

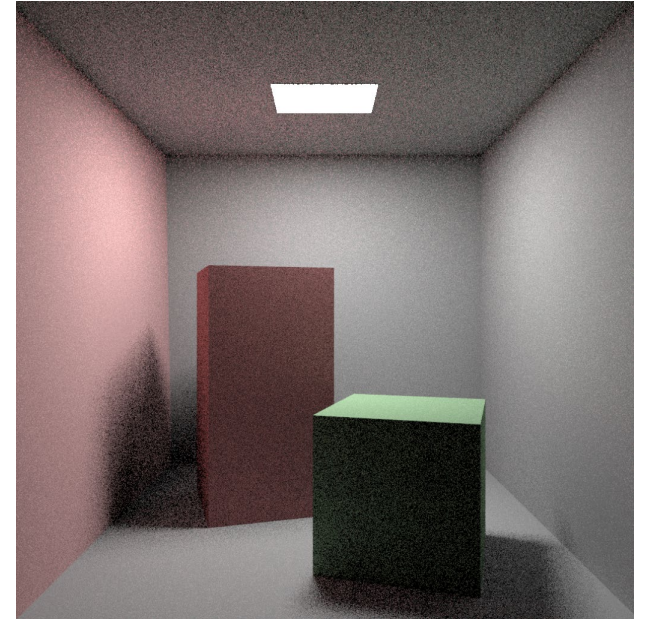
Lecture slides (CT4201/EC4215 – Computer Graphics)

Sampling and Denoising for Monte Carlo Rendering

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Observation

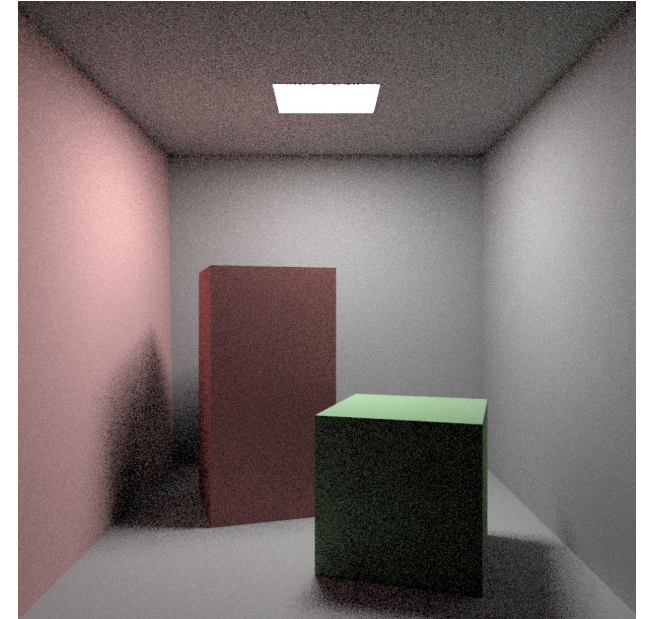
- The amount of noise varies across image pixels.



4 samples / pixel (1.25 secs)

Adaptive sampling

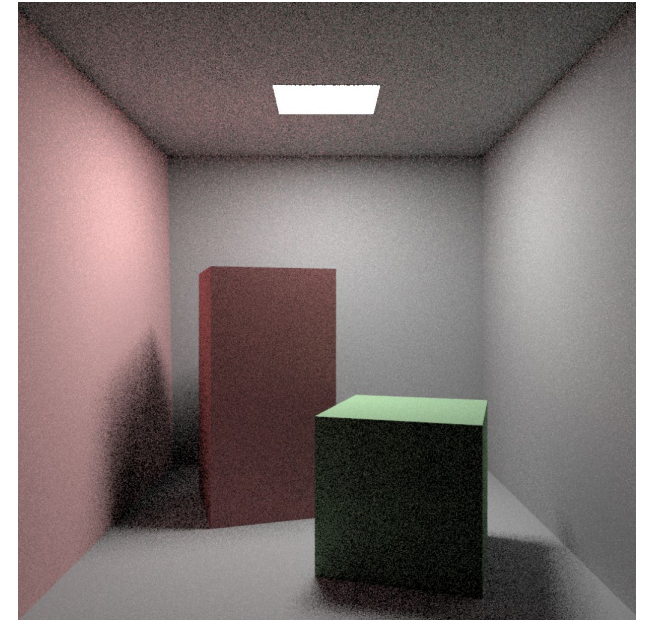
- Adaptive sampling:
 - Allocate more samples to the pixels with higher errors
- A procedure for adaptive sampling:
 - Use a small number of samples per pixel
 - Compute per-pixel sample variance
 - Allocate more samples only to the pixels with higher variances



4 samples / pixel (1.25 secs)

Image denoising

- Image denoising:
 - Blend pixel colors with their neighboring pixels
- A procedure for image denoising:
 - Generate a noisy image using sampling (or optionally adaptive sampling)
 - Apply an image filter to each pixel so that noise in a pixel color can be reduced



4 samples / pixel (1.25 secs)

