AUTHENTICATION IN ART

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These Four Technologies May Finally Put an End to Art Forgery

ARTSY EDITORIAL
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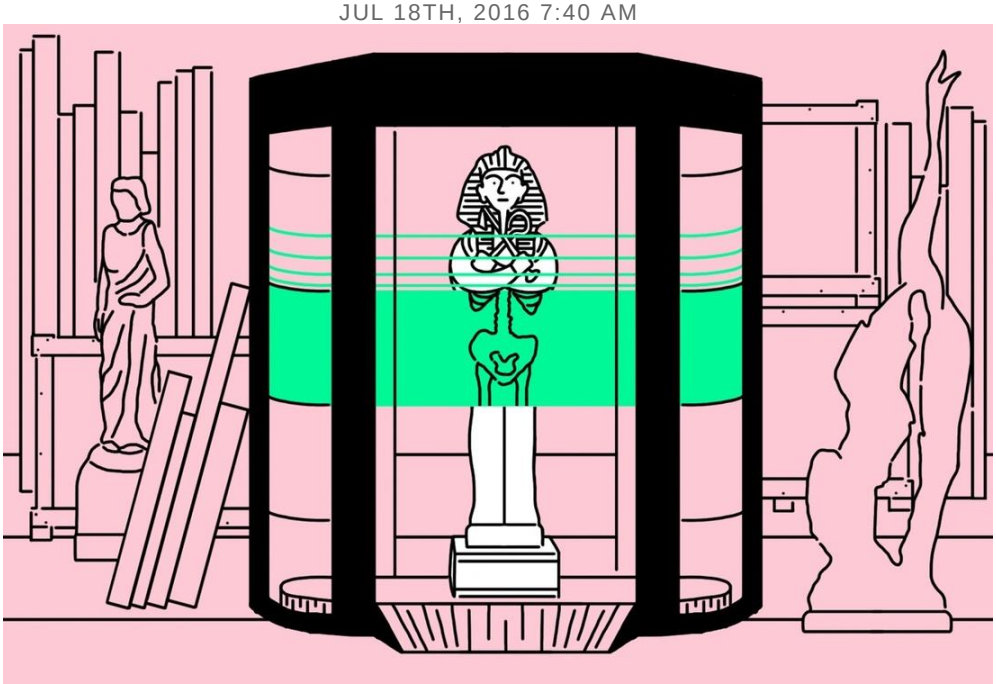

Like method actors and bearded brewmasters, the best art forgers are obsessed with authenticity. But thanks to a handful of new authentication technologies, even history's most painstaking efforts wouldn't stump today's art sleuths.

Take Han van Meegeren, the most successful knockoff artist of the pre-war period. Adjusted for inflation, he made $30 million selling ersatz Dutch masters. Curators weren't fooled just because the paintings looked perfect. (In fact, his Vermeers looked decidedly *imperfect*.) They were fooled because the art passed a crude forensic sniff test: every detail was "period correct." He tracked down 17th-century canvases and stretchers. He duplicated Vermeer's badger-hair brushes. And, in a stroke of OCD genius, he hand-ground exotic raw pigments following archaic formulas—no skimping allowed. Because faking Vermeer's gorgeous signature paint would feel like cheating.

Today's art authenticators have enough weapons in their arsenal—infrared spectroscopy, radiometric dating, gas chromatography—to spot a van Meegeren long before it hits the auction block. Many of these lab tests, though, are decades old, ample time for forgers to study the science and incremental improvements, perfect new counter-measures, and game the system.

Here's the good news: The balance of power in the forgery detection game is about to shift. The art world has been closely monitoring scientific breakthroughs in fields as diverse as A.I., bitcoin, and protein analysis, and the technologies born from this research have either been appropriated by authenticators or will be soon. With these extra layers of security added to the

vetting process, the current generation of copycat artists will find it increasingly difficult to hoodwink museum directors and collectors. Listen carefully, art patrons: That's the sound of badger-hair brushes being turned into kindling.

Tracking Digital Provenance with Blockchain

Digital art is increasingly gaining traction in the contemporary art world. Phillips's last two "Paddles ON!" auctions, which showcased digital formats ranging from GIFs to video game screenshots, have been well received. Blue-chip galleries are on board too; Pace Art + Technology, a new 20,000-square-foot space in Silicon Valley, is dedicated solely to digital media. Digital art collectives—Japan's teamLab being the most prominent—have also sprung up.

Most importantly, prices are rising. In 2003, Cory Arcangel's *Super Mario Clouds*, a wall projection birthed from a hacked Nintendo chip, sold for $3,000. Last year, an edition of that same piece went for $630,000. Still, the question remains: How can a gallery sell digital content as investment-grade art when it already exists online and can be copied like a Google Doc? The answer is blockchain, the same computer technology that serves as the public ledger for bitcoin transactions around the globe. In the same way that you can verify and track the movement of any bitcoin ever mined, you can now verify and track the movement of any artwork ever created—online and in real time—provided that all the authorship and ownership records have been uploaded to a secure distributed database.

