



Cartoonifying Image with Neural Style Transfer

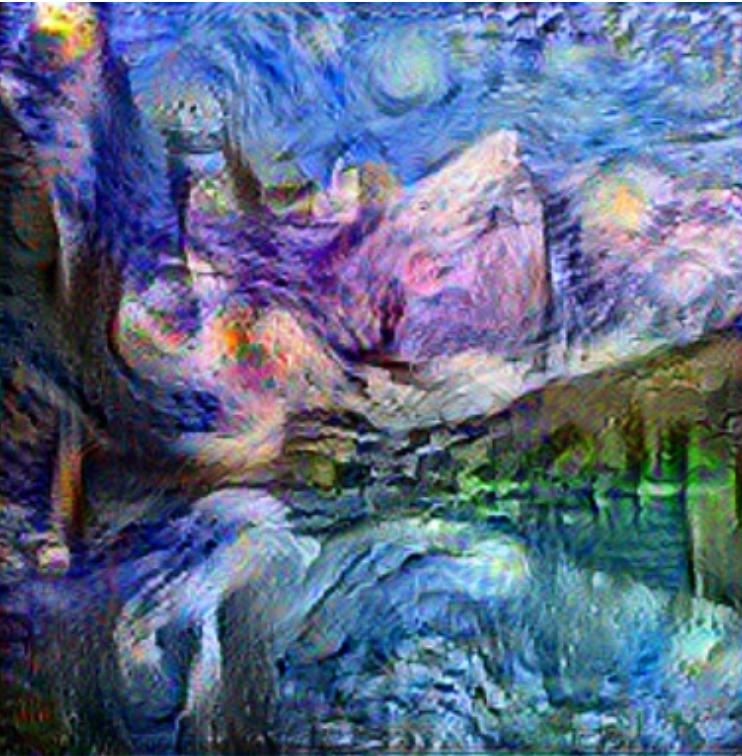
Deep learning technique for transferring artistic style between images.

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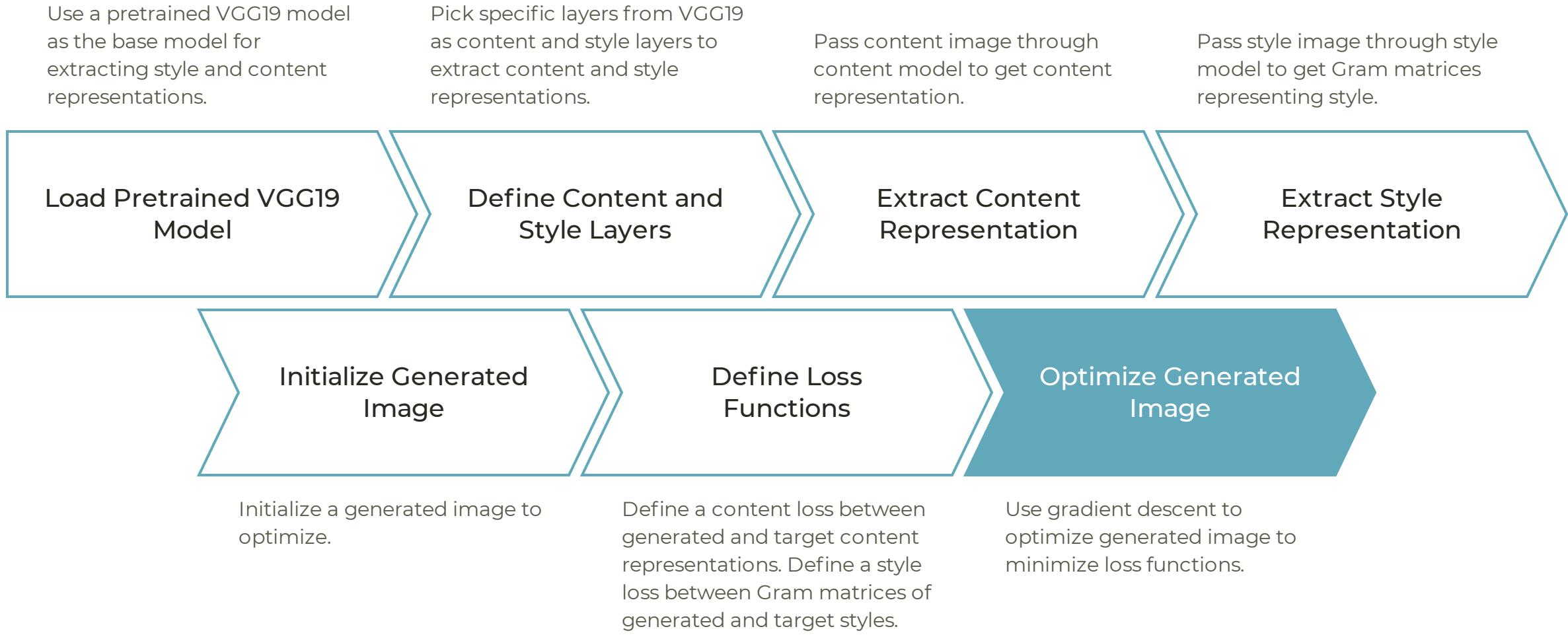
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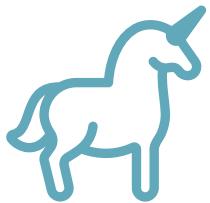
Introduction to Neural Style Transfer

