

Deep Convolutional Neural Network for Image Deconvolution

Many fundamental image-related problems involve deconvolution operators. Real blur degradation seldom complies with an ideal linear convolution model due to camera noise, saturation, image compression, to name a few. Instead of perfectly modeling outliers, which is rather challenging from a generative model perspective, we develop a deep convolutional neural network to capture the characteristics of degradation. We note directly applying existing deep neural networks does not produce reasonable results. Our solution is to establish the connection between traditional optimization-based schemes and a neural network architecture where a novel, separable structure is introduced as a reliable support for robust deconvolution against artifacts. Our network contains two submodules, both trained in a supervised manner with proper initialization. They yield decent performance on non-blind image deconvolution compared to previous generative-model based methods.

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