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IEEE

IEEE CIS Newsletter, Issue 71, December 2018

IEEE CIS Flagship Conferences

2019 IEEE Congress on Evolutionary Computation

The 2019 IEEE Congress on Evolutionary Computation (IEEE CEC 2019), the premier event in the area of evolutionary computation, will be held on 10-13 June 2019, at the Museum of New Zealand Te Papa Tongarewa, New Zealand's national museum located in Wellington. IEEE CEC 2019 will cover all topics on both the theory and applications of evolutionary computation and its hybridisation with other AI approaches, which will provide a forum for researchers and practitioners across all areas of evolutionary computation to meet and discuss recent advances, and feature exciting keynote speeches by world-leading researchers.

Lists of Special Sessions and Competitions.

Important Dates:

- Paper Submissions: **7 January 2019** (open now!)
- Paper Acceptance Notifications: 7 March 2019
- Conference Dates: 10-13 June 2019

For more information, please visit http://cec2019.org/.

2019 IEEE International Conference on Fuzzy Systems

The 2019 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE 2019), the world-leading event focusing on the theory and application of fuzzy logic, will be held in New Orleans, Louisiana, USA. FUZZ-IEEE 2019 will represent a unique meeting point for scientists and engineers, from academia and industry, to interact and discuss the latest enhancements and innovations in the field. The topics of the conference will cover all aspects of theory and applications of fuzzy logic and its hybridisations with other artificial and computational intelligence methods, see here.

Important Dates:

- Paper Submissions: **11 January 2019** (open now!)
- Paper Acceptance Notifications: 4 March 2019
- Conference Dates: 23-26 June 2019

For more information, please visit http://sites.ieee.org/fuzzieee-2019/.

2019 International Joint Conference on Neural Networks

Important Message

Proposals to Organize CIS Conferences

- Proposals for CIS sponsored conferences in 2020 must be submitted by **15 December**
- Proposals for IEEE SSCI 2021 must be submitted by **15 March 2019**
- Proposals for IEEE WCCI 2022 must be submitted by **15 April 2019**

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.

Distinguished Lecturer Invitation

CIS local chapters are encouraged to invite DLP speakers. For more information about DLP speaker invitation, please refer to the webpage.

CIS Conferences

- Conference Calendar (2019-2021)
- 2019 IEEE Congress on Evolutionary Computation (CEC 2019)

(Special Session Proposals: Nov. 9)

The 2019 International Joint Conference on Neural Networks (IJCNN) will be held in Budapest, Hungary on 14-19 July 2019. The conference is organized by the International Neural Network Society (INNS) in cooperation with the IEEE Computational Intelligence Society, and is the premier international meeting for researchers and other professionals in neural networks and related areas. It will feature invited plenary talks by world-renowned speakers in the areas of neural network theory and applications, computational neuroscience, robotics, and distributed intelligence. In addition to regular technical sessions with oral and poster presentations, the conference program will include special sessions, competitions, tutorials and workshops on topics of current interest.

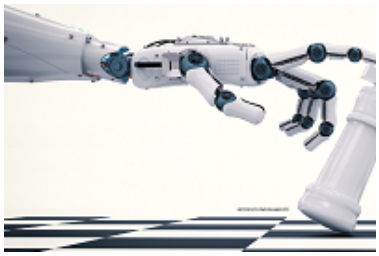
Important Dates:

- Paper Submissions: **15 December 2018** (open now!)
- Paper Acceptance Notifications: 30 January 2019
- Conference Dates: 14-19 July 2019

For more information, please visit http://www.ijcnn.org/.

Research Frontier

Cross-Validation for Imbalanced Datasets: Avoiding Overoptimistic and Overfitting Approaches



Although cross-validation is a standard procedure for performance evaluation, its joint application with oversampling remains an open question for researchers farther from the imbalanced data topic. A frequent experimental flaw is the application of oversampling algorithms to the entire dataset, resulting in biased models and overly-optimistic estimates.

IEEE Computational Intelligence Magazine, Nov. 2018

Hierarchical Deep Reinforcement Learning for Continuous Action Control

Robotic control in a continuous action space has long been a challenging topic. This is especially true when controlling robots to solve compound tasks, as both basic skills and compound skills need to be learned. In this paper, we propose a hierarchical deep reinforcement learning algorithm to learn basic skills and compound skills simultaneously. In the proposed algorithm, compound skills and basic skills are learned by two levels of hierarchy. In the first level of hierarchy, each basic skill is handled by its own actor, overseen by a shared basic critic. Then, in the second level of hierarchy, compound skills are learned by a meta critic by reusing basic skills. The proposed algorithm was evaluated on a Pioneer 3AT robot in three different navigation scenarios with fully observable tasks. The simulation 2 in a robot operating system Indigo environment. The results show that algorithm can learn both high performance basic skills and compound skills through the same learning process. The compound skills learned outperform those learned by a discrete action space deep reinforcement learning algorithm.

