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1.1 Introduction

Optimization is common in almost all phases of human activities, including labor division and cooperation in cave-dwelling hunting, intensive farming in agricultural production, job scheduling in industrial manufacturing, nutrition optimum in daily diet, design and implementation of national policies. In the early days of human being's history, optimization is totally based on personal experiences. With the development of mathematics, more and more optimization is realized by using accurate mathematical methods. Since the end of the twentieth century, fast development of computer and artificial intelligence technologies has provided new effective and efficient methods to solve complex optimization problems that were heretofore considered to be unsolvable or intractable.

When investigating naturalized methods, scientists are often inspired by nature which is usually a "good optimizer". For example, in species evolution, species that did not adapt to the environment were gradually eliminated; meanwhile, the others continued to exist, and even became more fit by trying to optimally combine good genes brought by their parents. Inspired by this, Kennedy and Eberhart [1] proposed a particle swarm optimization (PSO) algorithm. PSO is to solve the optimization problem by simulating all individuals try to move to the lowest energy state and then converge to a single cluster. Inspired by this, Kirkpatrick [12] proposed simulated annealing (SA) algorithm. A small fire's strength is very little, but the ant colony can aggregate its members in a faster way to solve the complicated tasks such as traveling and routing efficiently. Inspired by this, Liang [4] proposed an colony optimization (ACO) algorithm. Similarly, Kennedy and Eberhart [10] proposed particle swarm optimization (PSO) algorithm based on the social