Special Session:

Swarm Intelligence and Swarm Robotics

Organizers: Eneko Osaba, Javier Del Ser, Andrés Iglesias, Xin-She Yang

Swarm Intelligence (SI) refers to the complex collective behavior of self-organized and decentralized systems, typically composed of a (spatially distributed and often large) population of individuals, or agents. These agents interact among them and with the environment using different, simple, and local rules for coordinating actions. Such systems of the swarm can be inherently robust, effective, and flexible. Put differently, SI can be regarded as a generic behavioral concept embracing a wide portfolio of decentralized algorithms for performing different tasks, such as signal and graph processing, inference, prediction and optimization.

In this context, a myriad of application subfields of SI can be found in academia and industry, a clear evidence of the momentum gained by this discipline. Specifically, Swarm Robotics (SR) refers to the application of SI methods and techniques to scenarios where the population of agents consists of physical or simulated robotic devices with motion, interaction and communication capabilities. The focus of SR is to analyze how this swarm of relatively simple robots can be configured so as to coordinate in a distributed fashion and collectively accomplish different goals unaffordable for the capabilities of a single robot.

This Special Session to be held during DCAI2018 will gather researchers and practitioners to foster and ease rich discussions around the latest findings, research achievements and ideas in the areas of Swarm Intelligence and Swarm Robotics. Interested colleagues are invited to submit novel contributions via the submission system https://www.dcai-conference.net/, with an emphasis on the following topics (but not limited to):

- Recent advances on Swarm Intelligence methods for Robotics, with emphasis on those inspired by biological processes and behaviors typically observed in Nature, such as Particle Swarm Optimization, Bat Algorithm, Cuckoo Search, Ant Colony Optimization, Artificial Bee Colony, Firefly Algorithm and others.
- Novel applications of Swarm Intelligence to Robotics, with an emphasis on real-world scenarios.
- Hybridization of Swarm Intelligence and Soft Computing techniques, with applications to robotics and autonomous complex systems.
- New synergies between Swarm Intelligence and Swarm Robotics.
- Coordination and control of Swarm Robotic Systems.
- Adaptive Swarm Intelligence methods.
- Applications of Swarm Intelligence for collaborative positioning and route optimization in robotic swarms.
- Distributed inference in Swarm Robotics.
- Self-organization in robotics enabled by Swarm Intelligence.
- Distributed Swarm Robotic systems.

Only submissions with original contributions with respect to the state of the art in the above areas will be considered for inclusion in this session, i.e. special session papers will be treated under the same criteria as regular conference papers.

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