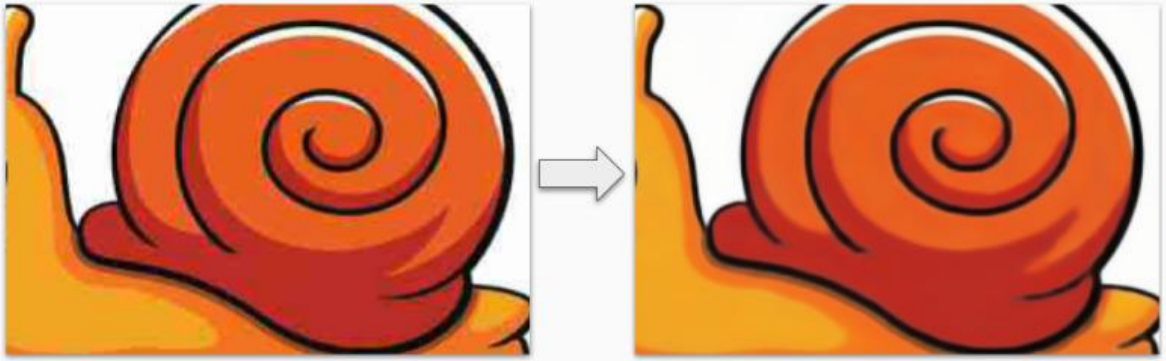
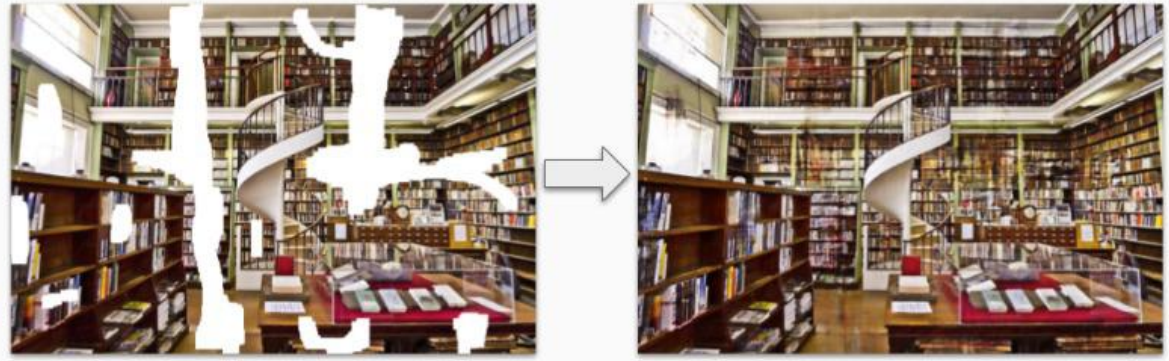
JPEG Artifacts removal



Corrupted | Deep image prior

Inpainting

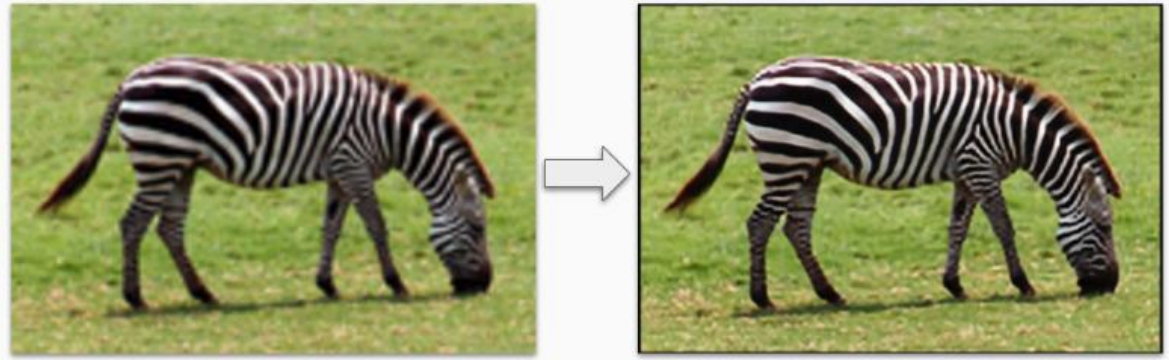


Corrupted | Deep image prior

Inpainting

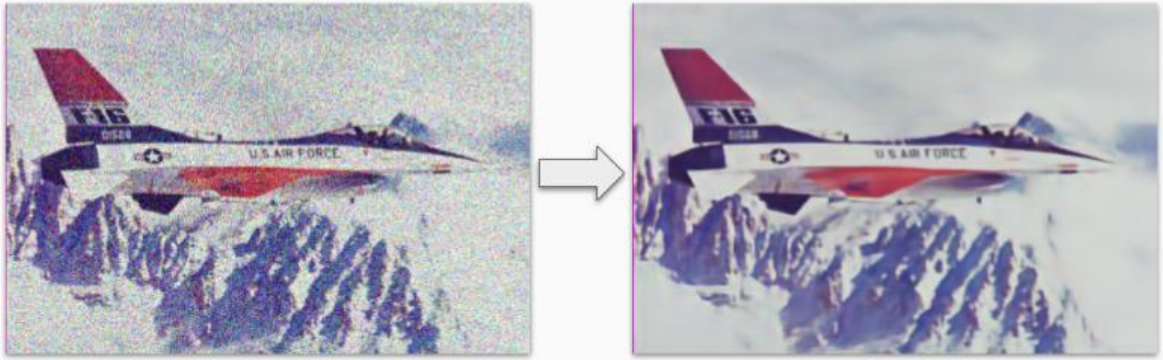
Corrupted | Deep image prior

Super-resolution



Corrupted | Deep image prior

Denoising



Corrupted | Deep image prior

Inpainting

Corrupted | Deep image prior

Deep image prior

Deep convolutional networks have become a popular tool for image generation and restoration. Generally, their excellent performance is imputed to their ability to learn realistic image priors from a large number ofexample images.
In this paper, we show that, on the contrar, the structure of a generator network is sufficient to capture a great deal of low-level image statistics prior to any learning. In order to do so, we show that a randomly-initialized neural network can be used as a handcrafted prior with excellent results in standard inverse problems such as denoising, super-resolution, and inpainting. Furthermore, the same prior can be used to invert deep neural representations to diagnose them, and to restore images based on flash-no flash input pairs.
Apart from its diverse applications, our approach highlights the inductive bias captured by standard generator network architectures. It also bridges the gap between two very popular families of image restoration methods: learning-based methods using deep convolutional networks and learning-free methods based on handcrafted image priors such as self-similarity.

We have investigated the success of recent image generator neural networks, teasing apart the contribution of the prior imposed by the choice of architecture from the contribution of the information transferred from external images through learning. As a byproduct, we have shown that fitting a randomly-initialized ConvNet to corrupted images works as a "Swiss knife"for restoration problems. While practically slow (taking several minutes of GPU computation per image), this approach does not require modeling of the degradation process or pre-training.

关键词：利用深度卷积网络进行图像还原，对如“去噪”、“超分辨率”和“图片修复”都有良好的效果。

https://github.com/DmitryUlyanov/deep-image-prior