

Self-supervised methods for low-level vision Denoising, Super-resolution and Deblurring

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Denoising: Implementation of state-of-the-art methods

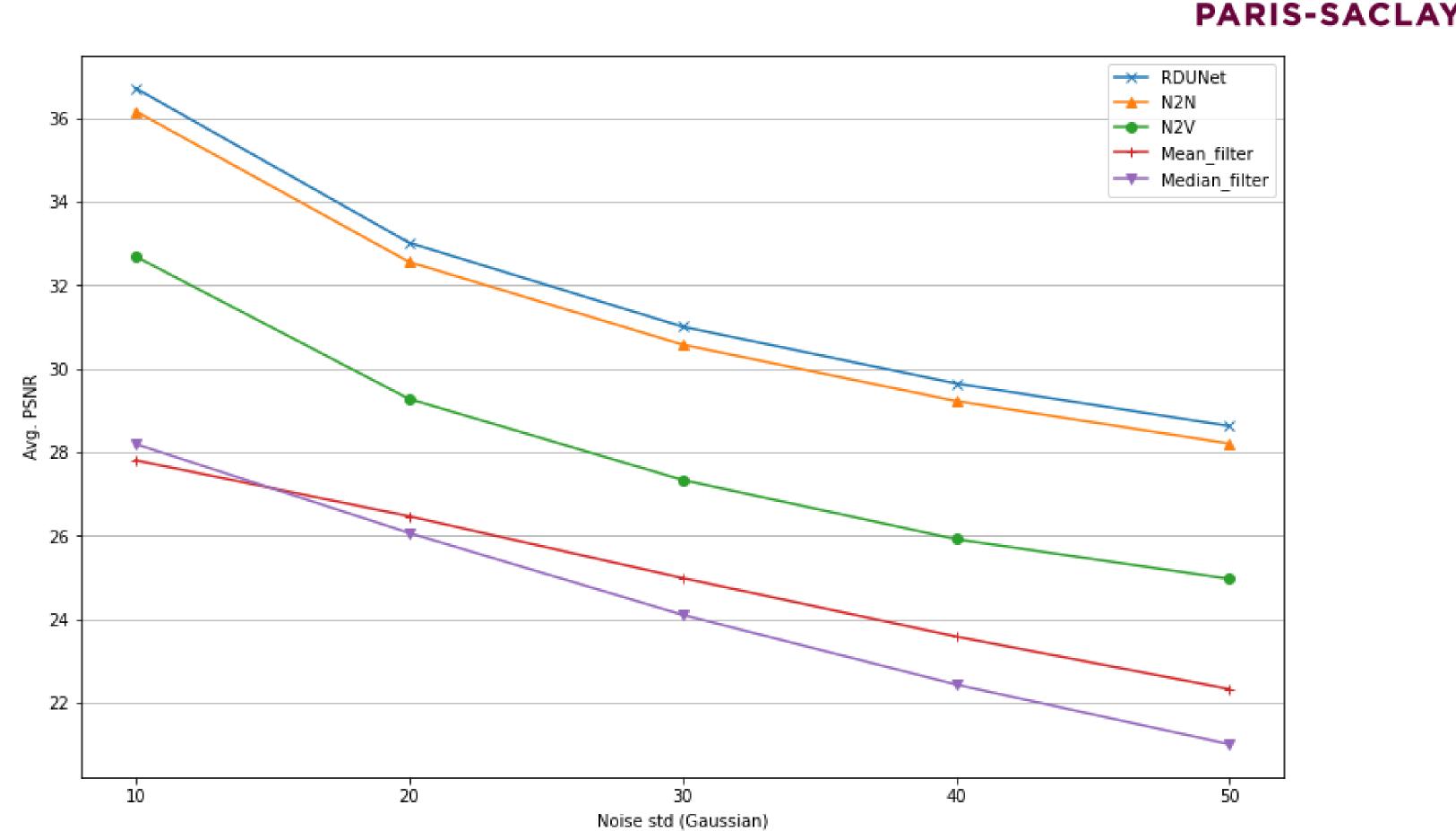


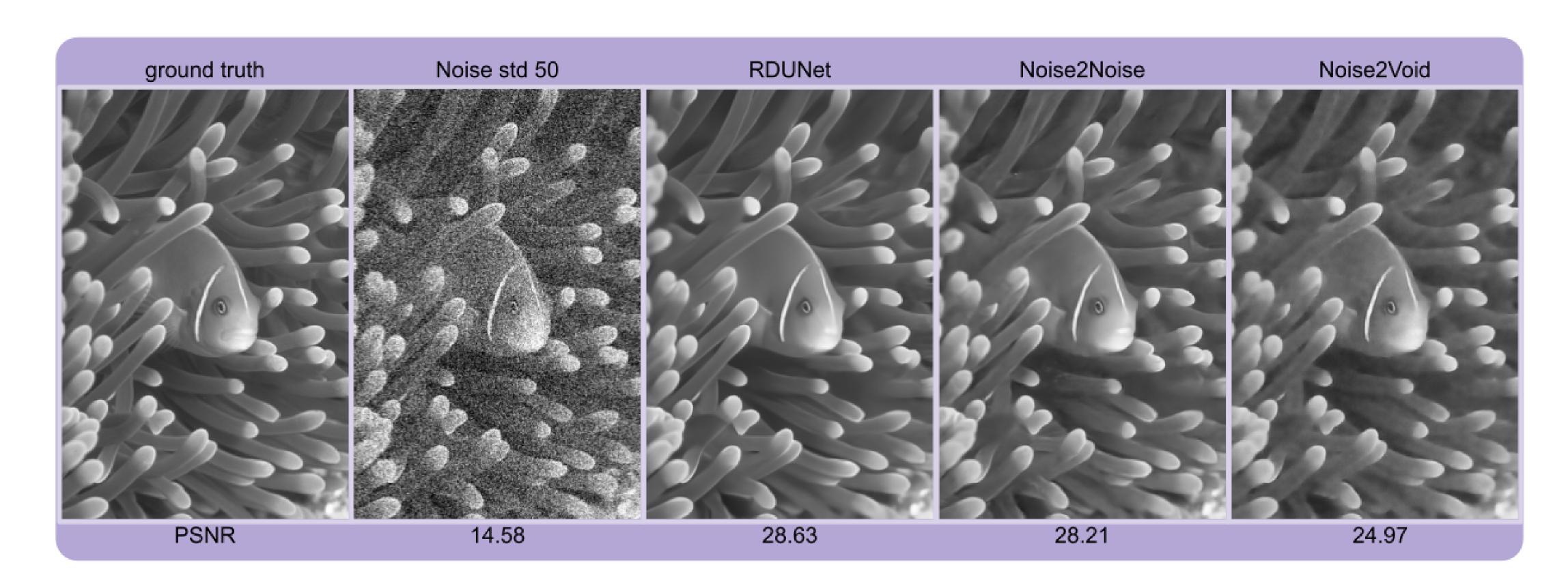
Project Method:

- Study the performance of RDUnet[1], Noise2Noise[3] and Noise2Void[2] on the BSD300 