

IEEE Transactions on Evolutionary Computation

Special issue on Swarm Intelligence

I. AIM AND SCOPE

Swarm Intelligence (SI) is an Artificial Intelligence technique involving the study of collective behaviour in decentralized systems. Such systems are made up by a population of simple individuals interacting locally with one another and with their environment. Although there is typically no centralized control dictating the behaviour of the individuals, local interactions among the individuals often cause a global pattern to emerge. Examples of systems like this can be found abundant in nature, including ant colonies, bird flocking, animal herding, honey bees, bacteria, and many more. SI refers to the problem-solving behaviour that emerges from the interaction between individuals of such systems, and computational swarm intelligence refers to algorithmic models of such behaviors. These algorithmic models have shown to be able to adapt well in changing environments, and are immensely flexible and robust. As traditional algorithms, which emphasize more on “centralization,” become increasingly inadequate in handling today’s more complex problems, SI algorithms offer an attractive alternative to problem solving. The last decade has shown rapid growing research interests in SI, as demonstrated by the significant increase of the number of research publications on SI, especially on two popular SI paradigms, namely Particle Swarm Optimization (PSO) and Ant Colony Optimization (ACO).

The aim of this special issue is to highlight the most significant recent developments on the topics of SI, to identify future research directions, and publicize SI algorithms 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Authors are invited to submit their original and unpublished work in the areas including (but not limited to) the following:

- Theoretical studies of SI paradigms and algorithms
- Development of new SI paradigms and algorithms
- SI algorithms for multi-objective optimization
- SI algorithms for constrained optimization
- SI algorithms for niching and multi-modal optimization
- SI algorithms for optimization in dynamic and noisy environments
- SI algorithms for evolving artificial neural networks
- SI algorithms for games and learning
- Hybrids between SI algorithms and other heuristic methods
- Comparative theoretical and empirical studies
- Benchmarking and evaluation of new SI algorithms
- Self-adaptive SI algorithms
- SI algorithms for real-world applications
- Nature-inspired algorithms based on collective behaviors
- Swarm robotics and other SI-inspired systems

III. IMPORTANT DATES

- **January 15, 2008, Extended submission deadline**
- March 31, 2008, Notification of the first-round review
- June 30, 2008, Revised submission due
- August 31, 2008, Final notice of acceptance/reject
- September 30, 2008, Final manuscript

The expected publication time of the special issue will be at the beginning of 2009.

IV. SUBMISSIONS

Manuscripts should be prepared according to the instructions of the “Information for Authors” section of the journal founded at (<http://iee-cis.org/pubs/tec/authors/>) and submission should be done through the IEEE TEC journal website: <http://tevciee.manuscriptcentral.com/> and clearly mark “Special Issue on Swarm Intelligence” as comments to the editor-in-chief. Submission of a manuscript implies that it is the authors’ original unpublished work and is not being submitted for possible publication elsewhere. The review process will be driven by the Guest Editors of this Special Issue and the Editor-in-Chief, Professor Xin Yao.

V. GUEST EDITORS

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