



Nature-Inspired Systems for Parallel, Asynchronous and Decentralised Environments

<http://www.cs.york.ac.uk/aig/nispade-mags/>

Nature-inspired algorithms such as genetic algorithms, particle swarm optimisation and ant colony algorithms are the solution technique of choice for some problems. Furthermore, their population-based stochastic search approach promises desirable algorithm features such as anytime decentralised solution and robustness to problem change. However, the efficient pursuit of more accurate solutions leads researchers to appeal to centralised, highly tuned and sequential implementations that are only loosely related to their successful natural counterparts. This limits their usefulness of these implementations to industry's direction of increasing distribution, decentralisation and adaptability.

Emerging computing environments such as autonomic computing, ubiquitous computing, Peer-to-Peer systems, the Grid and the Semantic Web demand the interaction of large numbers of decentralised, parallel, asynchronous, and distributed software entities in a standardised fashion.

If nature-inspired algorithms are to make an impact on these emerging computing environments, disciplined scientific and engineering investigations must be undertaken into the successful transfer of these algorithms, their design techniques and necessary infrastructures into such emerging computing environments. Topics of interest include:

METHODOLOGIES:

- Searching the vast parameter spaces of these systems.
- Empirical performance evaluation and benchmarking procedures for these systems.
- Software engineering techniques, e.g., design patterns, component frameworks and software architectures

APPLICATIONS:

- Applications of nature-inspired techniques in novel areas, such as mobile, pervasive and grid computing
- Scalability and performance optimisation of applications

SUBMISSIONS AND IMPORTANT DATES:

All researchers are invited to submit their work for consideration. Full formatting instruction for authors can be found at http://www.iospress.nl/html/15741702_ita.html

- **Paper submission: 6th May 2006**
- First Notification: 16th June 2006

MIDDLEWARE

- Supporting nature-inspired algorithms in a decentralised, asynchronous and parallel context (e.g. pheromone infrastructures).
- Integrating implementations within existing middleware technologies.
- Ontologies and protocols for nature-inspired system functionality (e.g. pheromone deposition, aggregation and dispersion).

EXPERIENCES AND RESULTS

- New issues in the emerging computing environments context (e.g. asynchronicity, self-organisation, hyperactivity, agent redundancy, messaging costs).
- Efficiency, robustness, population diversity, adaptiveness and other qualities.

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