dataset. The official implementations are [n2v_git] and [n2n_git].
- Reproduce Figure 4,7 of Noise2Void[2].
- Apply super-resolution to N2N and N2V.
- Create a novel architecture for Deblurring applied to N2N.

Next Step:

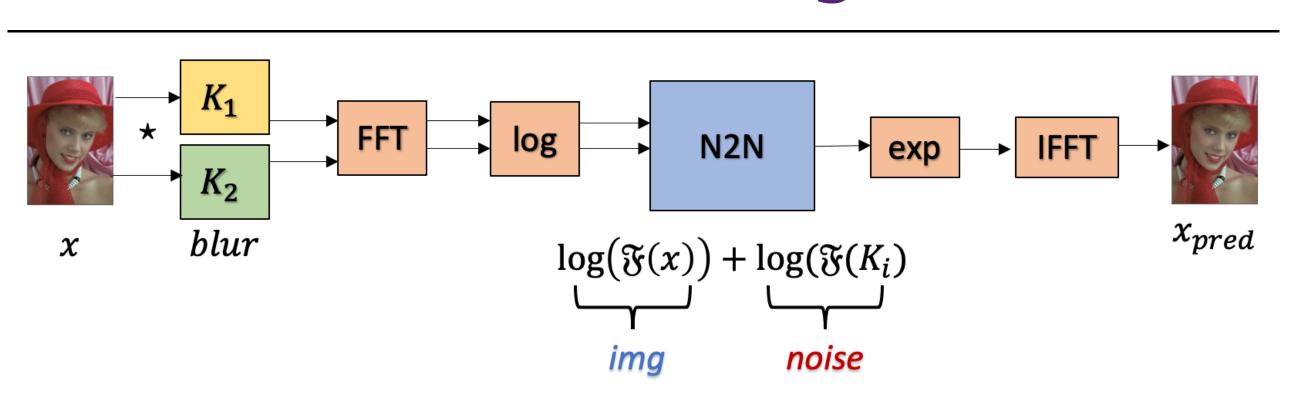
- Study the performance of N2N and N2V on different types of noise: Poisson
- Improve the performance of de-blurring.

