Vector-Valued Image Regularization with PDEs

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Course Project
Fundamentals of Digital Image Processing

DENOISING (dt = 1 for all cases)

Noisy Image

num of iter = 1

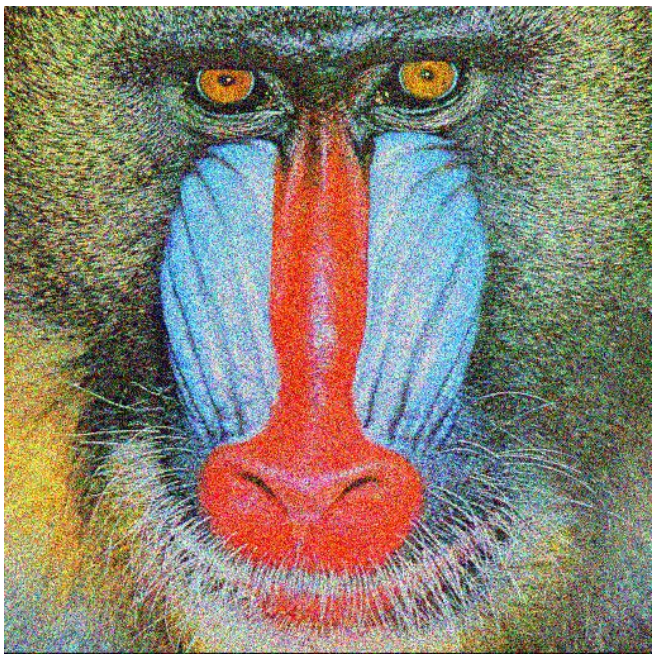
num of iter = 2

Noisy Image

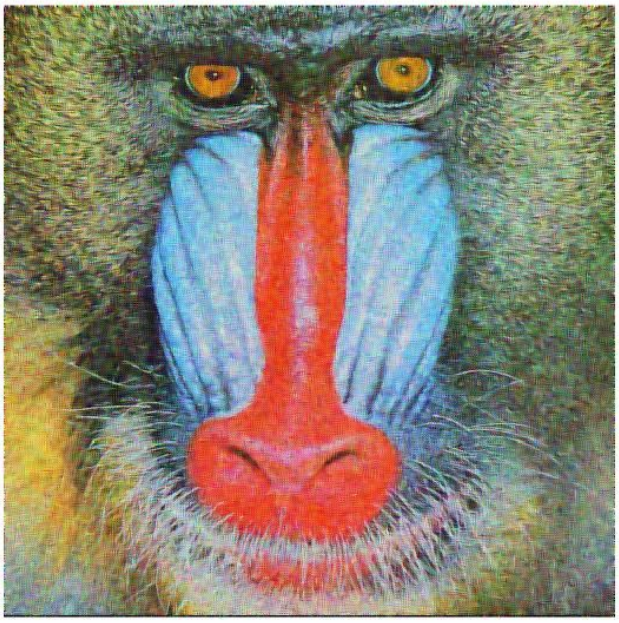
Num of iter = 1

Num of iter = 2

Noisy baboon



Num of iter = 2



Num of iter = 3

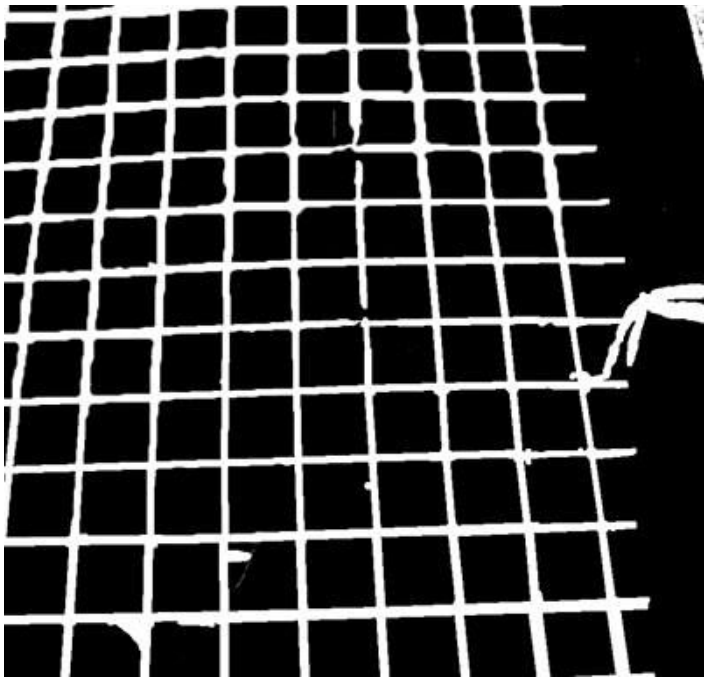
Inpainting

Original

Mask

Inpainted Image

Image

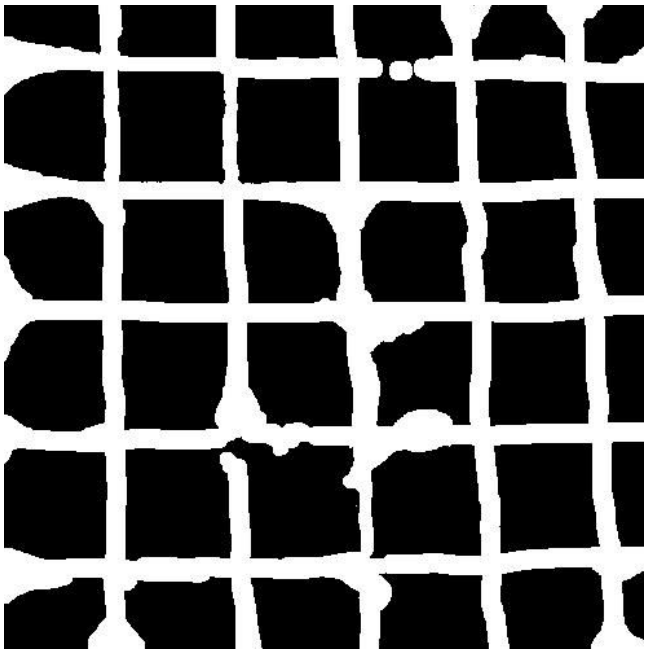


Mask

Inpainted Image

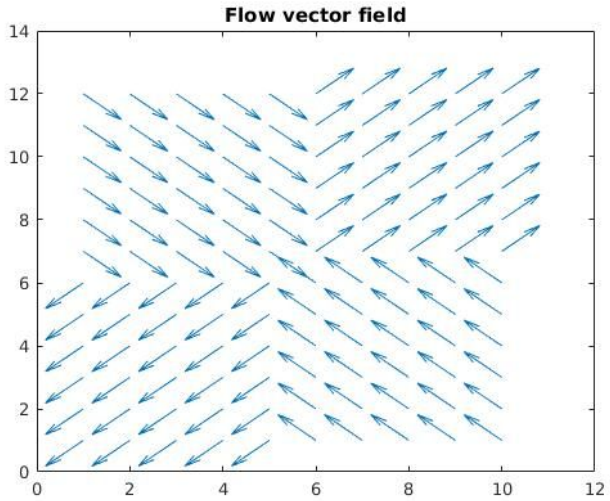
