Distributed System Computing Resource Scheduling Algorithm Based on Deep Reinforcement Learning

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Abstract : As the quantity and complexity of computing in large-scale software systems increase, distributed system computing becomes increasingly important. The distributed system realizes high-performance computing by collaboration between different computing resources. If there are no efficient resource scheduling resources, the abuse of distributed computing may cause resource waste and high costs. However, resource scheduling is usually an NP-hard problem, so we cannot find a general solution. However, some optimization algorithms exist like genetic algorithm, ant colony optimization, etc. The large scale of distributed systems makes this traditional optimization algorithm challenging to work with. Heuristic and machine learning algorithms are usually applied in this situation to ease the computing load. As a result, we do a review of traditional resource scheduling optimization algorithms and try to introduce a deep reinforcement learning method that utilizes the perceptual ability of neural networks and the decision-making ability of reinforcement learning. Using the machine learning method, we try to find important factors that influence the performance of distributed system computing and help the distributed system do an efficient computing resource scheduling. This paper surveys the application of deep reinforcement learning on distributed system computing resource scheduling proposes a deep reinforcement learning method that uses a recurrent neural network to optimize the resource scheduling, and proposes the challenges and improvement directions for DRL-based resource scheduling algorithms.

Keywords : resource scheduling, deep reinforcement learning, distributed system, artificial intelligence

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