Paper review

Video denoising:

1. Beyond a Gaussian Denoiser: Residual Learning of Deep CNN for Image Denoising(DnCNN)[2]

DnCNN use residual learning, which means that the network is trained to predict the noise instead of the clean image. The intuition behind this is that if the mapping from the noisy input f to the clean tar-get u is close to the identity function, then it is easier for the network to learn the residual mapping,f7→f−u.

Batch normalization is proposed to alleviate the internal covariate shift by incorporating a normalization step and a scale and shift step before the nonlinearity in each layer.

Because DnCNN use the 3\*3 convolution blocks. So the receptive field of DnCNN with depth of d should be(2d+1)×(2d+1).

1. Self-supervised training for blind multi-frame video denoising [1]

2.

DRL

1.

Computational Cameras:

1.

传统相机是基于暗箱原理，产生线性透视图像。计算相机使用新颖的光学器件来捕获编码图像，并使用计算模块对捕获的图像进行解码以产生新型视觉信息。计算相机(computational cameras)体现了相机和计算机的融合。Catadioptrics可以帮助提高视野范围

The traditional camera is based on the camera obscura principle and produces a linear perspective image. (b) A computational camera uses novel optics to capture a coded image and a computational module to decode the captured image to produce new types of visual information. A computational camera embodies the convergence of the camera and the computer. Catadioptrics can help improve the field of view. E.g. curved mirror.

Imaging can be viewed as having several dimensions, including spatial resolution, temporal resolution, spectral resolution, field of view, dynamic range, and depth.

Traditional cameras still remain limited in terms of the number of discrete brightness values they can measure. Our solution is to create a detector with an assortment of pixels with different sensitivities either by placing an optical mask with cells of different transmittances on the detector or by having interspersed sets of pixels on the detector exposed to the scene over different integration times.

Spectrum is used with a linear interference filter that passes a different wavelength of the visible light spectrum through each of its columns (inset image).

computational cameras use unconventional optics and software to produce new forms of visual information.

1. Dewil V, Anger J, Davy A, et al. Self-supervised training for blind multi-frame video denoising[C]//Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision. 2021: 2724-2734.
2. Zhang K, Zuo W, Chen Y, et al. Beyond a gaussian denoiser: Residual learning of deep cnn for image denoising[J]. IEEE transactions on image processing, 2017, 26(7): 3142-3155.