Original Image

Mask



Inpainted Image

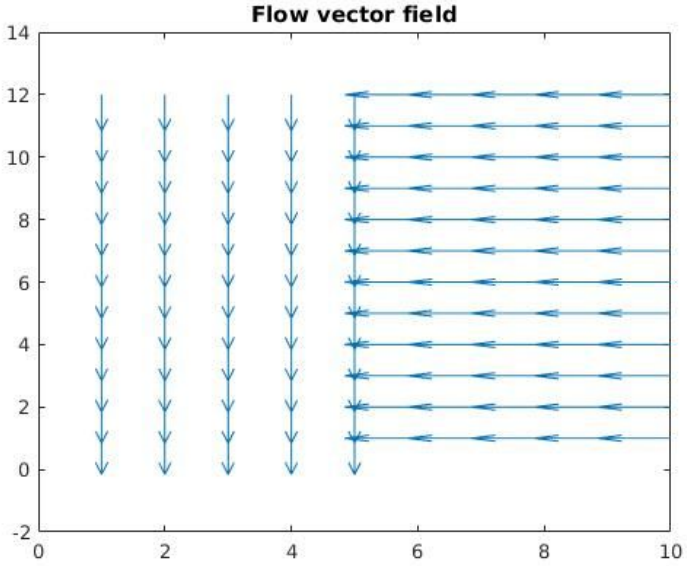
Flow Visualisation



Smoothing in direction of flow: 25 iterations

Smoothing in direction of flow: 50 iterations

Dt = 1



Smoothing in direction of flow: 25 iterations

Smoothing in direction of flow: 50 iterations

DT = 2

For denoising and flow visualization, we used the trace based PDE by computing the trace value i.e. the increment in image intensities for each channel.

For image inpainting, we used a spatially varying kernel derived from the spectral elements of the structure tensor to find the missing intensities (given by the mask).