

Implementing Neural Style Transfer in PyTorch



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Overview

Implement style transfer using

- VGG19
- AlexNet

Freeze weights of pre-trained model

Train target image weights

Scale style losses to be in the same range as content losses

VGG



Big innovation - stacking multiple small filters without pooling

E.g. Stack 3 convolutional layers of 3x3 rather than 1 convolutional layer of 7x7

Increase representational power without too many parameters

Small filters also provide regularization and mitigate overfitting

A Neural Algorithm of Artistic Style

<https://arxiv.org/abs/1508.06576>

Leon A. Gatys, Alexander S. Ecker, Matthias Bethge

AlexNet



Big innovation - stack convolutional layers directly atop each other

Do not place pooling layers between these directly stacked layers

Mitigate overfitting risk by high dropout (50%) and randomly shifting training images by offsets

AlexNet



Uses form of normalization called “local response normalization”

Strongly activated neurons inhibit nearby neurons

Causes neurons to “compete” to specialize in different types of features

AlexNet won 2012 ImageNet contest by a huge margin

Demo

**Perform style transfer using the VGG19
pre-trained model**

Demo

**Perform style transfer using the
AlexNet pre-trained model**

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