Edge-preserving filtering is essential tools for image processing and photo editing. There are much applications: Denoising, Detail enhancement, Stylization, HDR, Haze remove, Stereo matching, Optical flow estimation, and etc.

Main issue of the edge-preserving filtering is processing cost. There are several acceleration approaches:

- Approximation of FIR convolution (bilateral & non-local means)
- Decomposing to multiple Gaussian filters
- Real-time O(1) bilateral filter
- Raised cosine approximation
- Filtering with Local linear assumption
- Filtering with stack of box filtering
- Guided image filter
- Edge-preserving filter with IIR filtering
- Coefficients of IIR filtering for edge-preserving
- Recursive bilateral filter

Advantage and limitations in IIR representation:

- Computationally efficient
- Filtering with only geodesic distance, Euclidean distance is not supported.
- Does not support separability
- X Does not support separability

Contribution of this paper is:

- Representation of edge-preserving filtering with complex IIR filter
- Connection between the other approximation bilateral filtering with IIR filter

Introduction

Experimental Results

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