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Distributed Data Real-Time Transaction Calculation Based on Collaborative Optimization and Multi-Objective Genetic Algorithm

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ABSTRACT

Based on the above situation, this article elaborated on the methods that should be used to calculate the multi-information genetic algorithm (GA) in the current situation. The article mainly compared the non-dominated sorting genetic algorithm-II (NSGA-II) and multi-objective particle swarm optimization (MOPSO) with elite strategy. By measuring the solving speed and quality of the two algorithms, it was found that the NSGA-II had a greater advantage. Based on the NSGA-II, optimization processing was carried out. The NSGA-II was compared before and after optimization. After analyzing 48 data samples, it was found that the results of the NSGA-II before and after optimization showed that the algorithm tended to be more stable after optimization, thus indicating that the improved data was more accurate. The results indicated that the NSGA-II was necessary for its improvement, and its results were also reasonable.

KEYWORDS

Distributed Data, MOPSO Algorithm, Multi-Objective Genetic Algorithm, NSGA-II Algorithm, Real-Time Transaction Computing

1. INTRODUCTION

The article mainly compares Non-dominated Sorting Genetic Algorithm-II (NSGA-II) and Multi-Objective Particle Swarm Optimization (MOPSO), the main purpose of which is to quickly generate value calculations for items through real-time transaction calculations and improve the efficiency of workers. About The NSGA-II with elite strategy can be implemented in various fields, and this algorithm is also commonly used to optimize data. Ransikarbum K conducted research and analysis on disaster relief allocation by utilizing the NSGA-II. He combined the NSGA-II with Pareto frontier analysis and proposed a comparison between the NSGA-II and the exact method. He also evaluated the results based on ultra large scale technology and computational time to demonstrate the efficiency of the NSGA-II (Ransikarbum & Mason, 2022). Babaeinesami A believed that the configuration

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of the supply chain network was a key issue. This provided potential factors for reducing costs and improving service quality. Babaeinesami A designed a sales network according to customer requirements to minimize overall costs and CO2 emissions. In response to the complexity of this problem, he designed an adaptive NSGA-II. According to the constraint method, it was evaluated. He used design methods to adjust parameters to enhance the performance of the algorithm (Babaeinesami et al. 2022). It was also found that the solution time of the adaptive NSGA-II method was better than that of the constraint method.

Liu S believes that with the wide application of cloud computing technology, the services provided by cloud systems are becoming more and more diverse, so these systems are required to solve highly diverse and complex tasks. Liu S proposed a new Non-dominated Sorting Genetic Algorithm (NAGA). The improved crossover and mutation genetic operator enhances the optimization ability of the algorithm and greatly reduces the probability of the algorithm falling into local optimal solution. In addition, an upgraded fitness operator method was proposed by considering the main factors affecting the quality of service, such as task completion time, system load and network bandwidth. Finally, the improved genetic algorithm is proposed to effectively optimize the resource scheduling strategy, shorten the task completion time, promote system load balancing, and improve the quality of system service (Liu & Wang, 2020).

Zhou J carried out optimization analysis and dynamic parameter optimization through multi-objective collaborative optimization algorithm, aiming at the curve negotiation characteristics, comfort and tire eccentric wear of monorails. Zhou J finally concluded that the multi-objective cooperative optimization algorithm can successfully perform multi-objective optimization of monorail vehicles. Curve negotiation performance and comfort are improved, and optimized dynamic parameters reduce tire wear. In particular, a consistent objective function transformation strategy for multi-objective nonlinear convergence is proposed (Zhou et al. 2020).

Currently, there are many problems in the research of multi-objective optimization. Therefore, this article was based on an improved NSGA-II with elite strategy and multi-objective optimization method. By setting parameters for comparison, the pre optimization and post optimization were compared using parameters, and it was found that the computational speed and efficiency were improved (Ma et al. IEEE transactions on cybernetics).

For real-time data processing, it can be understood as: through the real-time data application platform of police business of the Public Security Department, a real-time control system can be built to serve the detection of public security cases; In the online loan application business of the financial industry, the real-time data application platform conducts data mining and analysis, and on the one hand, real-time feedback on user behavior; On the other hand, it helps enterprises make scientific analysis decisions in the shortest time, taking typical breakpoint marketing scenarios as examples; In the bank credit card business: the system application real-time data collection, cleaning, risk warning, help the bank to establish a credit card anti-fraud system, with the "channel-anti-fraud engine-host" implementation framework to judge fraudulent transactions and intercept (Liao & Ho, 2021).

The speed of data processing becomes particularly important when it comes to the value of a real-time data platform, which can be considered to diminish rapidly over time, and one of the key values of real-time processing is the ability to deliver data insights faster.

2. LITERATURE REVIEW

Cloud computing can flexibly adapt to high demand computing needs. The advantages provided by virtualization make cloud computing an attractive choice to meet the needs of high-performance computing and users.

Therefore, the article will be presented through Non-dominated Sorting Genetic Algorithm with Elite Strategy (NSGA-II) and Multi-Objective Particle Swarm Optimization (MOPSO). Algorithm-II