CS 663 - Project

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Flow-Based Image Abstraction

Implemented the paper Flow-Based Image Abstraction (2009) paper to non-photorealistically render natural images to simplify the visual cues and convey certain aspects of the scene more effectively.

Abstracting out key features by Region Smoothing and Line Extraction using flow that describes salient features of the image

Edge Tangent Flow

It is a feature preserving tangent vector field on the input image.

It magnified the nearby low magnitude vectors to align along dominant tangents along the edges in the image.

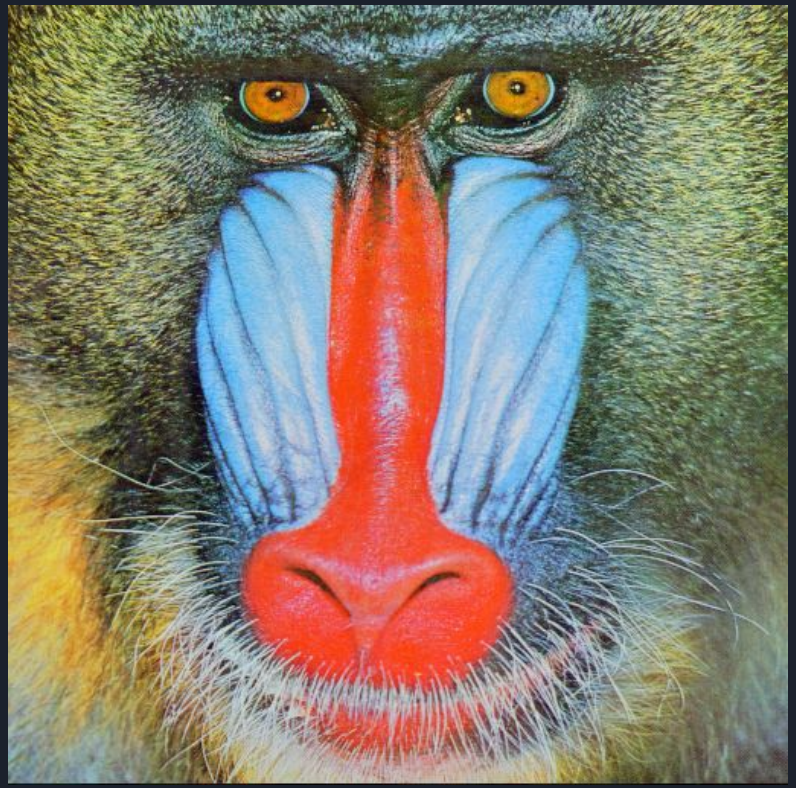
Salient edge directions are preserved, while weak edges are redirected to follow the neighboring dominant ones

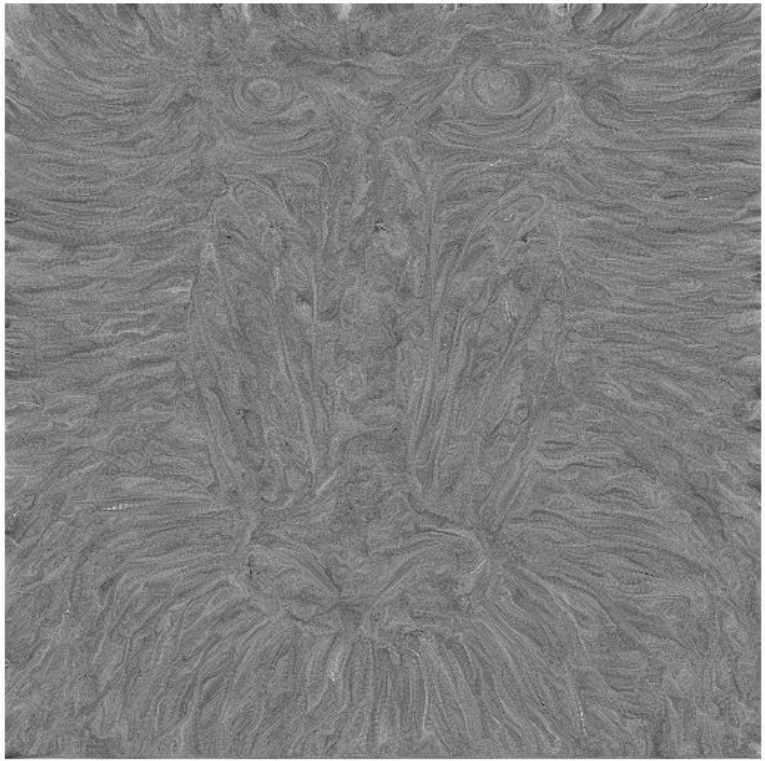
Visualizing ETF

We use the method of Line Integral Convolution to display the Edge Tangent Field.

