

SPECIAL ISSUE ON

EVOLUTIONARY NEURAL ARCHITECTURE SEARCH AND APPLICATIONS

Aims and Scope

Deep neural networks have shown significantly promising performance in addressing real-world problems. The achievements of such algorithms largely owe to its deep neural architectures. However, designing an optimal deep architecture for a particular problem requires rich domain knowledge on both the investigated data and the neural networks, which is not necessarily held by the end-users. Neural Architecture Search (NAS), as an emerging technique to automatically design the optimal deep architectures without having the expertise, is drawing increasing attention from industry and academia. However, NAS is theoretically a non-convex and non-differentiable optimization problem, and existing accurate methods are incapable of well addressing it.

Evolutionary computation (EC) approaches have shown superiority in addressing real-world problems due largely to their powerful abilities in searching for global optima, dealing with non-convex/non-differentiable problems, and requiring no rich domain knowledge. EC has been successfully applied for NAS of shallow and median-scale neural networks. The goal of this Special Issue is to investigate both the new methods and applications on how EC promotes the deep neural network architecture search without or with only rare human expertise.

Topics

This special issue is targeted on general readership articles about design and application of CI technologies. Topics of interest include, but are not limited to:

- Encoding strategy for both supervised and unsupervised deep neural networks, such as CNNs, Autoencoders, DBNs, GANs, LSTM, etc.
- Novel EC methods for automatically designing the encoding strategy
- Efficient genetic operators for variable-length individuals
- Multi- and many-objective evolutionary neural architecture search
- Evolutionary constrained neural architecture search
- Evolutionary bi-level neural architecture search

- Evolutionary methods for differential neural architecture search
- Evolutionary transfer learning for neural architecture search
- Surrogate-assist evolutionary neural architecture search
- Evolutionary fitness acceleration method of neural architecture search
- EC-based interpretable neural architecture search
- Evolutionary fuzzy neural architecture search
- Small-sample evolutionary neural architecture search
- Computational efficiency and scalability of evolutionary neural architecture search algorithms
- Real-world applications based evolutionary neural architecture search

Submission

The IEEE Computational Intelligence Magazine (CIM) publishes peer-reviewed high-quality articles. All manuscripts must be submitted electronically in PDF format. Manuscripts must be in standard IEEE two-column/single space format and adhere to a length of 10-12 pages (including figures and references) for regular papers. A mandatory page charge is imposed on all papers exceeding 12 pages in length.

More information on manuscript details and submission guidelines can be found at the following websites:

- Special Issue website: https://yn-sun.github.io/si_enasa.html
- IEEE CIM website: <https://cis.ieee.org/publications/ci-magazine/cim-information-for-authors>

Important Dates

- Manuscript Due: **August 30, 2020**
- First Notification: November 15, 2020
- Revision Due: December 15, 2020
- Final Notification: January 31, 2021

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