Title:

Evolutionary Computation for Feature Selection, Extraction and Dimensionality Reduction

Abstract:

In machine learning and data mining, the quality of the input data, i.e. feature space, is a key for success of any algorithm. Feature selection, feature extraction or construction and dimensionality reduction are important and necessary data pre-processing techniques to increase the quality of the feature space. However, they are challenging tasks due to the large search space and feature interactions. This special session aims to use Evolutionary Computation for feature reduction, covering ALL different evolutionary computation paradigms. Authors are invited to submit their original and unpublished work to this workshop.

Scope and Topics:

Topics of interest include but are not limited to:
• Dimensionality reduction
• Feature ranking/weighting
• Feature subset selection
• Multi-objective feature selection
• Filter, wrapper, and embedded methods for feature selection
• Feature extraction or construction
• Filter, wrapper, and embedded methods for feature extraction
• Multi-objective feature extraction
• Feature selection, extraction, and dimensionality reduction in image analysis, pattern recognition, classification, clustering, regression, and other tasks
• Feature selection, extraction, and dimensionality reduction on high-dimensional and large-scale data
• Analysis on evolutionary feature selection, extraction, and dimensionality reduction algorithms
• Hybridisation of evolutionary computation and neural networks, and fuzzy systems for feature selection and extraction
• Hybridisation of evolutionary computation and machine learning, information theory, statistics, mathematical modelling, etc., for feature selection and extraction
• Real-world applications of evolutionary feature selection and extraction, e.g. images and video sequences/analysis, face recognition, gene analysis, biomarker detection, medical data analysis, hand written digit recognition, text mining, instrument recognition, power system, financial and business data analysis, etc.

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Yu Xue received the Ph. D. degree from School of Computer Science and Technology, Nanjing University of Aeronautics and Astronautics, China, in 2013. He is an associate professor in the School of Computer and Software, Nanjing University of Information Science and Technology. He was a visiting scholar in the School of Engineering and Computer Science, Victoria University of Wellington, New Zealand (2016.8-2017.8). He was a research scholar in the Department of Computer Science and Engineering, Michigan State University, the United States of America (2017.10-2018.11). His research interests include Evolutionary Computation, Machine Learning, and Data mining.

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Bing Xue is currently an associate professor in School of Engineering and Computer Science at Victoria University of Wellington. She is currently the Chair of the IEEE CIS Task Force on Evolutionary Feature Selection and Construction. She is a Guest Editor for the Special Issue on Evolutionary Feature Reduction and Machine Learning for the Springer Journal of Soft Computing. She has been a chair for a number of international conferences including the Leading Chair of IEEE Symposium on Computational Intelligence in Feature Analysis, Selection, and Learning in Image and Pattern Recognition at SSCI 2016 and 2017. She is the organizer of the special session on Evolutionary Feature Selection and Construction in IEEE Congress on Evolutionary Computation (CEC) 2015, 2016 and 2017, and SEAL 2014 and 2017.

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