

Restylization Network: RestyNet

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Group 26

October 25, 2020

The Problem

In this project, we aim to achieve a technique that allows us to alter the style of one image to a desired style. In this context, we would like to focus on style transfer where the content of an image is blended with the style of another image. This style transfer process is an image stylization problem. Image stylization problem can be divided into two subcategories which are photorealistic image stylization and non-photorealistic image stylization. Basically, the network planned to be developed will take two images, one as content image and the other as style reference, then the content image will be blended with the style of the other image. The resulting image will contain the core elements of the content image and will appear to be painted in the style of the other image.

The Datasets

The methodology can be tried with various kinds of datasets yet the initial focus will be on the MS-COCO and Image-Net datasets to not to obtain unsatisfactory stylization results. However, as the project progresses, the team can perform experiments with other common datasets and self-generated datasets. Within this frame of reference, the examples of other common datasets are Cityscapes and Kaggle datasets. The images of self-generated datasets can be extracted from websites such as Flickr.

Planned Milestones

There are various approaches to the problem of image stylization. To begin with, the purpose of understanding the conditional and generative adversarial networks will be the initial focus. Before moving on with specific context, state-of-the-art approaches for style transfer tasks will be analysed together with image generation systems like pix2pix, PixelGAN and BigGAN. Some of the state-of-the-art approaches for the purpose of image stylization include Cycle-GAN, WCT, PhotoWCT. These image to image translation methods will be studied and their backbones and autoencoders such as VGG-19 and VGG-16 can be utilized throughout the project. The style transfer task can be achieved matching the Gram matrix statistics of pre-trained deep features and/or using a closed form solution as it is described in PhotoWCT. We are keen to utilize the PyTorch framework for the project. For the photo-realistic style transfer experiments, AMT perceptual studies and FCN scores are some of the metrics which the outputs of the network can be evaluated on. Finally, if the time enables, we would like to add a website or Flutter app in which our project can be ran. The progress of the project can be followed on [this github page](#).