About Face

Gary Singh, *San Jose, CA, USA*

A pivotal moment in the evolution of computer graphics has emerged. Digital artists inspired by Andy Warhol's 1985 Amiga experiments can now go back even further. Thanks to the generative algorithmic networking of Joel Simon and Tal Shiri, the spirit of Dada in 1916 Zürich is alive and well.

The cover image shows four different examples from "Derivative Works," a collaborative project by Simon and Shiri. Figure 1 shows a larger, singular example. In both cases, machine learning algorithms created collages by rearranging, scaling, layering, and cutting up various source imagery while attempting to make them look like faces. The results bring a whole new meaning to the term "loss function."

"It can work with any images," Simon told me. "It can optimize the images themselves if it's from a generative model."

The four faces on the cover and the one in Figure 1 were derived from imagery Simon and Shiri selected from Artbreeder, a portal Simon helped start as an experiment in collaborative interactive exploration using biological metaphors. The cover and Figure 1 specifically resulted from the BigGAN and StyleGAN models. Figures 2 and 3 show the source images from which Figure 1 was created.

As an undergrad at Carnegie-Mellon, Simon was in a joint program of Computer Science and Art, before leaving to do bioinformatics research. As a researcher he spent time studying genetic and evolutionary algorithms and developing various independent projects. At that point he became interested in GANs.

"I felt that the human-in-the-loop interactive evolutionary systems were a perfect fit for exploring latent space of GANs," Simon said, adding that this work led him to create Ganbreeder, now Artbreeder, both inspired by Picbreeder, which pioneered similar work for genetic algorithms. "Creation via exploration empowers a lot, because users are able to create things they never could have before, but are still in control and authorship of the process," he said.

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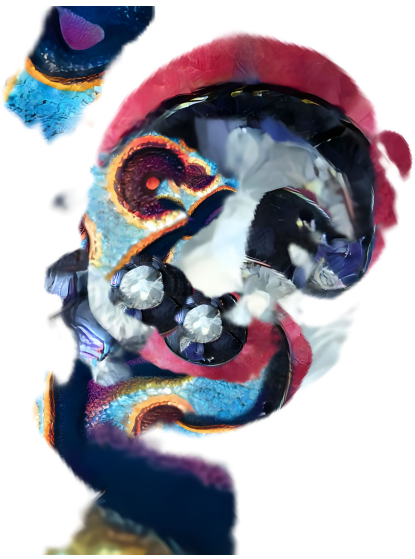

FIGURE 1. Single image from derivative works project by Joel Simon.

DADA GANs

There would be no Andy Warhol without the Dada art movement, which began in Zürich in 1916. Among many other exploits, the Dadaists pioneered the concept of photomontage before any such technique was codified, forever influencing collage methods in visual art, sculpture, and sound art. Until Dada, there was no established scheme for cutting, pasting, and collaging unrelated photos to each other. One can even go as far as to say that Dada anticipated the advertising industry, in its now-normal practice of Photoshopping images for print or display ads.

The Dadaists also helped pioneer the use of chance procedures in the creation of artworks—a trajectory that led directly to John Cage. They also inspired the Surrealists, another cadre of troublemakers, with their own ideas of tapping into the unconscious aspects of art collaboration.

None of these artists had access to GANs, of course. It was "lowbrow or no brow." Much has been written on the Surrealists' relationships to technology, or what would have been their relationships to technology, but one can only wonder what they might have created with the aid of machine learning. For Simon, it only made sense to expand on the history.

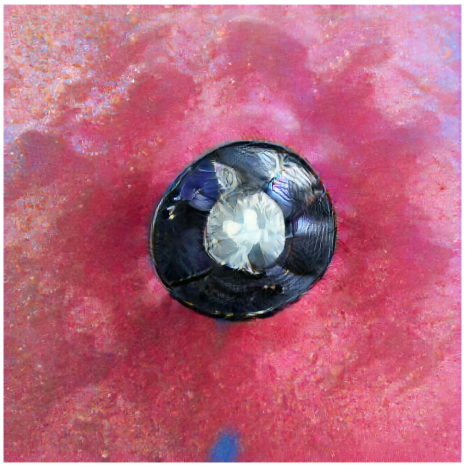

FIGURE 2. Artbreeder source image by Joel Simon.

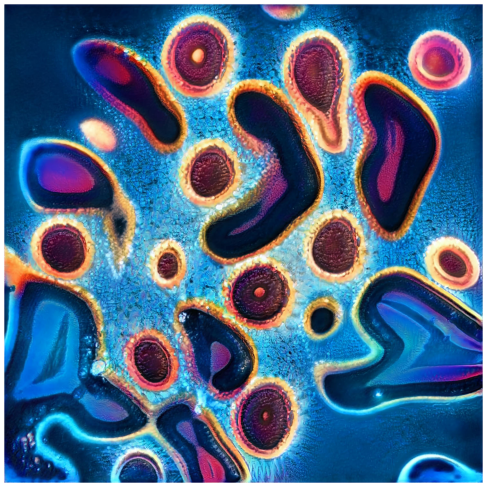

FIGURE 3. Artbreeder source image by Funnyai.

"The popularity of generative methods is creating a flood of low-quality images—so I think it's interesting how they could be reused and assembled into something else, similar to how the Dadaists used print media," Simon said.

Although Simon cites Dada as a direct inspiration, he does not stop there. He also cites the collage stop-motion films of Jan Švankmajer and the fruit-based portraits of Giuseppe Arcimboldo as significant visual influences.

Derivative Works is not a political project, as were much of Dada's exploits, but it does inherit the ideology behind Artbreeder—that creativity is often an inherently collaborative and recombinant process, so the tools and attributions must reflect that. All content on Artbreeder is in the public domain. Every collage cites the original images, lineages, and creators. For anyone that wants to use the code, it is available as an online IPython notebook. Like the Dadaists and Surrealists, the process is just as important as the final result.

"It is mostly a proof-of-concept of collage as an alternative image representation and also of having the optimization process be part of the artwork," Simon said.

On Simon's website for the project,[a] viewers can see both static source images as well as animations revealing how the source material eventually morphs into the final result. One can mouse over the final image and see which portions originated from which particular source.

Yet that does not automatically mean that the GANs are simply "tools." That would imply a degree of control that simply is not there. Instead, Simon says, the process is closer to cooking or rock tumbling.

"It is similar to the curatorial act of putting ingredients together into a stew and having a sense of what might work well together," he said. "It is more surprising though because it's hard to know what parts of the image will be used for what. More control could be added to the system—text-based optimization, initial placement of images—that would make it feel more like a tool than it is now."

PAINTING PROSE

Ultimately, when users just tweak algorithms to generate GAN images, the creative process takes a back seat. Most of the research prioritizes the content, since this is what can be optimized quantitatively. Simon wonders more about issues of authorship and ownership.

"I am interested in further developing machine learning for storytelling and creative play," he says. "A beautiful GAN image that you generated with a pull of a lever, like a slot machine, has limited expressive capacity. Its lack of authorship offers no sense of ownership. I want to empower the authorship."

One example is through his recent project, ProsePainter[b] which gives more individual input to the visual output. An interactive tool to "paint with words," ProsePainter incorporates guidable text-to-image generation into a traditional digital painting interface. Another example would be if machine learning tools could make collaborative storytelling as easy as play.

"That would be a lovely thing," Simon said.

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[a][Online]. Available: https://derivative.works/exhibits/

[b][Online]. Available: https://www.prosepainter.com/