Multi-scale Deep Convolutional Neural Networks for Microscopic Image Super-resolution

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Abstract: Recently, microscopic image faces the challenges of low contrast and difficult to view an entire large sample at high resolution (HR) output images. Super-resolution microscopic imaging approach used to resolve the said problem to reconstruct the high-resolution output image from the low resolution (LR) input image. Super-resolution deep convolutional neural network (CNN) significantly increase perceptual quality of microscopy image resolution, speed (signal-to-noise ratio), and data interpretation. In this paper, we present the first multi-scale deep convolutional neural networks for reconstructing the HR microscopic image from the degraded LR input images. Furthermore, we adopt the residual skip connection technique to reduce the computational cost of the model as well as increase the training efficiency. Extensive quantitative and qualitative evaluations show that the proposed method obtained the superior performance of microscopic images.

KEYWORDS: Inception block, super-resolution, microscopic imaging, convolutional neural networks.