

Big data analytics with swarm intelligence

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Abstract

Purpose – The quality and quantity of data are vital for the effectiveness of problem solving. Nowadays, big data analytics, which require managing an immense amount of data rapidly, has attracted more and more attention. It is a new research area in the field of information processing techniques. It faces the big challenges and difficulties of a large amount of data, high dimensionality, and dynamical change of data. However, such issues might be addressed with the help from other research fields, e.g., swarm intelligence (SI), which is a collection of nature-inspired searching techniques. The paper aims to discuss these issues.

Design/methodology/approach – In this paper, the potential application of SI in big data analytics is analyzed. The correspondence and association between big data analytics and SI techniques are discussed. As an example of the application of the SI algorithms in the big data processing, a commodity routing system in a port in China is introduced. Another example is the economic load dispatch problem in the planning of a modern power system.

Findings – The characteristics of big data include volume, variety, velocity, veracity, and value. In the SI algorithms, these features can be, respectively, represented as large scale, high dimensions, dynamical, noise/surrogates, and fitness/objective problems, which have been effectively solved.

Research limitations/implications – In current research, the example problem of the port is formulated but not solved yet given the ongoing nature of the project. The example could be understood as advanced IT or data processing technology, however, its underlying mechanism could be the SI algorithms. This paper is the first step in the research to utilize the SI algorithm to a big data analytics problem. The future research will compare the performance of the method and fit it in a dynamic real system.

Originality/value – Based on the combination of SI and data mining techniques, the authors can have a better understanding of the big data analytics problems, and design more effective algorithms to solve real-world big data analytical problems.

Keywords Evolutionary computation, Optimization, Data mining, Big data, Swarm intelligence, Big data analytics

Paper type Research paper