Essentially we convolve a white noise image with the streamline generated from the ETF.

Streamlines are generated using standard euclidean advection steps



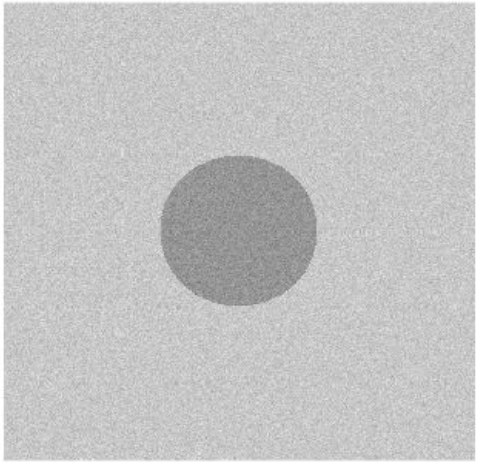


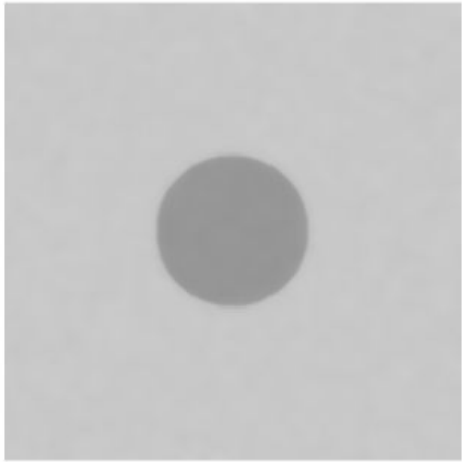
Flow Based Difference of Gaussian

Due to substandard results using Canny Egde filters and more artistic styled images using the DOG filter, we employ DOG filter using along the direction perpendicular to the streamlines obtained from ETF filter.

Flow Based Bilateral Filter

Mean shift segmentation gives arbitrary segments without preserving the features of image. FBL alternate iterations of 1D bilateral filter along the streamline and its perpendicular direction to take into the account the ETF along with feature preserving smoothing