An example of image denoising

- Deep learning based approaches
 - Kernel-Predicting Convolutional Networks for Denoising Monte Carlo Renderings [Bako et al. 17]
 - A general weighting can be represented as
 - $\hat{y}_c = \sum_i w_i y_i$
 - $w_i > 0$

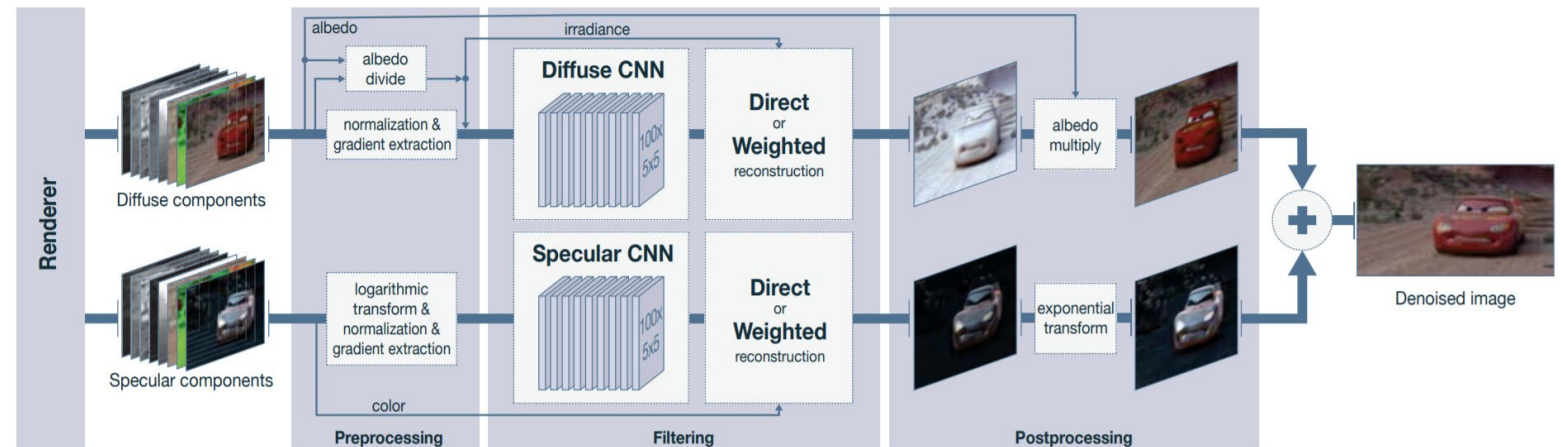


Image from [Bako et al. 17]

An example of image denoising

- Deep learning based approaches
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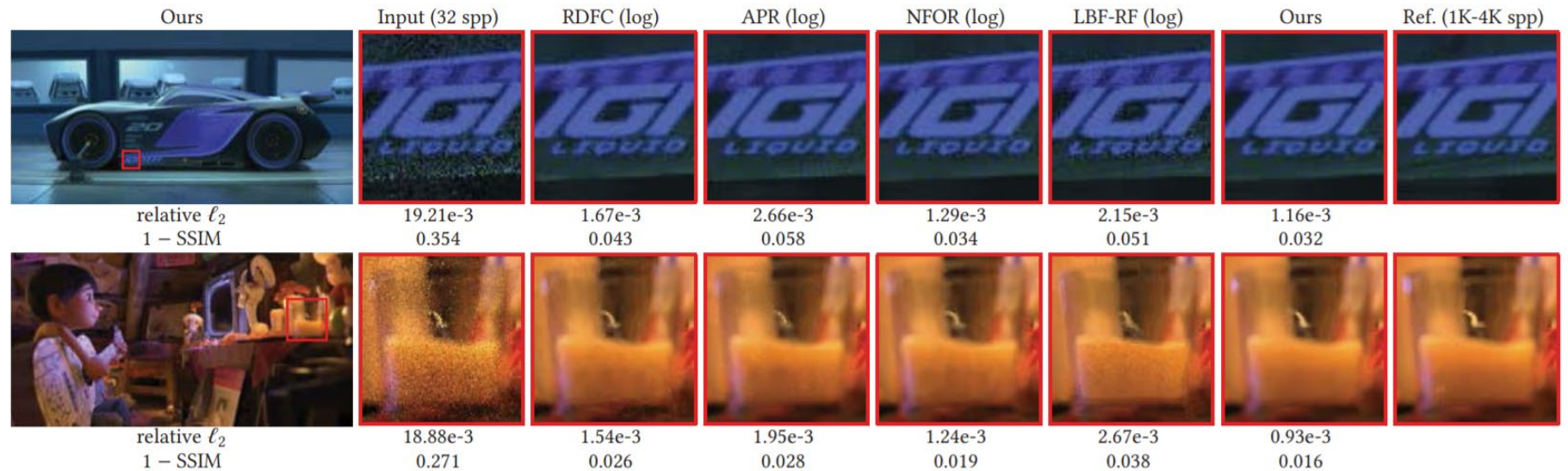


Image from [Bako et al. 17]