Neural style transfer is an exciting technique that leverages neural networks to synthesize a new image by combining the content of one image with the style of another. This allows us to take an ordinary photo and transform it into a vivid artistic rendering imbued with the aesthetic qualities of a famous painting.

How Neural Style Transfer Works



Key Components



- Content loss

Matches generated image content to target content image



- Style loss

Matches generated image style to target style image



- Optimizer

Updates generated image to minimize loss

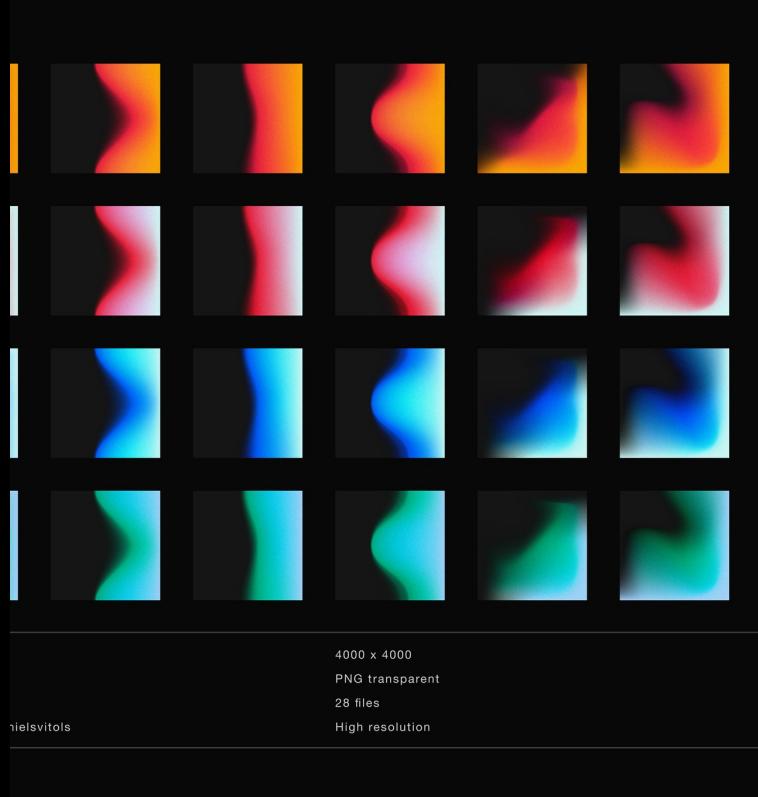
These are the key components for neural style transfer to generate a stylized image.

