intelligent Tutoring System called Oscar and the experiments to automatically predict each individual learner's preferred style in order to provide an adaptive learning experience. Using the Felder-Silverman model of learning styles, a set of typical behaviours is mapped to a set of variables to capture each learner's behaviour during an adaptive conversational tutorial. The complexities of capturing data implicitly during a real-time tutoring conversation in a live teaching/learning environment will be discussed. A number of methods and algorithms (e.g. rule-based, MLP neural networks, decision trees, fuzzy decision trees) were applied to the behaviour dataset to determine the best predictions for each of the 4 dimensions of learning style, and for attribute selection to reduce time/complexity for application in real-time tutoring conversations.

For more information on this and other webinars, please visit the CIS webinars website.

Call for Papers (Journal)

- IEEE TFS Special Issue on Fuzzy Rough Sets for Big Data (May 15 - extended)
- IEEE TFS Special Issue on Toward Humanoid Robots: Fuzzy Sets and Extensions (May 1)
- IEEE TFS Special Issue on Nature-inspired Optimization Methods in Fuzzy Systems (Jul 1)
- IEEE CIM Special Issue on Evolutionary Machine Learning (Jul 15)
- IEEE TFS Special Issue on Fuzzy Based AI: Emerging Techniques and their Applications (Aug 1)
- IEEE TFS Special Issue on Smart Fuzzy Optimization in Operational Research and Renewable Energy: Modelling, Simulation and Application (Nov 1)

Call for Papers (Conference)

- The 9th International Conference on Information Science and Technology (ICIST 2019) (Apr 1)
- The 15th ACM/SIGEVO Workshop on Foundations of Genetic Algorithms (FOGA XV) (Apr 17)
- ICDL-EpiRob Workshop on Naturalistic Non-Verbal and Affective Human-Robot Interactions (May 12)

Call for Participation (Conference)

- The 3rd International Symposium on Autonomous Systems (ISAS 2019) (May 29-31)

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