

Predicting buyer behavior: Sotheby's acquired the start-up Thread Genius in 2018, founded in 2015 by two former Spotify engineers. The company, initially active in the fashion industry, uses image recognition to understand consumers' tastes and offer them similar visuals. This purchase comes two years after the purchase of the Mei Moses Art Indices, a database of nearly 50,000 repeated auctions in 8 categories. A mine to be integrated into the Thread Genius system? Tim Schneider, who runs the The Gray Market section dedicated to the backstage of the art market on Artnet, highlights the limits of the system in a market where goods are not substitutable. Two visually close sculptures created by artists with different ratings will not guarantee the same reaction from collectors. According to Schneider, such a mechanism is intended primarily for buyers who are not well informed and beginners. This does not mean that it is a bad purchase for Sotheby's, which could use it to attract new customers to retain later.

It is not simply that the art market itself that is interested in the behaviour of "visitors". In 2017, the Data & Musée project was launched, which aims to "study online and in situ behavior, in order to make better use of data in the post-visit period and promote exhibitions based on profile, for example", explains Philippe Rivière, head of digital and communication services at Paris Musées.

The AI to track down fakes

Artificial intelligence is well on its way to more minutely analysing the behavior of market players, but it is also turning towards the very heart of the market: the work. All the debates and trials where specialists argue about the authenticity of a De Vinci, eliminated by expert software? In November 2017, Ahmed Elgammal of Rutgers University in the United States presented a tool that identifies fakes based on an analyse of the thousands of pencil strokes that make up a drawing. A touch signature theory that dates back to the 1950s... but the high number of traits to analyze made the task too difficult for humans. Artificial intelligence recognizes the artist at 80%, and above all is able to detect fakes from a single brush stroke! As with The Green Canvas, the next question is that of a change of scale. Researchers are now working on more complex paintings and the problem of an artist's changing style during his or her career. With these projects, we see once again the old dream of a flawless authentication system shimmering in the distance... but this is not so sure, because even if these tools do assist the experts, the final choice will always be that of a human, and not a machine.

The Replica project, led since 2015 by the Digital Humanities Laboratory of the École Polytechnique Fédérale de Lausanne, promises to develop the first search engine specifically designed to explore artistic collections. Using artificial intelligence to extract more image data, it connects thousands of works of art from elements such as form or pattern, which traditional search engines are not able to do. If the project is primarily aimed at art historians and research, it could also be used for a stylistic analysis to demonstrate the authenticity of a work.

Roman Komarek, a Czech entrepreneur, intends to ensure that once the work has been authenticated, it does not undergo any alteration during its life cycle. His company Veracity Protocol is developing a decentralised IT infrastructure that combines the mathematical imprint of a photograph of the work (or any other object) with a "passport" that guarantees its origin.

Creative, artificial intelligence?

Collecting data and analysing it is good, making it art is better. The Parisian collective Obvious claims an "artistic approach where it is the machine that takes care of the creative part," according to Pierre Fautrel, one of the three team members, with Hugo Caselles-Dupré and Gauthier Vernier. Using generative antagonistic networks (GAN, for Adversarial Generative Network), the collective creates portraits of a fake 18th century family. The technique consists of driving two neural networks in parallel:

one generates images and the other checks whether they are known or not. Both networks learn what a portrait is from a large database. Once the creative network succeeds in misleading the control network by presenting it with a portrait created by it, the process is completed. The portrait is then ink-jet printed and framed. The result may have convinced the machine, but humans quickly spot a certain strangeness: "we make conceptual art, people are rarely subjugated by rendering", admits Pierre Fautrel. Another point of research, the database that feeds the generator network is composed mainly of Western works, and the collective wishes to incorporate visuals from Asia for other projects.

The portrait of the Earl of Belamy will be the first work generated by AI to be presented by an auction house at the Christie's New York "Prints and Photography" sale in October 2018. However, this is not the first auction of its kind. In 2016, 29 paintings made by Google's artificial intelligence went under the hammer for a charity sale in San Francisco, the most expensive painting going for \$8,000 (the low estimate of Obvious's portrait by Christie's).

But the Christie's sale should be a milestone, as it symbolises access to the "established" art market. Art and technology networks have developed rather at a certain distance from it, within universities (Art and Science Chair which brings together the Polytechnic School and the National Superior School of Decorative Arts) or dedicated festivals such as Ars Electronica in Austria.

Anne-Cécile Worms, co-founder (with Ada Fizir) and president of the ArtJaws marketplace, dedicated to new media artists, confirms this, "For the moment collectors are still buying work that hangs on the wall, we are accompanying them in the discovery of techart and issues such as the maintenance of the work", she explains. "Artificial intelligence is of course one of the technologies that interests us, and we will soon present a commissioner dedicated to this theme on the platform", an educational effort that could be reversed if the digital art market was to focus on another target, says Jason Bailey. "You have a growing class of engineers who earn a good living and are interested in art, but they can be intimidated by the art world. Except that if they go to an exhibition or auction presenting algorithmic works they will be the most knowledgeable people about the piece! There is a market to be made here", he concludes.

Dominique Moulon, art critic and independent curator, invites us to be vigilant about the nature of the works that use these technologies. "The Next Rembrandt, a web generated by a program "in the manner of" is typically a fake work... we are in a matrix of forgery", he bemoans. "The most interesting works are those that take technologies as a societal subject rather than those that use them."

Beyond art?

As we have seen, the machine is not yet ready to replace the human. It is the ambiguity of artificial intelligence, which plays on the fantasy and threat of a mechanical intelligence that would surpass its creator. The technicality of the subject can quickly transform an algorithm that is ultimately quite simple into a "promise of revolution", and... few are those who can – and want to – reveal it.

And if we continue to play leapfrog over the notions of creativity, technology and borders, we arrive at virtual territories far from the archipelago of the art market. In October 2017, designer Frank Lantz launched a game that consists of producing paper clips by controlling a few increasingly complex variables. The game ends with the destruction of the world: the AI you trained followed its goal to the end. Inspired by the book *Superintelligence* by philosopher Nick Bostrom, which presents a similar example, the game was tested (and often finished) by 450,000 people in ten days. Not art, not science, not entertainment, but all three. Welcome to the future.

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