Every event in the lifespan of an artwork becomes a block that contains a timestamp and information linking it to the previous block, enabling prospective buyers to confirm that the artwork has been licensed. This tech is ideal for digital media, where copies may be passed off as originals, and the specifics regarding limited editions and artist's proofs are frequently vague.

Several companies are peddling this service: Verisart in Los Angeles, Ascribe in Berlin, and Everledger in London. Deloitte also sees the opportunity, having unveiled its ArtTracktive service at the ICT Spring summit in Luxembourg. But the startup that's become a buzzword in the art world is Monegraph. That's because the founder is an artist. "Digital art has a problem: Bits are infinitely reproducible, and people want exclusivity and verifiability," explains media artist and Monegraph founder Kevin McCoy. "Blockchain solves that problem by providing a clear and distinct provenance."

Anti-Forgery through "Deep Learning"

Traditionally, authentication has relied on connoisseurs. After studying things like brushstroke, texture, composition, and color, they summon forth their vast wealth of knowledge and divine the truth. But as is the case with sports officiating, bad calls are part of the game. One of the most famous examples is Dr. Abraham Bredius. In the 1930s, he was recognized as the foremost authority on Dutch Old Masters. The ex-museum director was celebrated for his scholarship and unerring eye. Today, however, he's remembered as the guy who mistook van Meegeren's forgery, *The Supper at Emmaus*, for a national treasure. Bredius's exuberant appraisal, published in *The Burlington Magazine*, included the fateful line "every inch [is] a Vermeer."

Hans van Meegeren's forgery of Vermeer's *The Last Supper*, 1984. Photographer Croes, Rob C., Fotocollectie Anefo, Nationaal Archief NL. Image via Wikimedia Commons.

It's only a matter of time before a robot can tell the difference between a van Meegeren and a Vermeer. Much of the research into this technology is being conducted at the Rutgers Art and Artificial Intelligence Laboratory, an offshoot of the university's computer science department. A paper published last year by two of the lab's scientists, Babak Saleh and Ahmed Elgammal, shows how an algorithm they developed is able to differentiate between Picasso and Matisse drawings with over 75-percent accuracy without analyzing composition or subject matter. Just by looking at individual strokes. In addition to automatically classifying images from a database of 80,000 individual works, the algorithm can also search for stylistic connections among them. In one example, the researchers chose a group of paintings and asked the program to identify the "closest match" among paintings in other genres. The results found extraordinary similarities between examples of Russian Romanticism and French Impressionism, and between works of Pop Art and the Northern Renaissance.

Like any other computer technology, over time, this algorithm will become more sophisticated and accuracy rates will spike. In the near future, a new anti-forgery algorithm based on this scientific research will be launched. Major museums, corporate art curators, and insurance companies will see to that. "The machine has an advantage over the human eye because it can

analyze hundreds of thousands of individual strokes and statistically characterize them," says Elgammal. "If we train the machine to identify styles based on characteristics that are less intentional and unconsciously rendered by the artist, we'll be able to detect forgeries." Think about that for a moment: an algorithm that can detect the artist's subconscious in brushstrokes or pencil sketches. Good luck copying that, Mr. van Meegeren.

A More Sophisticated "Fingerprint"

The gold standard in early-20th-century authenticity cases has been an expert's stamp of approval. Today, however, when forgery cases go to trial, provenance and connoisseurship are increasingly under scrutiny. Certificates of authenticity and bills of sale can be fabricated. In 2013, Modigliani Institute president Christian Parisot was arrested and charged with providing false certificates for almost $8.7 million worth of counterfeit—you guessed it—Modiglianis. Likewise, art historians and appraisers can be bribed, have conflicts of interest, or just screw up. This goes a long way toward explaining why the men in white lab coats wield so much clout in forgery cases.

There is no litmus test that can distinguish between art and artifice. But unlike the subjective eye, the latest spectra-matching science to hit the art forensics scene, peptide mass fingerprinting (better known as PMF), is hard to dismiss. Originally developed in 1993 and typically used in industries like biotech, PMF is a data-crunching tech that can analyze animal proteins on a molecular level. Until now, there was no scientific method to identify the type of animal tissue used in art materials like paint binders, adhesives, and coatings. A fancy machine called the Waters LDI-Time-of-Flight mass spectrometer has changed all that. After analyzing samples taken from an artwork, the LDI deconstructs the proteins and produces spectra containing markers that make up the sample's "fingerprint." These markers are then compared to those found in various animal tissues, like egg yolk, to find matches.

