Wavelet Integrated Adder Neural Networks for Better Image Classification

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Abstract

Adder neural networks is a new kind of deep learning model in which the original massive multiplications in convolutions are replaced by additions. The overall energy consumption using adder networks is reduced significantly. However, there is an accuracy drop in image classification task. In this letter, we present a add-wavelet transform block (AWT) instead of the existing down-sampling operations. Based on the AWT, we propose a novel adder neural networks (AddWaveNets) to improve classification accuracy. Experimental results on CIFAR datasets show that our proposed AddWaveNets achieves significant improvements in classification accuracy and a powerful ability of feature learning compared to state-of-the-art quantization networks.

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