Neural Style Transfer

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Abstract: *Introduced by Gatys* et al. *(2015), the field of Neural Style Transfer has not only evolved rapidly but also allowed for insights into the processes inside neural networks and into human perception. Various methods, ranging from image based to model based approaches have been introduced to alleviate the weaknesses of the original formulation. Here, we recapture the idea behind Gatys* et al. *(2015)'s algorithm and give an overview of methods, used in the current field of Neural Style Transfer.*

Contents

1 Introduction

Art has played an important role in human culture throughout most of its history Carroll (2004). Despite this, little is known about what the deciding factors of what we perceive as aesthetic are. Recent progresses in Artificial Intelligence yield astonishing accuracy in computer vision tasks, leading to the impression, that Convolutional Neural Nets almost rival the perceptive prowess of the human visual cortex.
Applying the style of one image to the content of another has been a topic in the field of non-realistic rendering for more than two decades Jing *et al.* (2019).
Gatys *et al.* (2015)'s work showed that powerful Convolutional Neural Nets can be used to transfer arbitrary styles to any content image. Besides the visually astonishing results, their work also gives us an insight on the creation and perception of artistic images, a field where Neural Networks have not yet been as outstanding as their human counterpart.

1.1 sub section

FIGURES have captions below the figures!!!
TABLES have captions above the tables!!!

2 Original Idea

3 Methods

3.1 Image Based

3.2 Model Based

4 Challenges/Outlook

4.1 Evaluation

4.2 Interpretability

5 Conclusion

Table 1: caption

A	B	C
1	2	3
4	5	6

References

Carroll, N. (2004). Art and human nature. *The journal of aesthetics and art criticism*, **62**(2), 95–107.

Gatys, L. A., Ecker, A. S., and Bethge, M. (2015). A neural algorithm of artistic style. *arXiv preprint arXiv:1508.06576*.

Jing, Y., Yang, Y., Feng, Z., Ye, J., Yu, Y., and Song, M. (2019). Neural style transfer: A review. *IEEE transactions on visualization and computer graphics*.