

ART & ML PROJECT 1

Self-Portrait: Style Transfer

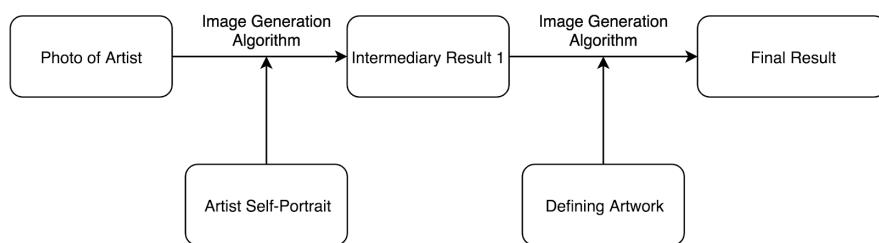
Caroline Wu, Claire Yuan, Candy Dong, Zhuona Ma

github.com/claireyuan/ArtML-project-1

Concept

In this project, we investigate the issue of ownership and the way artists see themselves. We play with generating “self-portraits” in different ways using a photograph of the artist and various examples of their style. Can these results be considered “self-portraits” because it is a portrait of the artist done in their own style? By using an artist’s photograph and an actual self-portrait, we also hope to show how the artists’ view of themselves compares to reality.

Technique



We experimented with different algorithms and different artists. With Picasso, we used two rounds of Fast Style Transfer [1]. With Monet, we used three rounds of Style Transfer [3]. With Andy Warhol, we used two rounds of Style Transfer. Another approach we used was to first style transfer the artist’s portrait with different style images, then average the output in order to generalize the style of the artist rather than the pattern of a particular image.

Process

We tried a few different algorithms before deciding to iterate for our final pieces.

Deep Dream Generator

We started by prototyping using Deep Dream Generator online so that we could quickly try out ideas. We quickly learned to choose our content and style images so that their features matched relatively closely. For example, in one failed attempt, the style image of Monet had a hat on and the content photo did not. The style transfer tried to make Monet’s bald head into a hat. Subsequent more successful experiments used a content photo in which Monet is also wearing a hat. In another case, the content and style images of Warhol were not similarly proportioned, and the result was undesirable. See Appendix Table 1. With the online generator, we were also able to play with the weight of the style versus the content. See Appendix Table 2.

Neural Doodle

We tried using Neural Doodle to combine Monet with one of his artworks. This technique uses a style mask to control where certain parts of the style image are reflected on the content image. This was not ideal since only the focus of the painting, the sunflowers, was exhibited clearly in the result. The background of the artwork manifested in blurry, pixelated sections. See Appendix Table 3.

Results

For Monet, we picked “Bouquet of Flowers” and “San Giorgio Maggiore at Dusk” because they are well-known paintings, and their bright colors transfer well.

Method	Content Image	Style Image	Result
--------	---------------	-------------	--------

Style Transfer			
Style Transfer			
Style Transfer			

For Andy Warhol, we picked his brightest artwork to give his portrait a vivid splash of color. We used style transfer and played with different weights for style and semantic input.

Method	Content Image	Style Image	Result
Style Transfer			
Style Transfer			

For Pablo Picasso, we picked “Women of Algiers (Version O)” as his defining artwork because it has very distinct style and broke records for the most expensive artwork sold at auction in 2015 [2].

Method	Content Image	Style Image	Result
Style Transfer			
Style Transfer			

For Monet, we tried another technique by first performing style transfer using three of his famous paintings, then using them to style-transfer the semantic image respectively, and finally average the output images. We tried this approach because we wanted to generalize Monet’s style rather than style-transfer on a particular painting. The

black and white did not produce a significant outcome, i.e. the pattern is insignificant on gray scale. On the other hand, this technique worked well on Monet's self-portrait by converting it to a more subtle, impressionist style.

Method	Content Image	Style Images	Average Output
Style Transfer			
Style Transfer			

See Appendix Tables 4 and 5 for more detailed process.

Reflection

Before settling on artists and their artwork, we considered two other ideas: exploring the fusion of multiple cultures through festival decorations, and using realistic photos as style images while artworks as semantic images. However, using style transfer using the self-portraits seemed more relevant, especially given the symposium discussion about ownership. Given more time, we would have liked to experiment with mixing different image generation algorithms together instead of repeatedly iterating one algorithm. Ultimately, we are satisfied with our results and we learned a lot about the artistic process and curation.

Individual Contributions

Caroline

- Prototyping on Neural Doodle
- Style Transfer with Monet

Claire

- Prototyping on Deep Dream Generator
- Fast Style Transfer with Picasso

Candy

- Modularized Style Transfer source code based on VGG19 for multiple style inputs
- Style Transfer with Andy Warhol

Zhuona

- Prototyping on Deep Dream Generator
- Style Transfer & Averaging with Monet

References

- [1] [Logan Engstrom. *Fast Style Transfer*. 2016.](#)
- [2] [Joe Tacopino. "Picasso painting sets world record at auction." May 11, 2015.](#)
- [3] [Leon A. Gatys, et al. "A Neural Algorithm of Artistic Style." 2015.](#)

Appendix

Table 1

Content Image	Style Image	Result
		
		

Table 2

Content Image	Style Image	Result (lower style weight)	Result (higher style weight)
			
			

Table 3

Content Image	Style Image	Result
 	 	

Table 4

Method	Content Image	Style Image	Output
Style Transfer			

Style Transfer			
Style Transfer			
Averaged Output			

Table 5

Method	Content Image	Style Image	Output
Style Transfer			
Style Transfer			
Style Transfer			
Average Output			