Research Advances in Fireworks Algorithm and Its Applications

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Yellow Zone, Academic 1
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Abstract

Recently, inspired from the collective behaviors of many swarm-based creatures in nature or social phenomena, swarm intelligence (SI) has been received attention and studied extensively, gradually becomes a class of efficiently intelligent optimization methods. Inspired by fireworks explosion at night, the fireworks algorithm (FWA) was developed in 2010. Since then, several improvements and some applications were proposed to improve the efficiency of FWA. In this talk, the fireworks algorithm is first described in detail and reviewed, then several effective improved fireworks algorithms are highlighted individually. By changing the ways of calculating numbers and amplitudes of sparks in fireworks’ explosion, the improved FWA algorithms become more reasonable and explainable. In addition, the multi-objective fireworks algorithm and the graphic processing unit (GPU) based FWA are also briefly presented, particularly the GPU-based FWA is able to speed up the optimization process considerably. Extensive experiments on IEEE-CEC’s benchmark functions demonstrate that the improved fireworks algorithms significantly increase the accuracy of found solutions, yet decrease the running time dramatically. Finally, some applications of FWA are briefly described, while its shortcomings and future research directions are identified.

Biography

Ying Tan is a full professor and PhD advisor at the School of Electronics Engineering and Computer Science of Peking University, and director of Computational Intelligence Laboratory at Peking University (PKU). He received his BEng, MS, and PhD from Southeast Univ., in 1985, 1988, and 1997, respectively. He is the inventor of Fireworks Algorithm (FWA).

He serves as the Editor-in-Chief of International Journal of Computational Intelligence and Pattern Recognition (IJCIPR), the Associate Editor of IEEE Transaction on Cybernetics (Cyb), the Associate Editor of IEEE Transaction on Neural Networks and Learning Systems (NNLS), International Journal of Artificial Intelligence (IJAI), International Journal of Swarm Intelligence Research (IJISIR), etc. He also served as an Editor of Springer’s Lecture Notes on Computer Science (LNCS) for more than 20 volumes, and Guest Editors of several referred Journals, including Information Science, Softcomputing, Neurocomputing, IJAI, IJSIR, B&B, CJ, IEEE/ACM Transactions on Computational Biology and Bioinformatics (IEEE/ACM TCBB). He received the 2nd-Class Natural Science Award of China in 2009 and a number of academic prizes in his fields. He is a senior member of IEEE. He is the founder and chair of the ICSI International Conference series. He was a general co-chair of 1st&2nd BRICS CCI, program committee co-chair of WCCI 2014, etc.

His research interests include computational intelligence, swarm intelligence, data mining, pattern recognition, intelligent information processing for information security. He has published more than 260 papers in refereed journals and conferences in these areas, and authored/co-authored 10 books and 12 chapters in book, and received 3 invention patents.

All are welcome!

In case of questions, please contact Prof Qingfu Zhang at Tel: 3442 8632, E-mail: qingfu.zhang@cityu.edu.hk, or visit the CS Departmental Seminar Web at http://www.cs.cityu.edu.hk/news/seminars/seminars.html.