Tentative Outline

Evolutionary Computation for Deep Learning and Machine Learning
Sectional Editors: Yu Xue, Yong Zhang, Adam Slowik

- **Scope of the Thematic Issue:**

Evolutionary computation technique has been widely used for addressing various challenging problems due to its powerful global search ability. There are many complex optimization tasks in the fields of machine learning and data mining such as feature selection, neural architecture search, hyper-parameter search, etc. This workshop aims to collect original papers that develop new evolutionary computation techniques to address any kind of machine learning and data mining tasks.

Keywords:

Neural architecture search; EvolNAS; AutoML; Self-adaptive evolutionary NAS; Evolutionary neural networks; Hyper-parameter optimization

Sub-topics:

The sub-topics to be covered within the issue should be provided:

- Neural architecture search (NAS)
- EvolNAS
- AutoML
- Self-adaptive evolutionary NAS
- Evolutionary neural networks
- Evolutionary computation for neural architecture search
- Hyper-parameter tuning with evolutionary computation
- Hyper-parameter tuning with self-adaptive evolutionary algorithm
- Evolutionary computation for deep neural networks
- Evolutionary computation in deep learning for regression/clustering/classification
- Hyper-parameter optimization
- Evolutionary computation for hyper-parameter optimization
- Evolutionary computation for automatic machine learning
- Evolutionary computation for deep neural network
- Evolutionary transfer learning
- Full-space neural architecture search
- Differentiable NAS
- Hybridization of evolutionary computation and neural networks
- Feature selection, extraction, and dimensionality reduction on high-dimensional and large-scale data
- Evolutionary feature selection and construction
- Multi-objective feature selection/Multi-object classification/ Multi-object clustering
- Multi-task optimization, Multi-task learning, Meta learning
- Learning based optimization
- Hybridization of evolutionary computation and cost-sensitive classification/clustering
- Bi-level optimization (BLO)
- Hybridization of evolutionary computation and class-imbalance classification/clustering
- Numerical optimization/Combination optimization/ Multi-objective optimization

- Genetic algorithm/Genetic programming/Particle swarm optimization/Ant colony optimization/Artificial bee colony/Differential evolution/Fireworks algorithm/Brain storm optimization
- Classification/clustering/regression
- Machine learning/Data mining/Neural network/Deep learning/Support vector machine/Decision tree/Deep neural network/Convolutional neural network/Reinforcement learning/Ensemble learning/K-means
- Real-world applications of evolutionary computation and machine learning, e.g. images and video sequences/analysis, face recognition, gene analysis, biomarker detection, medical data analysis, text mining, intrusion detection systems, vehicle routing, computer vision, natural language processing, speech recognition, etc.

Tentative titles of the articles:

1. A multi-objective evolutionary algorithm for high dimensional portfolio optimization

2. Evolutionary generative adversarial network for video prediction

3. Hybrid initialization method for multi-objective feature selection

4. A genetic programming approach to feature construction for ensemble learning

5. A running performance metric and stagnation detection mechanism for multi-objective optimization

6. Genetic algorithm for echo state network

7. An effective evolutionary transfer approach multi-objective multitasking optimization

Schedule:
- Thematic issue submission deadline: **31, Dec. 2022**

Contacts:
Sectional Editors Name: Yu Xue
Affiliation: Nanjing University of Information Science & Technology, China
Email: xueyu@nuist.edu.cn