- 2019 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE 2019)
  New Orleans, USA
  23-26 June 2019
  (Submission: Jan. 11)
- 2019 International Joint Conference on Neural Networks (IJCNN 2019)
  Budapest, Hungary
  14-19 July 2019
  (Submission: Dec. 15)
- 2019 IEEE Conference on Computational Intelligence in Bioinformatics and Computational Biology (CIBCB 2019)
  Tuscany, Italy
  9-11 July 2019
- 2019 Joint IEEE International Conference on Developmental Learning and Epigenetic Robotics (ICDL-EpiRob 2019)
  Oslo, Norway
  19-22 August 2019
- 2019 IEEE Conference on Games (CoG 2019)
  London, UK
  20-23 August 2019

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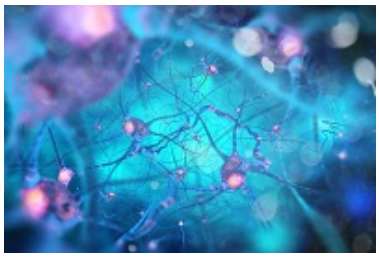
IEEE Transactions on Neural Networks and Learning Systems, Nov. 2018

Building a Spiking Neural Network Model of the Basal Ganglia on SpiNNaker



We present a biologically inspired and scalable model of the basal ganglia (BG) simulated on the spiking neural network architecture (SpiNNaker) machine, a biologically inspired low-power hardware platform allowing parallel, asynchronous computing. Our BG model consists of six cell populations, where the neuro-computational unit is a conductance-based Izhikevich spiking neuron; the number of neurons in each population is proportional to that reported in anatomical literature. This model is treated as a single-channel of action-selection in the BG, and is scaled-up to three channels with lateral cross-channel connections. When tested with two competing inputs, this three-channel model demonstrates action-selection behavior. The SpiNNaker-based model is mapped exactly on to SpineML running on a conventional computer; both model responses show functional and qualitative similarity, thus validating the usability of SpiNNaker for simulating biologically plausible networks. Furthermore, the SpiNNaker-based model simulates in real time for time-steps ≥ 1 ms; power dissipated during model execution is ≈ 1.8 W.

IEEE Transactions on Cognitive and Developmental Systems, Sep. 2018

Pac-Man Conquers Academia: Two Decades of Research Using a Classic Arcade Game

Pac-Man, and its equally popular successor Ms. Pac-Man, are often attributed to being the frontrunners of the golden age of arcade video games. Their impact goes well beyond the commercial world of video games and both games have featured in numerous academic research projects over the last two decades. In fact, scientific interest is on the rise and many avenues of research have been pursued, including studies in robotics, biology, sociology, and psychology. The most active field of research is computational intelligence, not least because of popular academic gaming competitions that feature Ms. Pac-Man. This paper summarizes the peer-reviewed research that focuses on either game (or close variants thereof) with particular emphasis on the field of computational intelligence. The potential usefulness of games like Pac-Man for higher education is also discussed and the paper concludes with a discussion of prospects for future work.

IEEE Transactions on Games, Sep. 2018

Members Activities

Webinars

- **Developments in Type-2 Fuzzy Logic**
  Speaker: Prof. Jon Garibaldi
  Date & Time: 10 December 16:00 GMT
- **Theories for Modelling Reasoning**
  Speaker: Prof. María Daniela López De Luise
  Date & Time: 19 December 13:00 GMT

More information can be found at CIS Webinars.

Call for Papers (Journal)

- IEEE CIM Special Issue on CI for Internet of Things in the Big Data Era (31 Dec)
- IEEE TFS Special Issue on Deep Fuzzy Models (1 Dec)
- IEEE TFS Special Issue on Fuzzy Rough Sets for Big Data (1 Apr 2019)
- IEEE TFS Special Issue on Toward Humanoid Robots: Fuzzy Sets and Extensions (1 May 2019)
- IEEE TCDS Special Issue on Continual Unsupervised Sensorimotor Learning (6 Jan 2019)

Call for Papers (Conference)

- IEEE Conference on Computational Intelligence for Financial Engineering and Economics (CIFEr 2019) (8 Dec)
- IEEE International Conference on Development and Learning and on Epigenetic Robotics (ICDL-EpiRob 2019) (22 Feb)
- IEEE CEC 2019 Special Session on Evolutionary Computation for Creativity, Manufacture and Engineering Management in the Industry 4.0 Era
- IEEE CEC 2019 Special Session on Computational Intelligence for Cybersecurity
- IEEE CEC 2019 Special Session on Swarm Intelligence in Operations Research, Management Science, and Decision-Making
- IEEE CEC 2019 Special Session on Evolutionary Computation for Multi-Agent Systems
- IEEE CEC 2019 Special Session on Evolutionary Algorithms for Complex Optimization in the Energy Domain
- IEEE CEC 2019 Special Session on Speciation
- 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 Music, Art, and Creativity
- IEEE CEC 2019 Special Session on When Evolutionary Computation Meets Data Mining
- IEEE CEC 2019 Special Session on Games
- IEEE CEC 2019 Special Session on Ethics and Social Implications of Computational Intelligence
- IEEE CEC 2019 Special Session on Evolutionary Deep Learning and Applications
- IEEE FUZZ-IEEE 2019 Special Session on Software for Soft Computing
- IEEE FUZZ-IEEE 2019 Special Session on Advances on eXplainable Artificial Intelligence
- International Conference on Advanced Computational Intelligence (ICACI 2019) (1 Jan)
- International Conference on Process Mining (ICPM 2019) (8 Feb)

Career Opportunities

- Post-Doctoral Swarm Robotics, School of Engineering and Information Technology, University of New South Wales Canberra, Australia (6 Dec)
- 12 fully-funded PhD studentships, EPSRC Centre for Doctoral Training in Intelligent Games and Game Intelligence (IGGI), UK (31 Jan)