

Depth-Preserving Style Transfer

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Abstract

Style transfer is defined as the process that given a content image and a style image it tries to migrate the style from the style image to the content image. Though it is not clear what the exact definition of style is, pattern transforming and matching are generally accepted.

In this work we present a novel method which preserve the depth information of the content image while migrating the style.

1. Introduction

convolutional neural network (CNN)

2. Related Work

2.1. Image Style Transfer

Style transfer can be considered as a more general form of texture transfer, where one transfers texture from one image (style image) to another image (content image). Ideally, semantics of the content image should not be altered in this process. In texture transfer, it is usually the low-level features that are utilized, e.g., in [1].

With the recent prevalence of deep neural networks, researchers started exploring how high-level features extracted by neural networks can be utilized for the task of style transfer. For instance, Gatys *et al.* perform image style transfer by synthesizing a new image that matches both contents of the content image and styles of the style image [4]. In particular, they extract content representations from the content image and style representations from the style image using the VGG network [5]. Since the VGG network is trained to perform object recognition and localization tasks, the layers deep down the network hierarchy capture object information (i.e., the contents) of the content image and are insensitive to the exact pixel values. Therefore, outputs from these deep layers serve as good content targets that the synthesized image tries to achieve at varying levels

of resolution. As for style, they adopt a feature space built on filter responses in any layer of the network [2]. By design, the feature space captures texture information without global arrangement. Finally, they minimize a weighted sum of the content and style loss under a CNN framework, where forward and backward passes are iteratively performed.

Building upon this work, the authors recently devised a way of preserve the original colors in the content image [3]. One drawback of this optimization-based approach

2.2. Depth

3. Methods

4. Experiments

5. Discussion & Conclusion

References

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