Chapter 51
Study on Secure Dynamic Covering Algorithm for E-Logistics Information in a Cloud Computing Platform

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ABSTRACT

For traditional coverage method, local adaptive weighted search is adopted for subspace reconstruction of e-logistics information, which requires significant iterative computations and leads to large coverage errors and unsatisfactory results. This paper proposes a secure dynamic covering algorithm for e-logistics information based on the basis of directional clustering for the envelope of optimization solution vectors. A data network distribution model of e-logistics information on a cloud computing platform is constructed to extract features of e-logistics information and to construct time series of information flows. The directional clustering algorithm for the envelope of optimization solution vectors is introduced to schedule features of e-logistics information. The experimental results show that the proposed algorithm has higher coverage rate, smaller error, and increases performance of e-logistics information transmission and higher application value on a cloud computing platform.

1. INTRODUCTION

With the rapid development of e-commerce and e-logistics, optimizing management and scheduling of e-logistics information has become an important measure to improve logistics efficiency and guarantee logistics security. Establishing an APP terminal for e-logistics information on a cloud computing platform to cover e-logistics information has become a key technology to improve abilities of secure e-logistics information secure transmission and sharing (Bingru & Yong, 2015; Limin et al., 2015; Sun & Han, 2012).

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Secure dynamic coverage of e-logistics information has mainly adopted to construct an e-logistics parameter system on a cloud computing platform; based on information hinges of a logistics distribution center, cargo distribution lists are established, and distribution vehicles are arranged; transportation routes are arranged with coordination with e-commercial client ends; based on cargo distribution demands, running routes of transportation vehicles and midway transfers are arranged; receipts are confirmed without delay; exchange and coverage of logistics information are recorded to realize whole-course secure dynamic coverage and real record of cargo handing-over and to manage issues concerning un-delivered and rejected cargoes in time. It is indicated that secure dynamic coverage of e-logistics information plays a vital role for the improvement of e-logistics information management (Huang & Gao, 2014; Spielman & Teng, 2014; Spielman & Srivastava, 2011; Hui, 2015).

Cloud computing, as a high-efficient multithreading decentralized computing method, enters the field of modern large-scale data computing and information processing, and allows dynamic scheduling and decentralized information processing of super-large scale data in substantial distributed computers (Yanqiong & Shiping, 2015; Nixue, 2014; Jianwei & Sonlin, 2014). The paper is to study optimized secure dynamic covering method for e-logistics information on a cloud computing platform. Traditionally, local adaptive weighted search method for e-logistics information is adopted to realize exchange and coverage of e-logistics information, which requires subspace reconstruction for e-logistics information and shows the deficiency of declined convergence rate with the increase of information scale. For the issue, improvement designs are provided in relevant literatures (Jianwei et al., 2014). The e-logistics information reconstruction and covering algorithm based on dimension reduction of redundant date high-dimensional space is presented in (Zhiqiang et al., 2015) to design FCM clustering algorithm for covering and scheduling of e-logistics information; however, the method shows deficiencies of high computing cost and unsatisfactory disturbance resistance. In (Sabbouh & McCracken, 2014) the secure dynamic covering method for e-logistics information on a cloud computing platform is presented on the basis of resources scheduling and feature extraction of K-Means multi-source information; in the method, a hierarchical and modularized architecture is adopted to achieve a supply chain network model of e-logistics information on a cloud platform, to extract spatial spectrum features of e-logistics information and to realize secure dynamic coverage of information; however, the method requires setting of e-logistics information priority process; during the priority scheduling process, state distortion and local convergence occur. (Moniruzzaman et al., 2014) presented a PCA-based (principal component analysis-based) e-logistics information reconstruction and covering algorithm; in an organizational model, Item and virtual BOM concepts are introduced in the method to find the dispersion between logistics information content and target information and to realize e-logistics information reconstruction and coverage; although the method realizes reconstruction and coverage of e-logistics information, it shows deficiencies of long operation time and low precision.

Targeting on deficiencies of traditional methods, the paper presents a secure dynamic covering algorithm for e-logistics information on the basis of directional clustering for the envelope of optimization solution vectors. A data network distribution model of e-logistics information on a cloud computing platform is constructed to extract features of e-logistics information and to construct time series of information flows; the algorithm of directional clustering for the envelope of optimization solution vectors is introduced to schedule features of e-logistics information, based on which the secure dynamic covering algorithm for e-logistics information on a cloud computing platform is improved. It is indicated by the simulation results that, comparing with traditional covering algorithm, the improved algorithm for secure dynamic