COMPUTATIONAL INTELLIGENCE BASED ON THE BEHAVIOR OF CATS

SHU-CHUAN CHU

Department of Information Management,
Cheng Shiu University
840, Cheng Cing Road, Kaohsiung County 83347, Taiwan
scchu@bit.kuas.edu.tw

PEI-WEI TSAI

Department of Electronic Engineering,
National Kaohsiung University of Applied Sciences
415, Chien Kung Road, Kaohsiung City 80778, Taiwan
pwtsai@bit.kuas.edu.tw

ABSTRACT. *Optimization problems are very important in many fields. To the present, many optimization algorithms based on computational intelligence have been proposed, such as the Genetic Algorithm, Ant Colony Optimization (ACO), and Particle Swarm Optimization (PSO). In this paper, a new optimization algorithm, namely, Cat Swarm Optimization (CSO) is proposed. CSO is generated by observing the behavior of cats, and composed of two sub-models by simulating the behavior of cats. According to the experiments, the results reveal that CSO is superior to PSO.*
Keywords: Cat swarm optimization, Swarm intelligence, Soft computing, Evolutionary computing

1. **Introduction.** Computational intelligence is a hot research topic and many related algorithms have been proposed in recent years, such as the Genetic Algorithm (GA) [1-5], The Ant Colony Optimization (ACO) [6-9], the Particle Swarm Optimization (PSO) [10-14], and the Simulated Annealing (SA) [15,16]. Some of these optimization algorithms were developed based on swarm intelligence by simulating the intelligent behavior of animals. The selection, crossover, mutation and reproduction operations are utilized in GA to solve the optimization problems. ACO solves the optimization problems by moving the tracks of ants with the assistance of the pheromone. PSO finds the solutions by moving the particles in the solution space based on the balance of personal experience and best group experience. SA optimizes the solution based on the control of temperature for the acceptance or rejection of tuning the solution. GA and SA belong to the area of evolutionary algorithms. However, ACO and PSO come under the authority of swarm intelligence.

The idea of computational intelligence may come from observing the behavior of creatures. ACO was presented by studying the behavior of ants, and PSO was presented by examining the movements of flocking gulls. Through inspecting the behavior of the cat, Cat Swarm Optimization (CSO) is proposed in this paper. The artificial structure can be