ACM TRANSACTIONS on AUTONOMOUS and ADAPTIVE SYSTEMS

Special Issue on Foraging Theory Based Optimization Algorithms

I. AIM AND SCOPE

Foraging means the act of searching for food and it forms an integral part of the daily life of most of the living creatures. Natural organisms forage in such a way as to maximize their energy intake per unit time. In other words, they strive to find, capture, and consume food containing the most calories while expending the least amount of time possible in doing so. Thus, considering all the constraints presented by their own physiology such as sensing and cognitive capabilities, environment (e.g. density of prey, risks from predators, and physical characteristics of the search space) etc., the natural foraging strategy that these organisms follow, can lead to optimization.

Inspired by the conceptions emerging from foraging theory and sometimes based on their wide generalizations, in recent past, a handful of algorithms have been developed for solving nearly intractable numerical and combinatorial optimization problems in engineering. Most prominent among them are the Ant Systems (AS) and Ant Colony Optimization (ACO), Bacterial Foraging Optimization (BFO), and the algorithms based on bees social foraging. They have recently been shown to produce superior results in a wide variety of real-world applications. Some of the algorithms even use the concept of foraging in much more general sense, e.g. human beings forage for information, musician forage for a perfect state of harmony of the notes being played (E.g. the Harmony Search Algorithm).

During the last five years, research on and with the foraging-based optimization techniques like ACO, BFOA, Bees Foraging, Artificial Bee Colony etc. has reached a very promising state. But there is still a long way to go in order to fully utilize the potential of the artificial foraging algorithms. This special issue aims at bringing researchers from academia and industry together to report and review the latest progresses in this rapidly emerged field, to explore future directions of research, and to publicize the foraging based algorithms and metaheuristics to a wider audience

II. TOPICS COVERED

Authors are invited to submit their original and unpublished work in the areas including (but not limited to) the following:

1) Theoretical and empirical study of foraging based algorithms like: The Ant Colony Optimization (ACO), The Bacterial Foraging Optimization Algorithm (BFOA), Honey Bee Social Foraging Algorithms, Simulated Waggle Dance, Adaptive Bird Flocking Algorithm, Harmony Search (HS) with special emphasis on mathematical modeling and dynamical analysis for investigating issues like convergence, stability, and robustness.

2) Connections to / comparison with other powerful swarm and evolutionary computing algorithms like Particle Swarm Optimization, Genetic Algorithms, Differential Evolution etc.
3) Development, benchmarking, and evaluation of new foraging based algorithms.
4) Parameter automation and self-adaptation in foraging based optimization techniques
5) Foraging theory based algorithms for optimization in dynamic and noisy environments
6) Foraging theory based algorithms for constrained, niching and multi-objective optimization
7) Applications to diverse domains including: Swarm robotics, Adaptive and optimal control, Optimal dynamics resource allocation problems, Distributed control of uninhabited autonomous vehicles, Fuzzy/neural controller design for nonlinear systems, Training artificial neural networks for pattern recognition, Clustering and Classification, Forming manufacturing cells, Optimal scheduling of jobs for a production machine, Telecommunication network routing and network optimization, Financial prediction, Econometrics, and Business Intelligence, Generalized assignment problems, Power Systems, Robust multi-agent system design

Authors should prepare manuscripts according to the [ACM accepted manuscript preparation guidelines.](#) Each ACM TAAS issue must be no longer than 100 pages, as a guidance papers should not exceed 20 pages.

III. IMPORTANT DATES

- December 31, 2009, Submission deadline
- May 1, 2010, Notification of the first-round review
- August 1, 2010, Revised submission due
- October 30, 2010, Final notice of acceptance/reject
- November 30, 2010, Final manuscript

The expected publication time of the special issue will be in 2011.

IV. GUEST EDITORS

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