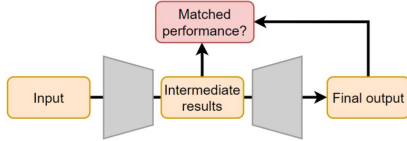# Weakly-supervising the Deep Priors for Blind Image Deconvolution
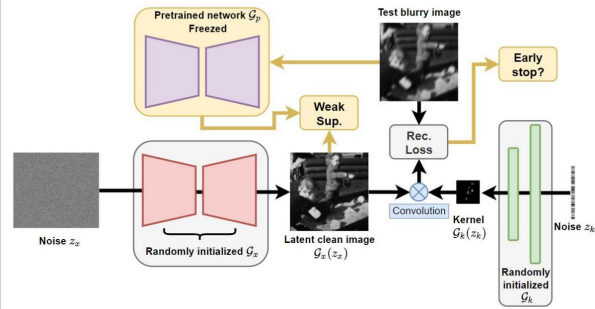
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Motivation

➢ This work is inspired by a deep priors for blind image deconvolution framework what is optimized by reconstructing the input blurry image [1].

➢ The latent image is an intermediate result that is not guaranteed to be what we expected [2, 3].

➢ Therefore, we utilize a pre-trained deblurring network for weak supervision.

Related Work

➢ Ren et al. [1] proposed a self-supervised method to deblur an image. However, the network is randomly initialized without learned rich feature from large-scale dataset. The expected deblurred image is also the intermediate result which might not be clean as we expected [2, 3]. It also requires large number of iterations to deblur an image. An adaptive early stopping criteria should be developed for efficiency.

References

[1] Ren et al, Neural blind deconvolution using deep priors, CVPR, 2020.
[2] Xue et al, Video Enhancement with Task-Oriented Flow, IJCV, 2019
[3] Chi et al, All at Once: Temporally Adaptive Multi-Frame Interpolation with Advanced Motion Modeling, ECCV, 2020

Proposed methods

Main contribution:

➢ The existing network is randomly initialized and expected to model the image prior (limited prior knowledge).

➢ We propose to add a supervision directly at the intermediate latent image by utilizing a pre-trained deblurring model.

➢ A early stopping criteria is developed to avoid overfitting.

Experimental Results

	Baseline	[4]	[5]	+[4]	+[5]
PSNR	33.07	25.19	25.56	33.89	33.41
SSIM	0.931	0.771	0.729	0.935	0.924

Table 1 PSNR/SSIM results for different methods. Adding weak supervision is beneficial.

Stopping criteria: MSE				
# Sequences	5	10	30	50
PSNR	32.63	33.24	33.29	32.78
SSIM	0.919	0.935	0.936	0.921
# Iterations	1510	1520	1573	1691

Table 2 PSNR/SSIM results for utilizing MSE as a stopping criteria.

[4] Zhang et al, Deep Stacked Hierarchical Multi-patch Network for Image Deblurring, CVPR 2019.
[5] Dong et al, Wiener Meets Deep Learning for Image Deblurring, NeurIPS, 2020

Input   [5]   [1]   +[5]