ABSTRACT

We propose a highly efficient and faster Single Image Super-Resolution (SISR) model with Deep Convolutional neural networks (Deep CNN). Deep CNN have recently shown that they have a significant reconstruction performance on single-image super-resolution. The current trend is using deeper CNN layers to improve performance. However, deep models demand larger computation resources and are not suitable for network edge devices like mobile, tablet and IoT devices. Our model achieves state-of-the-art reconstruction performance with at least 10 times lower calculation cost by Deep CNN with Residual Net,Skip Connection and Network in Network (DCSCN). A combination of Deep CNN and Skip connection layers are used as a feature extractor for image features on both local and global areas. Parallelized 1x1 CNN 's, like the one called Network in Network, are also used for image reconstruction. That structure reduces the dimensions of the previous layer's output for faster computation with less information loss, and make it possible to process original images directly. Also we optimize the number of layers and filters of each CNN to significantly reduce the calculation cost.Single Image Super-Resolution (SISR) has garnered significant attention in the realm of computer vision, aiming to enhance the quality of low-resolution images by generating corresponding high-resolution counterparts. The advent of Deep Convolutional Neural Networks (Deep CNN) has revolutionized this field, pushing the boundaries of reconstruction performance. However, the escalating complexity of deep models comes at the cost of increased computational resources, rendering them impractical for deployment on network edge devices such as mobile phones, tablets, and IoT devices. In response to this challenge, a novel and highly efficient SISR model, named Deep CNN with Residual Net, Skip Connection, and Network in Network (DCSCN), is proposed.Thus, the proposed algorithm not only achieves state-of-the-art performance but also achieves faster and more efficient computation.