Content and Style Layers



Shallow Layers

The shallow layers like block1_conv1 capture low level features like edges, textures, colors. They represent the style of an image.



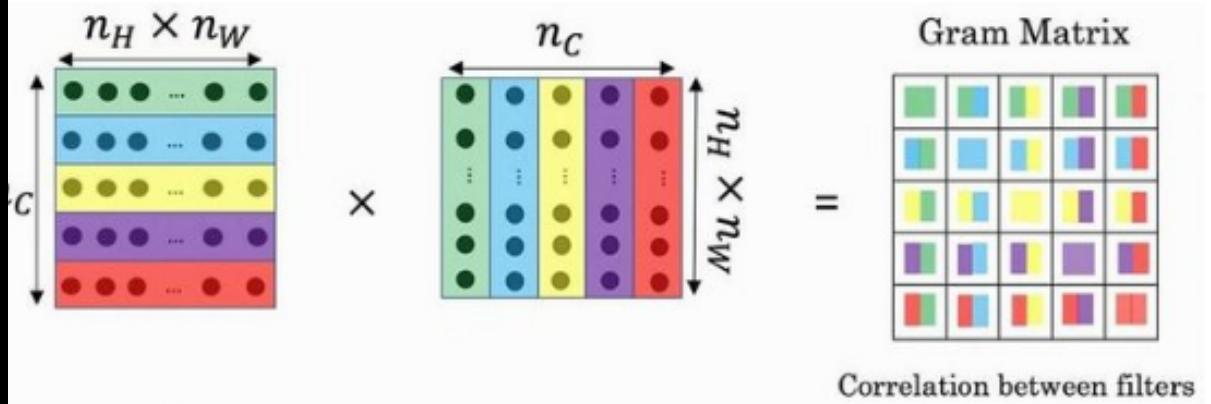
Deep Layers

The deeper layers like block5_conv2 capture high level content and objects in an image. They represent the content of an image.



Style and Content

By combining shallow and deep layers, style transfer algorithms can transfer the style from one image to the content of another image.



Gram Matrices

Gram matrices capture correlations between feature maps in neural networks. By matching Gram matrix correlations between the generated image and style image, we can transfer the style from one image to another during neural style transfer.

Applications



- Artistic style transfer

Transfer artistic styles from famous paintings to ordinary photos



- Texture transfer

Transfer textures and patterns from one image to another



- Cartoonizing photos

Transform real photos into cartoon-like images



- Stylizing videos

Apply artistic styles to videos frame-by-frame

Neural style transfer has many creative applications for generating stylized and artistic imagery.

Limitations



- Slow optimization process

The iterative optimization process can take hundreds of iterations and be quite slow



- Difficulty handling large images

Large images require more memory and compute, making style transfer difficult

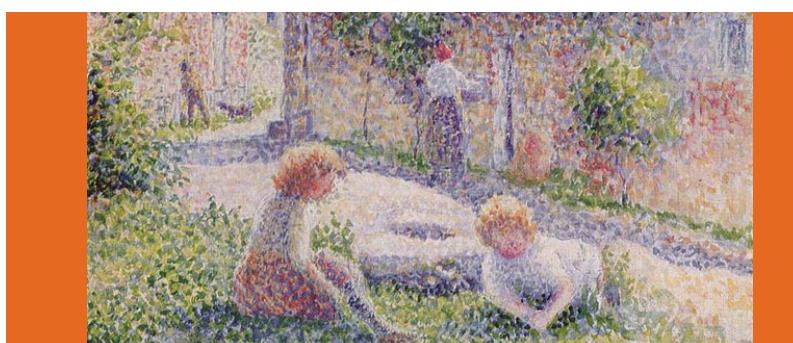


- Balancing style and content

Getting the right balance between preserving content and transferring style is challenging

While neural style transfer is powerful, it still has some limitations to improve.

Results



Thank You