

DIP Final Group 19 Report

Group members

B08902061 資工大四 郭柏廷
B08902070 資工大四 戴培凱

Division of Work

There's no specific division of work, it's about 50%-50%

Methods we used

- Style Transfer Algorithm
 - Image only
 - Neural Style Transfer (by Leon Gatys et al.)
 - SANet
 - Video and Image
 - MCCNet
 - Linear Style Transfer(Li et al.)
- Additional functions added
 - Preserve Color Transfer
 - 2 ways to implement
 1. Color Histogram Matching
 - Do Color Transfer on style image with content image, or
 - Do Color Transfer on stylized result with content image
 - Downside
 - Get poor color preserve result if style image has few color
 2. Luminance only transfer
 - RGB -> YUV
 - Y is luminance, UV is colors
 - Do style transfer only on Y channel
 - Reversible Transform

- Do forward transform on content images before style transfer, and backward transform the stylized result
- If a transform can be recovered(backward transform) without losing much details, it can be called a Reversible Transform
- Types of reversible transform we implement
 - Resize
 - Rotate
 - Swirl
 - Wavy
- Procedure of Our Program
 - For image style transfer
 - add noise
 - reversible forward
 - style transfer
 - reversible backward
 - preserve color
 - For video style transfer
 - add noise
 - reversible forward (only resize and rotate)
 - style transfer
 - reversible backward
 - preserve color
 - How to run
 - see github README

Results

- Images
 - Image 1

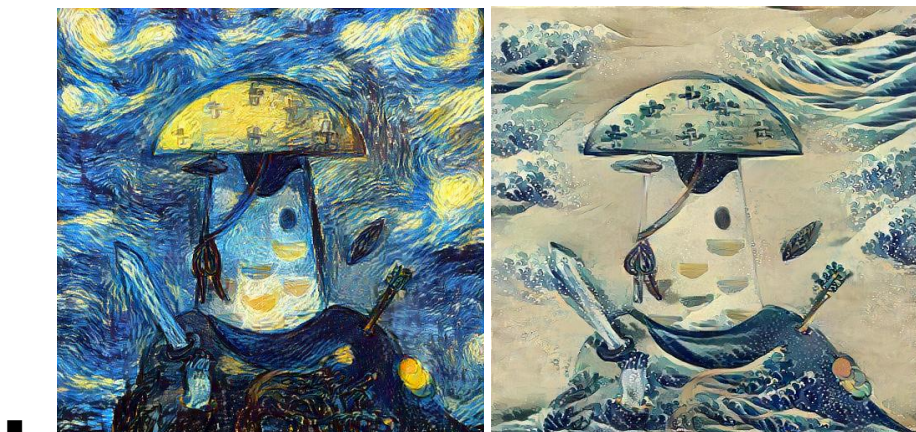




Image 2



- For videos and more result, please see Presentation and Github
 - Presentation
 - <https://docs.google.com/presentation/d/1UF8GscKSB5iidyNLauxmdw-UiMvXuGbfV8IEyJQsEmU/edit#slide=id.p>
 - Github
 - https://github.com/B08902070/DIP_final

Discussions

- Ways to improve stylized results
 - Modifying Style Transfer Models
 - pre-train VGG using style transfer data instead of original pretrain weight
 - Modify weights in each layers of VGG by multiplying some coefficients or do normalization

- Do normalization on loss function
 - Use exponential moving average to reduce noise
- Pre-processing content and style images
 - add noise to on single color background
 - Do normalization on lightness of style image
 - Add some effect on content images like reversible transform or color preserve
- What could be better?
 - Style Transform effect on video is not obvious
 - Still some flickering in stylized video result
 - The artifact of add noise method on single color background is still obvious in some style images

Reference

- <https://github.com/crowsonkb/style-transfer-pytorch>
- <https://github.com/diyiyiii/MCCNet>
- <https://github.com/sunshineatnoon/LinearStyleTransfer/blob/master/README.md>
- <https://github.com/MaxReimann/stroke-adjustable-nst-transforms>
- <https://github.com/GlebSBrykin/SANET>