Two-Archive Algorithm for Many-Objective Optimization

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Yellow Zone, Academic 1
City University of Hong Kong
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ABSTRACT

Many-objective optimization problems (MaOPs) pose challenges to existing multi-objective evolutionary algorithms (MOEAs) in terms of convergence, diversity, and complexity. Among the existing work, the two-archive algorithm (Two Arch) is a low complexity algorithm with two archives focusing on convergence and diversity respectively. We introduce a significantly improved two-archive algorithm (i.e., Two Arch2) for MaOPs in this talk. In our Two Arch2, we use different selection principles (indicator-based and Pareto-based) in the two archives. We design a new Lp-norm based (p < 1) diversity maintenance scheme. In order to evaluate the performance of Two Arch2 on MaOPs, we have compared it with several MOEAs on a wide range of benchmark problems with different numbers of objectives. The experimental results show that Two Arch2 can cope with MaOPs (up to 20 objectives) with satisfactory convergence, diversity, and complexity. In this talk, we will also discuss other methods that can help to simplify MaOPs in some cases. It’s argued that simpler methods should be attempted first, before developing any new algorithms.

BIOGRAPHY

Xin Yao is a Professor of Computer Science and the Director of CERCIA (Centre of Excellence for Research in Computational Intelligence and Applications) at the University of Birmingham, UK. He is an IEEE Fellow and a Distinguished Lecturer of IEEE Computational Intelligence Society (CIS). His work won the 2001 IEEE Donald G. Fink Prize Paper Award, 2010 and 2015 IEEE Transactions on Evolutionary Computation Outstanding Paper Awards, 2010 BT Gordon Radley Award for Best Author of Innovation (Finalist), 2011 IEEE Transactions on Neural Networks Outstanding Paper Award, and many other best paper awards. He won the prestigious Royal Society Wolfson Research Merit Award in 2012 and the 2013 IEEE CIS Evolutionary Computation Pioneer Award. He was the Editor-in-Chief (2003-08) of IEEE Transactions on Evolutionary Computation and the Immediate Past President (2016) of IEEE CIS. His major research interests include evolutionary computation, ensemble learning, and their applications, especially in software engineering.

All are welcome!

In case of questions, please contact Prof KWONG Tak Wu Sam at Tel: 3442 2907, E-mail: cssamk@cityu.edu.hk, or visit the CS Departmental Seminar Web at http://www.cs.cityu.edu.hk/news/seminars/seminars.html.