

# Preface

Many modelling and optimization problems require sophisticated algorithms to solve. Contemporary optimization algorithms are often nature-inspired, based on swarm intelligence. In the last two decades, there have been significant developments in the area of metaheuristic optimization and computational intelligence. Optimization and computational intelligence have become ever-increasingly more important. One of the core activities of the computational intelligence is that “intelligent” evolutionary algorithms play a vital role. Accompanying the progress of computational intelligence is the emergence of metaheuristic algorithms. Among such algorithms, swarm-intelligence-based algorithms form a large part of contemporary algorithms, and these algorithms are becoming widely used in classifications, optimization, image processing, business intelligence as well as in machine learning and computational intelligence.

Most new nature-inspired optimization algorithms are swarm-intelligence-based, with multiple interacting agents. They are flexible, efficient and easy to implement. For example, firefly algorithm (FA) was developed in late 2007 and early 2008 by Xin-She Yang, based on the flashing behaviour of tropical fireflies, and FA has been proved to be very efficient in solving multimodal, nonlinear, global optimization problems. It is also very efficient in dealing with classification problems and image processing. As another example, cuckoo search (CS) was developed by Xin-She Yang and Suash Deb in 2009, based on the brooding parasitism of some cuckoo species, in combination with Lévy flights, and CS is very efficient as demonstrated in many studies by many researchers with diverse applications. In fact, at the time of the writing in July 2013, there have been more than 440 research papers on cuckoo search and 600 papers on firefly algorithm in the literature, which shows that these algorithms are indeed an active, hot research area.

This book strives to provide a timely summary of the latest developments concerning cuckoo search and firefly algorithm with many contributions from leading experts in the field. Topics include cuckoo search, firefly algorithm, classifications, scheduling, feature selection, travelling salesman problem, neural network training, semantic web service, multi-objective manufacturing process optimization, parameter-tuning, queuing, randomization, reliability problem, GPU optimization, shape optimization and others. This unique book can thus serve as an ideal reference for both graduates and researchers in computer science, evolutionary computing, machine learning, computational intelligence and optimization,

as well as engineers in business intelligence, knowledge management and information technology.

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Theory and Applications

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