2017 IJCNN Special Session on "Optimizing Neural Networks via Evolutionary Computation and Swarm Intelligence"

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Organized by

IEEE CIS Task Force on Intelligent Adaptive Fault Tolerant Control, Reliability, and Optimization

Organizers:

Wei-Chang Yeh, National Tsing Hua University, Taiwan (yeh@ieee.org)

Yew-Soon Ong, School of Computer Engineering Nanyang Technological University, Singapore (ysong@ieee.org)

Scope and motivation

Today, neural networks have been widely recognized as useful frameworks to model multidimensional nonlinear relationships. It has been successfully applied in real-world applications including signal processing, robot control, classification, etc. Recently, it has also been employed to construct deep architectures for deep learning to model high-level abstractions in data, and achieved considerable success in applications such as natural language processing, music signal recognition, computer vision and automatic speech recognition, etc. Despite the success achieved by neural network, constructing multilayer neural networks involves challenging optimization problems, i.e., finding appropriate architecture and the corresponding optimal weights for some of the core applications of interest.

Evolutionary Computation and Swarm Intelligence are natural inspired heuristic

methods with global search capability that have attracted extensive attentions in the last decades. They have been successfully applied to complex optimization problems including continuous optimization, combinatorial optimization, constrained optimization, etc. The aim of this special session is to provide a forum for researchers in the field of neural network to exchange their latest advances in theories, technologies, and practice of optimizing neural networks, especially with deep and large architecture, using evolutionary computation and swarm intelligence.

Relevance for IJCNN

This Special Session on "Optimizing Neural Networks via Evolutionary Computation and Swarm Intelligence" mainly focus on the research of exploring Evolutionary Computation and Swarm Intelligence methodologies for optimizing the neural network architectures. Despite a significant amount of research have been done in neural networks, there remains many open issues and intriguing challenges in optimizing neural network architectures, especially in todays' deep learning context, where neural networks usually have many layers and large number of neurons.

Authors are invited to submit their original and unpublished work in the areas including, but not limited to:

Topics

- Evolutionary Computation in Neural Networks,
- Swarm Intelligence in Neural Networks,
- Advances in Evolutionary Computation and/or Swarm Intelligence,
- Knowledge incorporation in Evolutionary Computation and/or Swarm Intelligence,
- Advances in Neural Networks
- Analytical studies that enhance our understanding on the behaviors of Evolutionary Computation and/or Swarm Intelligence in optimizing Neural Networks,
- Novel or Improved frameworks of Neural Networks,
- Others.

Program Organizers and Chair:

Professor Wei-Chang Yeh, Ph.D.
Department of Industrial Engineering and Engineering Management
National Tsing Hua University, Hsinchu, Taiwan 300
Phone: +886-3-5742443

Fax: +886-3-572-2204
Email: yeh@ieee.org
URL: http://integrationandcollaboration.org
https://sites.google.com/site/integrationcollaborationlab/

Wei-Chang Yeh has completed his Ph.D degree in 1992 at the Department of Industrial Engineering, University of Texas at Arlington, USA. He is the Professor of the Department of Industrial Engineering and Engineering Management in the National Tsing Hua University, Taiwan. He has also published more than 108 papers in reputed journals and serves as an editorial board member of repute. His research interest includes Network Reliability, Cloud Computing Management, Simplified Swarm Optimization (SSO) and Soft Computing and Data Mining. Prof. Yeh is an editorial board member of "Reliability Engineering and System Safety (RESS)", "Soft Computing with Applications (SCA)" and "International Journal of management and Marketing (IJMM)". He is most honored to be able to serve as the Chair for Task Force of Intelligent Adaptive Fault Tolerant Control, Optimization and Reliability, and looks forward to the event.

Yew-Soon Ong is currently an Associate Professor and Director of Computational Intelligence Graduate Laboratory, Director of the A*Star SIMTECH-NTU Joint Lab on Complex Systems at the Nanyang Technological University, Singapore, and the Programme Principal Investigator of the Rolls-Royce@NTU Corporate Lab. He received his PhD degree on Artificial Intelligence in complex design from the Computational Engineering and Design Center, University of Southampton, United Kingdom in 2003. His current research interest in computational intelligence spans across memetic computation, evolutionary computation, machine learning, Big Data Analytics and agent-based systems.

He is the founding Technical Editor-in-Chief of Memetic Computing Journal, founding Chief Editor of the Springer book series on studies in adaptation, learning, and optimization, Associate Editor of the IEEE Transactions on Evolutionary Computation, the IEEE Transactions on Neural Networks & Learning Systems, IEEE Computational Intelligence Magazine, IEEE Transactions on Cybernetics, IEEE Transactions on Big Data, Soft Computing, International Journal of System Sciences and others. He has coauthored over 200 refereed publications and his research grants

in the last five years amounts to a total of more than 25 million Singapore dollars. His research work on Memetic Algorithm was featured by Thomson Scientific's Essential Science Indicators as one of the most cited emerging area of research in August 2007. And he is recipient of the 2015 IEEE Computational Intelligence Magazine Outstanding Paper Award and the 2012 IEEE Transactions on Evolutionary Computation Outstanding Paper Award for his work pertaining to Memetic Computation. Several of his research technologies in memetic computation have been commercialized and licensed to companies and institutions worldwide. Over the last 5 years, he has been invited to deliver over 20 keynote, plenary or lecture speeches at international conferences, workshops and lecture series.

He chaired the IEEE Computational Intelligence Society Emerging Technologies Technical Committee from 2012-2013 and the IEEE Computational Intelligence Society Intelligent Systems and Applications Technical Committee from 2013-2014. Presently, he is Conference Chair of the Congress on Evolutionary Computation, World Congress on Computational Intelligence, Vancouver, Canada, 2016 and also secretary of the IEEE Transactions on Computational Intelligence and AI in Games steering committee.

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