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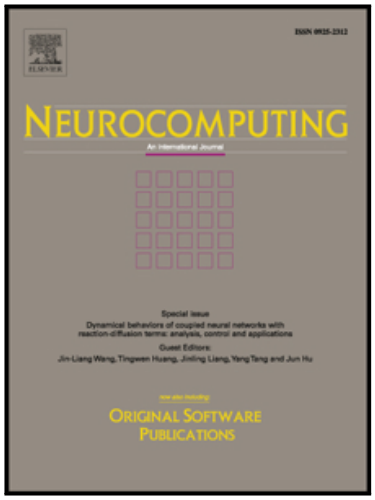

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High-Frequency Details Enhancing DenseNet for Super-Resolution

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Abstract

Convolutional neural networks based models have made impressive advances for single-image super-resolution task. To advance the reconstruction quality of high-frequency details of the images, which are difficult to recover in super-resolution task, this paper proposes a super-resolution method using a high-frequency information enhancing densely connected convolutional neural network (**SRDN**) which can make the network pay more attention to high-frequency regions' reconstruction like edges and textures during training. Our method applies relatively higher weights on the gradient descent values of these high-frequency regions' pixels before they are propagated backward to update the parameters of the network during training. After that, we use a Generative Adversarial Network to finetune the trained model for finer texture details and more photo-realistic results. Experiments show that our approach can achieve a significant boost in the reconstruction quality of high-frequency details at high magnification ratios. We also design a novel measurement to evaluate the high-frequency details' difference (**HFD**) between the ground truth image and the generated image.

Keywords: Super-resolution, CNN, Details enhancing, GAN

1. Introduction

The reproduction of a high-resolution (HR) image from its low-resolution (LR) counterpart is referred as single image super-resolution (SISR)([1]), which enjoyed

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