SPECIAL ISSUE ON

MACHINE LEARNING ASSISTED EVOLUTIONARY MULTI-OBJECTIVE OPTIMIZATION

Aims and Scope

Optimization and learning are two main paradigms of artificial intelligence techniques in addressing real-world complex problems, with their respective focuses but frequently enhanced by each other. Evolutionary multi-objective optimization (EMO) algorithms are a family of nature-inspired algorithms widely used for solving multi-objective optimization problems (MOPs). Despite the great success achieved, most traditional EMO algorithms have also encountered many challenges in terms of optimization performance and efficiency for solving complex MOPs such as large-scale MOPs, expensive MOPs, dynamic MOPs, and real-world MOPs. To meet these challenges, there have been increasing interest in applying machine learning (ML) techniques to enhancing the EMO algorithms. Specifically, ML techniques can be adopted to extract useful knowledge hidden in the data generated by EMO algorithms in search process, and this knowledge can assist different components in EMO algorithms in different ways, e.g., problem formulation, offspring generation, fitness evaluation, and/or environmental selection. These machine learning assisted components have substantially enhanced the ability of EMO algorithms in handling complex MOPs. In light of such emerging topics in EMO research, this special issue focuses on machine learning assisted evolutionary multi-objective optimization, aiming to promote the development of theories and methodologies and the discussions of machine learning techniques for evolutionary algorithms in addressing complex MOPs.

Topics

We welcome high-quality original submissions addressing topics related to machine learning assisted evolutionary multi-objective optimization, but are not limited to:

- Multi-objective estimation of distribution algorithms
- Multi-objective Bayesian optimization algorithms
- Surrogate assisted multi-objective evolutionary algorithms

- Machine learning assisted objective space analysis/reconstruction for evolutionary multi-/many-objective optimization
- Machine learning assisted decision space analysis/reconstruction for evolutionary large-scale multi-objective optimization
- Knowledge transfer for dynamic evolutionary multi-objective optimization
- Privacy-preserving and fairness-aware evolutionary multi-objective optimization
- Machine learning assisted evolutionary multi-objective optimization for real-world applications

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 pages (including figures and references) for regular papers. A mandatory page charge is imposed on all papers exceeding 10 pages in length.

More information on manuscript details and submission guidelines can be found at IEEE CIM website: https://cis.ieee.org/publications/ci-magazine/cim-information-for-authors

Important Dates

- Manuscript Due: **September 1, 2022**
- First Notification: November 15, 2022
- Revision Due: December 15, 2022
- Final Notification: January 31, 2023

Guest Editors

- **Xingyi Zhang**, Anhui University, China
- **Ran Cheng**, Southern University of Science and Technology, China
- **Liang Feng**, Chongqing University, China
- **Yaochu Jin**, Bielefeld University, Germany