Style Transformation

Course Code : DA526

Instructor : Debanga Raj Neog

Group #22
Vudatha Venkata Narendra
Kaja Gnana Prakash
Maddala Karthik
Tejas Chandra Karreddula
Ashish Kumar Pal

Problem Statement

Imagine that you can create a true artwork by yourself, turning your own photo or a familiar landscape into a painting done like Picasso would do it. Seams impossible right? With the help of deep neural networks, this dream has now become reality. Neural style transfer has become a trending topic both in academic literature and industrial applications.

From the deep learning perspective, ideas for style transfer stem from attempts to interpret the features that a deep neural network learns and understand how exactly it works.

Introduction

Style transfer is an optimization technique used to take two images — a content image and a style reference image (such as an artwork by a famous painter) — and blend them together so the output image looks like the content image, but “painted” in the style of the style reference image.

Transferring the style from one image onto another can be considered a problem of texture transfer. In texture transfer the goal is to synthesise a texture from a source image while constraining the texture synthesis in order to preserve the semantic content of a target image.

Why style transfer?....

Style transfer is an active area of research and development in computer vision and deep learning, and there are several novel approaches and techniques that could be introduced to improve its performance and functionality. Here are some of them:

Multi-style transfer: Current style transfer techniques can apply only one style to an image. Multi-style transfer can be introduced to apply multiple styles to an image, which would be useful in creating more diverse and unique visuals.

Interactive style transfer: Interactive style transfer allows users to adjust and manipulate the style and content of an image in real-time, giving them greater control over the final output.

Adaptive style transfer: Adaptive style transfer adjusts the style transfer process based on the content and style of the input image, which would result in more accurate and realistic output images.

Fine-grained style transfer: Fine-grained style transfer would enable users to transfer specific visual features, such as texture, color, or brush strokes, between images, allowing for more precise control over the style transfer process.

Real-time style transfer: Current style transfer techniques can take several seconds or even minutes to process an image. Real-time style transfer could be introduced to enable fast and efficient style transfer on live video streams or other real-time applications.

Methodology

There are several methodologies that are commonly used in style transfer. Here are some of them:

Convolutional neural networks (CNNs): CNNs are a type of deep neural network that can learn and extract features from images. CNNs are used in style transfer to identify the content and style features of an image.

Feature reconstruction: Feature reconstruction is a methodology that involves reconstructing an image based on its content and style features. This methodology is used in style transfer to create a new image that combines the content features of one image with the style features of another.

Optimization: Optimization is a methodology that involves minimizing a loss function to obtain the optimal solution. In style transfer, optimization is used to find the best combination of content and style features that result in a visually pleasing output image.

Cont..

Transfer learning: Transfer learning is a methodology that involves using pre-trained models to perform a task. In style transfer, transfer learning is used to apply the knowledge learned from pre-trained models to new images.

Using VGG19: VGG19 is a widely used convolutional neural network that has been pre-trained on a large dataset of images. By using VGG19, you can leverage its pre-trained weights to extract content and style features from your input images, which can improve the quality and efficiency of your style transfer.

Using the Gram matrix: The Gram matrix is a mathematical technique that is used to measure the correlations between different features in an image. By using the Gram matrix, you can extract the style features of an image, which can be used to transfer the style of one image to another.

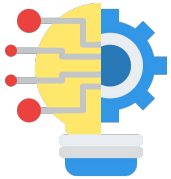
We are trying to implement

Combining VGG19 and the Gram matrix:

While both VGG19 and the Gram matrix have been used in previous style transfer projects, the combination of the two can be considered novel. By using VGG19 to extract content features and the Gram matrix to extract style features, you can create a more accurate and effective style transfer algorithm.

Dataset

We took our data from kaggle



Novelty

Style transformation is done either using gram matrix or vgg now we are trying to combine the advantage that we are going to obtain from vgg as well as gram matrix and we are designing a new model.

Related Works:

Thank you