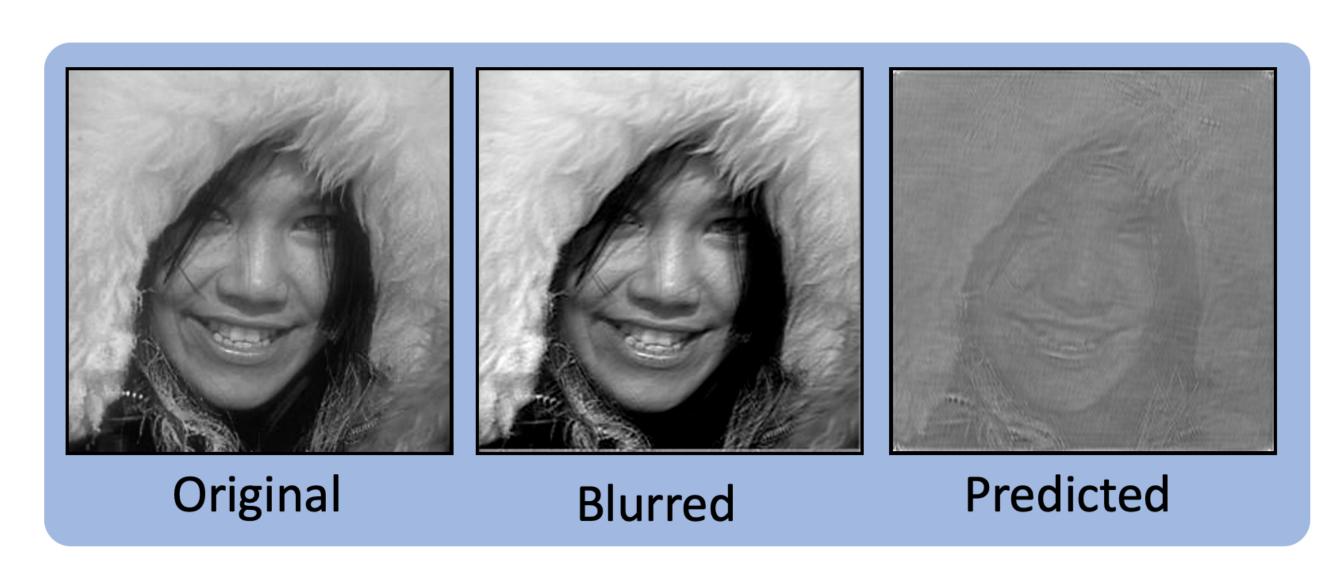




Super-resolution ground truth Input sampling down (bicubic) sampling + noise (width/2, height/2) (width, height) (width, height) Noise2Void output **PSNR** Noise2Noise N2V N2N Avg. PSNR 27.88 24.77

Deblurring





References

- [1] Javier Gurrola-Ramos, Oscar Dalmau, and Teresa E. Alarcón. A residual dense u-net neural network for image denoising. *IEEE Access*, 9:31742-31754, 2021.
- [2] Alexander Krull, Tim-Oliver Buchholz, and Florian Jug. Noise2void learning denoising from single noisy images. *CoRR*, abs/1811.10980, 2018.
- [3] Jaakko Lehtinen, Jacob Munkberg, Jon Hasselgren, Samuli Laine, Tero Karras, Miika Aittala, and Timo Aila. Noise2noise: Learning image restoration without clean data. *CoRR*, abs/1803.04189, 2018.