Next Top Fashion Designer? A Computer

By Daniela Hernandez

Apparel seller Stitch Fix recently introduced a coral, sleeveless blouse with a split neckline—and an unusual creative provenance. It was one of three new tops designed with the help of artificial intelligence.

The San Francisco-based e-commerce company, which sends customers boxes of preselected outfits, is leveraging computers to analyze purchasing behavior and learn what elements of style are popular. The software then recombines well-liked sleeve types, cuts and prints into new looks to maximize the odds a client "loves the resulting style," said Erin Boyle, a Stitch Fix data scientist.

The three tops sold out as part of preselected boxes last year, according to the six-year-old company, and in February, it started selling nine more items designed with the help of computers, including dresses and tops. It plans to sell more than two dozen others by the end of the year. (AI-created styles are priced similarly to human designs, according to a company spokeswoman.)

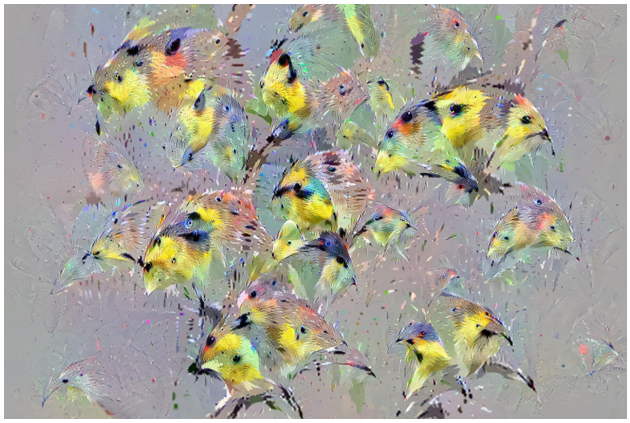
The "hybrid designs," as they are known inside Stitch Fix, are part of a movement in the tech industry to develop software that can be creative, and produce content such as songs, logos, videogames, clothing and special effects. The field of computational creativity dates back decades, but is flourishing thanks to advances in machine learning, plus increased access to data and computing power.

Alphabet Inc. 's Google, Adobe Systems Inc., Microsoft Corp. , and Sony Corp. have active research projects related to computational creativity. Some, like Adobe, have spent millions in this space. Tech companies and researchers hope that teaching computers to be creative could lead to more powerful AI systems. Long term, the results could improve processes that require complex analysis, such as computer-vision systems in self-driving cars, according to machine-learning experts. And some companies, like Stitch Fix and Adobe, are already using such software to produce products.

One primary goal for tech firms is to create so-called general artificial intelligence—machines that excel at multiple tasks. Currently, AI systems are typically good at only one thing, like categorizing objects, and training the

systems can require extensive help from humans. Today's smart systems also aren't very good at dealing with unpredictable situations, according to machine-learning experts.

To get machines to learn on their own, some companies are employing what's known as "adversarial training," which pits two pieces of software against each other. The Facebook AI Research lab recently used the technique—developed at the University of Montreal—to make computer-generated images of churches and faces, among others. Others have since used it to create nearly photo-realistic images of ants, birds, monasteries and volcanoes.



Google created this kaleidoscope-like image of birds with a program known as DeepDream. DeepDream is a deep-neural network, a breed of artificial-intelligence software that learns patterns from large amounts of data.

Many of Google's DeepDream images have a psychedelic flair. Last year some DeepDream images sold at auction for as much as $8,000.

PHOTOS: MIKE TYKA/GOOGLE(2)

During adversarial training, one network tries to create images the other network can't tell were dreamed up by a computer. From their interactions, the generator learns to create images on its own that can pass for real-world pictures and the other network figures out what's real—and what's fake.

Such training is "a way of handling the uncertainty in the world," according to FAIR chief Yann LeCun, who says such adversarial networks are the "best idea" to come out of machine-learning research in the past decade.

Other techniques, like that used by Stitch Fix, use algorithms to meld existing ideas into new combinations. Autodesk has spent the past seven years developing an AI system called Dreamcatcher that could be used in industrial design, according to Michael Bergin, a principal research scientist at the San Rafael, Calif., software firm. The system creates designs after users enter certain performance desires, materials and the tooling available.

Researchers at Autodesk created a proof-of-concept car part that was about 35% lighter than the original that could be used to connect a vehicle chassis to the

Autodesk used Dreamcatcher to design a chair inspired by Hans J. Wegner's Elbow chair. *PHOTO: AUTODESK*

wheel. Autodesk has also used Dreamcatcher to design a chair inspired by Hans J. Wegner 's Elbow chair and is working with design company Hackrod to create a car. The Hackrod team aims to reveal the design to be 3-D printed later this year, according to Autodesk.

London-based startup Jukedeck has developed an AI that composes melodies. Logojoy, a Toronto-based online service that helps small businesses, freelancers and hobbyists create logos with the help of machine-learning software, has sold 3,000 logos, according to founder Dawson Whitfield.

Online, there is also an active community of hobbyists who experiment with various AI techniques to create art, ranging from computer-generated poetry in the style of T.S. Eliot to special effects that mimic artists like Pablo Picasso.

Autodesk is working with design company Hackrod to create a car. Above is a rendering of the design. *PHOTO: AUTODESK*

RELATED

- Human Touch Still Key to Design

Despite the flurry of activity, AI experts think it could be years, if not decades, before software can create compelling and salable works of art or design without any human input.

At Stitch Fix, researchers hope their AI-assisted designs will "fill in the gaps" between what's commercially available and what customers tell Stitch Fix they want, according to Eric Colson, the company's chief algorithms officer. The software sifts through trillions of possible combinations of sleeves, patterns, cuts and necklines for blouses. Sometimes the predictions fall short, with mashups of patterns and colors, that while popular on their own, don't go well together or cuts that don't work with a certain fabric. That's when human designers take over.

The hybrid fashions themselves are a "tiny" part of the business, comprising "not even 1%" of products currently, Mr. Colson says, but they're expanding.

Adobe's artificial intelligence design team at the company's San Francisco office. Adobe has invested millions into building algorithms that make the creative process more efficient, according to the company. *PHOTO: ANGELA DECENZO FOR THE WALL STREET JOURNAL*

—Tim Higgins contributed to this article.

Write to Daniela Hernandez at daniela.hernandez@wsj.com

Corrections & Amplifications
Eric Colson is Stitch Fix's chief algorithms officer and Michael Bergin is a principal research scientist at Autodesk. An earlier version of this article incorrectly misspelled their last names.(3/12/2017)

Next Top Fashion Designer? A Computer
By **DANIELA HERNANDEZ**
Updated March 13, 2017 1:00 a.m. ET