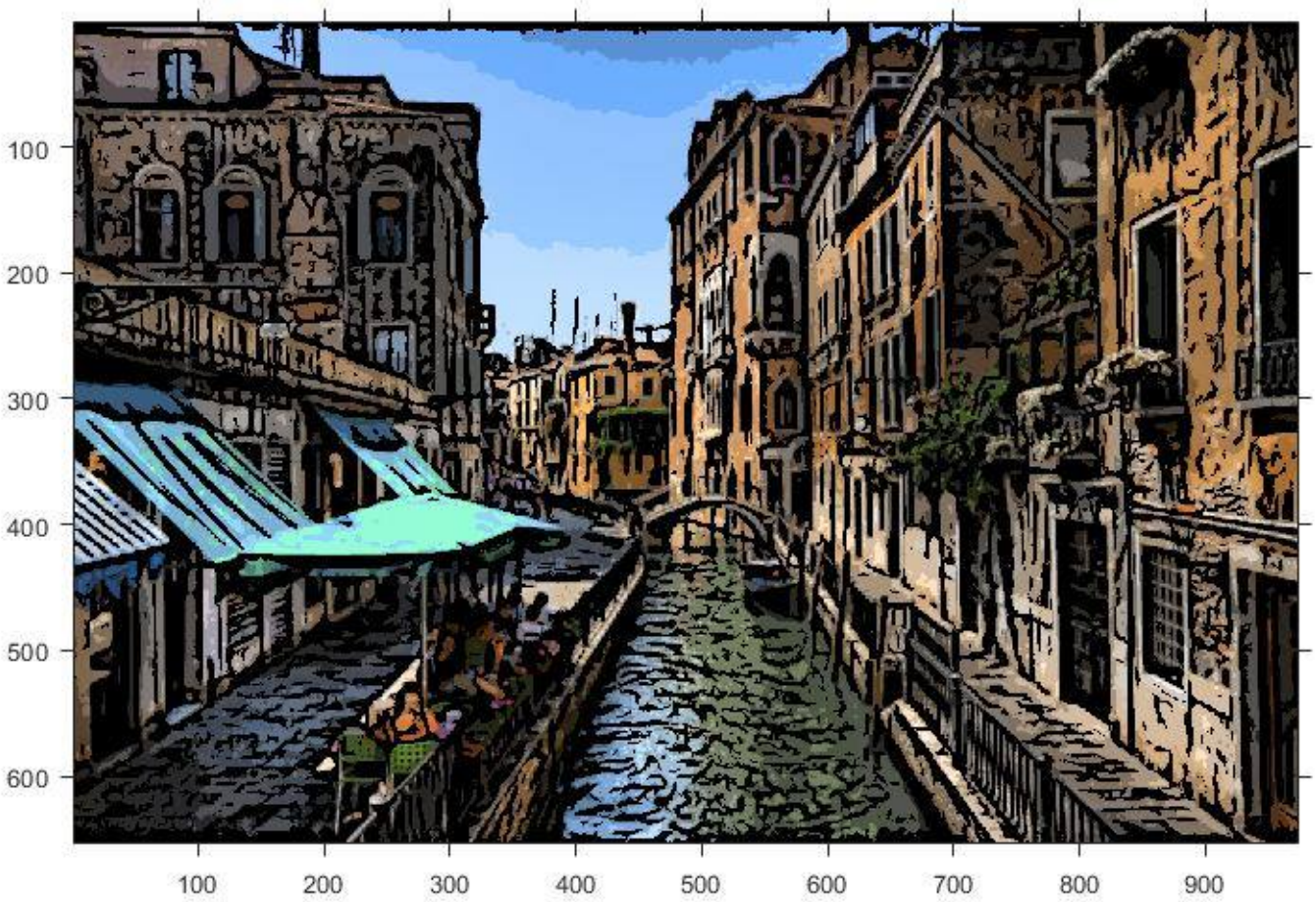




Quantization

To get cartoonish artifacts after bilateral filter we perform a quantization over the image pixels. We refer the paper Real-Time Video Abstraction(2006) to implement this step. We tried to use luminance gradient to reduce quantization but still there are some artifacts appearing in sky in one of the results.

Final Results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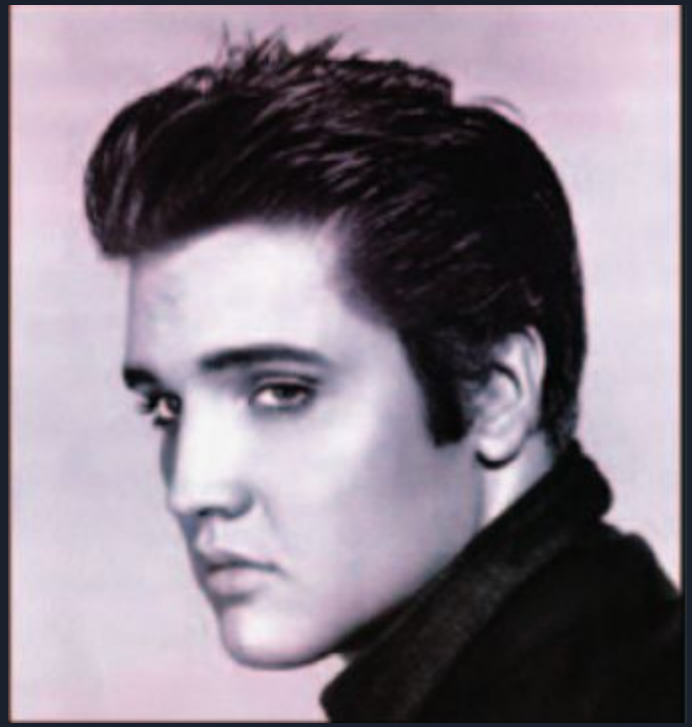

Thank You