

# ABSTRACT

Neural Style Transfer (NST) is a deep learning technique that synthesizes a new image by blending the content of one image with the artistic style of another. It uses convolutional neural networks (CNNs), such as VGG-19, to extract high-level content and style features. The technique optimizes an output image by minimizing a loss function that balances content preservation and stylistic resemblance.

This paper introduces an improved NST approach by enhancing the style loss function. Instead of relying solely on the traditional Gram matrix, which captures only texture correlations, the method incorporates spatial transformation maps to better preserve texture details and global arrangement. As a result, the stylized images show clearer textures, reduced distortion, and improved visual quality.

Although NST offers impressive artistic results, it has limitations, including high computational cost and limited real-time performance. Nevertheless, it has broad applications in digital art, photo editing, film production, and virtual reality. The improved method demonstrates superior quality over traditional NST techniques, making it a promising direction for future developments in image style transfer.

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