

[Trends in Digital Media]

[BSc. in Information Technology specialized in Interactive Media]

[Srilanka Institute of Information Technology]

Creating stylized artwork using neural style transfer

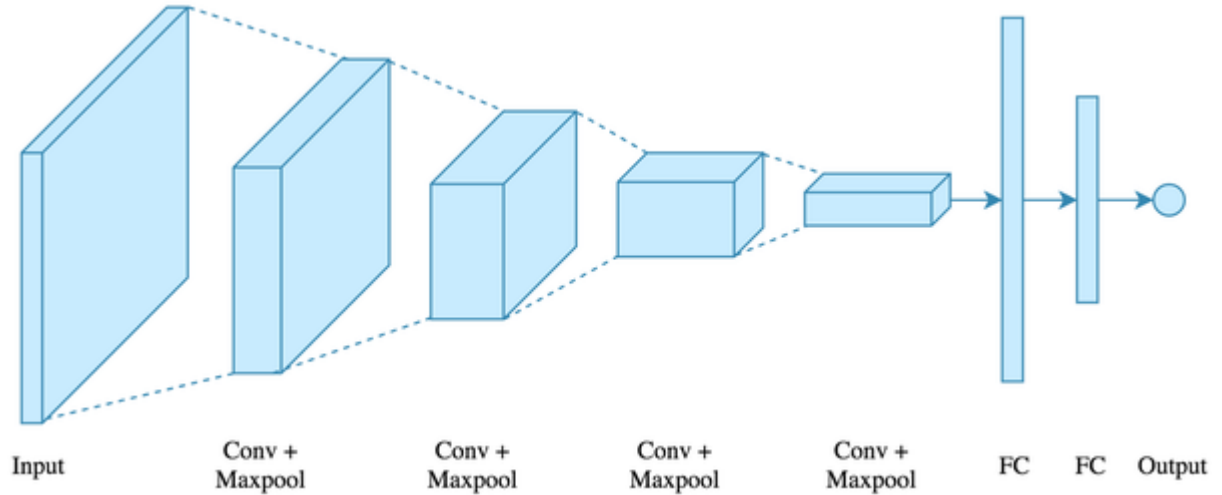
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Introduction

Neural style transfer basically means transferring a style of an image to another using neural networks. Convolutional neural networks (CNN) are used for this [1]. There are lots of research that have improved over this technology that focuses on a lot smoother and faster modules.

Convolutional neural networks have a hierarchical feature learning system [1]. The lower levels are more focused on less important features like edges and pixel details while the higher levels are more focused on features like shapes [1].



There are two special terms in style transfer called content loss and style loss [1][2]. These are hyper parameters which can be used to do get a varied range of styling.

$$\mathcal{L}_{total}(\vec{p}, \vec{a}, \vec{x}) = \alpha \mathcal{L}_{content}(\vec{p}, \vec{x}) + \beta \mathcal{L}_{style}(\vec{a}, \vec{x})$$

If content weight is kept very high, content will be given more preference and less style will be applied for the output image. If style weight is more than content weight, more style will be applied, and content will be kept very low on the output image.

Customizations

As mentioned before there is a wider capacity of solutions which can be produced depending on the above-mentioned hyper parameters. The customization is as followings:

- Selecting a suitable set of convolution layers from the module
- Setting up style measurements for each selected layer
- Determining and setting up the amount of weight (content and style)
- Setting a printing point and number of iterations

References

- [1]L. Gatys, A. S. Ecker and M. Bethge, "A Neural Algorithm of Artistic Style", *Arxiv.org*, 2021. [Online]. Available: <https://arxiv.org/pdf/1508.06576.pdf>. [Accessed: 25- Jun- 2021].
- [2]J. Johnson, A. Alahi and L. Fei-Fei, "Perceptual Losses for Real-Time Style Transfer and Super-Resolution", *Arxiv.org*, 2021. [Online]. Available: <https://arxiv.org/pdf/1603.08155.pdf>. [Accessed: 25- Jun- 2021].

Github link : https://github.com/Mishy34/TDM_ML/upload/main