This technology, the latest toy for museum conservationists, will soon be added to the authenticator's toolkit as well. Art conservation and art authentication are as closely aligned as the military and law enforcement. There's a revolving door that links the two professions and it's constantly spinning. Daniel Kirby, the scientist who pioneered art conservation PMF, is well aware of this nexus. "These are two sides of the same coin, the only difference is context," says the former Harvard conservation scientist. "One guy's job is preserving an artwork, the other guy's job is determining if it's real or fake. But they both look at the same things and use the same instruments." Kirby is already fielding calls from insurance companies and art collectors willing to pay handsomely for his PMF magic.

Kirby's projects have ranged from verifying that an antiquarian book was bound in human skin (affirmative) to determining the composition of Alaskan kayaks (hide: bearded seal; stitching: humpback whale sinew). He has also discovered that Mark Rothko used animal glue and egg on Panel 1 in his Harvard Murals cycle. PMF is so precise that it can even identify what kind of egg (duck, chicken, quail) and which part of the egg (yolk, white, or both) was used as a binder. For the record, Rothko used whole chicken egg to bind the paint and prime his Panel 1 canvas. With so many artworks containing animal proteins—medieval European artists favored fish glue, while Picasso prepped his canvasses with glue made from rabbit skin—insiders are studying Kirby's research closely. Now the technology just needs to mature. "I've got 80 critters in the database," says Kirby. "As that grows over time, I'll start getting more matches."

Embedding Synthetic DNA

In the mid-'90s, a sketch of Eric Fischl's notorious painting *Bad Boy* hit the secondary market. The oil-on-paper work was so convincing it not only fooled a major auction house—it fooled Fischl. When friend Simon de Pury congratulated him on this large, monochromatic piece being included in an upcoming Sotheby's auction, Fischl studied the photo of the imposter lot

printed in the glossy catalog, and immediately recognized his handiwork. Dredging his memory, though, he couldn't remember ever doing this sketch. "I thought I was losing my mind," recalls Fischl. "Whoever painted it absolutely nailed my style at that time. The only way I knew it wasn't mine was that I had never done any preparatory drawings of that painting."

Seeing a mediocre forgery of your work is one thing. Seeing your very soul in another artist's brushstrokes is quite another. With that kind of backstory, it's no wonder Fischl endorses synthetic DNA. He says that he's "in line" to use this new anti-forgery tech, which allows artists to tag their works with tiny bits of synthetic DNA, when it launches: "Between the explosion of the art market, and countries like China that don't recognize copyright laws and have highly skilled artisans who can knock off any artist's style, forgeries have become common. The goal is to develop a tamper-proof coding system that will become the standard for authenticating art."

The Global Center for Innovation at the State University of New York at Albany is experimenting with this ingenious ID science. The project was initially funded to the tune of $2 million by ARIS Title Insurance, a company that specializes in underwriting fine art. ARIS recently purchased the technology, and spun off a company called Provenire Authentication to market it. Like other players in the industry, ARIS wants to protect its slice of the $55 billion fine art market.

The idea is for artists to authenticate their work immediately upon completion—right after the paint on a canvas has dried or a sculpture has left the foundry—by attaching a DNA sample to it the size of a postage stamp.

The recurring analogy is the car industry: Think of this as a VIN number for art. Rather than using the artist's personal DNA, which might raise privacy issues and could conceivably be stolen and embedded in forgeries, synthetic DNA is made in a laboratory. Each artwork is inconspicuously tagged with a unique strand of bioengineered material that provides an encrypted link between the artwork and a secure database containing the definitive information about the artwork.

This DNA data, retrieved by a scanner, will be available to gallery dealers, museum employees, and anyone else who needs to verify the piece. The DNA meets archival standards. It doesn't come in contact with the art and isn't susceptible to environmental conditions or tampering. Moreover, deciphering and copying the DNA would be virtually impossible, even if you could find a rogue scientist in Shenzhen to do your bidding. Forget about removing the tag—you'd leave a trail of microscopic evidence all over the piece.

"Synthetic DNA will be admissible evidence in court," says Provenire Authentication CEO Sam Salman. "Let's hope that the technology of the good guys is always ahead of the bad guys." The projected product price is $150. For those who can't wait to mark their artistic territory with some synthetic DNA, Tagsmart, a British company offering a similar service, is already online. Founded by London framer Mark Darbyshire and software developer Steve Cooke, Tagsmart is a "three-way product" incorporating a synthetic DNA label, a certificate of authenticity, and a digital passport (provenance history). So sleep soundly, Mr. Fischl. At last, your artistic legacy and eight-figure estate is now suitably firewalled.

—Rene Chun