

عنوان مقاله:

A Novel Approach for Cluster Self-Optimization Using Big Data Analytics

محل انتشار:

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خلاصه مقاله:

One of the current challenges in providing high bitrate services in next generation mobile networks is limitation of available resources. The goal of proposing a self-optimization model is to maximize the network efficiency and increase the quality of services provided to femto-cell users, considering the limited resources in radio access networks. The basis for our proposed scheme is to introduce a self-optimization model based on neighbouring relations. Using this model, we can create the possibility of controlling resources and neighbouring parameters without the need of human manipulation and only based on the network's intelligence. To increase the model efficiency, we applied the big data technique for analyzing data and increasing the accuracy of the decision-making process in a way that on the uplink, the sent data by users is to be analyzed in self-optimization engine. The experimental results show that despite the tremendous volume of the analyzed data – which is hundreds of times bigger than usual methods – it is possible to improve the KPIs, such as throughput, up to 30 percent by optimal resource allocation and reducing the signaling load. Also, the presence of feature extraction and parameter selection modules will reduce the response time of the self-optimization model up to 25 percent when the number of parameters is too high. Moreover, numerical results indicate the superiority of using support vector machine (SVM) learning algorithm. It improves the accuracy level of decision making based on the rule-based expert system. Finally, uplink quality improvement and 15-percent increment of the coverage area under satisfied SINR conditions can be considered as outcome of the proposed scheme.

کلمات کلیدی:

Self-Optimization Networking; Big Data; Quality of service (QoS); Resource Allocation; Load Balancing

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