عنوان مقاله:

Optimization of Spectral Efficiency in Cell-Free massive MIMO Systems UsingDeep Neural Networks

محل انتشار:

هفتمین کنفرانس بین المللی مهندسی برق ،الکترونیک و شبکه های هوشمند (سال: 1401)

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خلاصه مقاله:

Cellular communication is a widely used technology in the world where the coverage area is dividedinto multiple cells. Interference is one of the most important challenges in cellular networks whichcauses problems by reducing the quality of the service. Cell-Free (CF) massive multiple-input multipleoutput(MIMO) is a novel technolgy in which a large number of distributed access points (APs) areconcurrently serving a small number of user equipment (UE). CF network can be an alternativetechnology to cellular networks for reducing interference. A challenging task in a CF network isscalability, where although the number of UEs tends to infinity, the computational complexity mustremain finite in each AP or UE. In this paper, we provide two architectures of Dense fully connectedneural network (Dense_Net) and ۱D convolution neural network (Conv_Net) to be implemented indifferent cases in terms of the number of antennas in each AP/UE and the method for the combiningvector. The Dense_Net outperforms the Conv_Net in all the cases. For instance, in the first case it hasa %۶۲.۸۷ improvement in terms of loss. The results show that our proposed method performs better interms of obtaining optimal values for spectral efficiency (SE).

کلمات کلیدی:

Cell-Free Massive MIMO, scalability, spectrum efficiency, deep learning,convolutional neural network

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