Pure genius... but is it art?

The pursuit of machine creativity may be divisive, but there is no denying it can have beautiful results, says **Douglas Heaven**

Book

The Artist in the Machine: The world of AI-powered creativity
Arthur I. Miller
MIT Press

BEAUTY was in the eye of the technician who ran down the corridors of Bell Labs in New York one day in 1965 shouting that a computer had created art. The machine in question, the room-sized IBM 7094, was set up to send numbers to a plotter, a device that turned them into precise line graphs. But thanks to an error in the plotter that day, the numbers produced a random-looking scrawl instead.

A Bell Labs scientist called A. Michael Noll was intrigued. He started to call the result "computer art" and set about trying to get IBM 7094 to reproduce the accidental scribble on purpose. After a few coding experiments, he got it to output pleasing zigzag patterns on demand.

Noll said that the results reminded him of Picasso's 1911-12 painting *Ma Jolie* (pictured right), and ended up exhibiting some of the images in a gallery in New York. When Noll sought to copyright the work, however, the US Library of Congress was less impressed by marks made by a machine. When Noll presented the images as the specific results of a computer program he had written, the library relented.

That distinction, between art made by a computer versus art made with a computer, has been at the heart of the debate swirling around creative machines ever since. Created

by a machine? It isn't art. Created by a human? It isn't machine art.

In *The Artist in the Machine*, Arthur Miller does a good job of showing how that fuzzy distinction has only grown fuzzier. And in the space where human and machine creativity merges, there are big questions to explore. Will machines ever be considered truly creative? What would that mean for our understanding of artificial intelligence? And how would it change how we think of creativity in general?

Miller, a historian and philosopher of science at University College London, adopts a creator-agnostic definition of creativity, one based simply on the ability to produce new knowledge from old ingredients. "How can a system produce results that go far beyond the material it has to work with?" he writes. "This is the problem of creativity."

This is Miller's third book mining the intersection of art and science for interesting ideas. He comes at the topic via a

background in physics and cognitive science and believes that images are the primary objects of creative thinking. If brains are like computers (a claim we are to take on trust), then why can't computers be creative?

After a whistle-stop tour of what various thinkers think about creativity, we get to the strongest section of the book. Through a series of meetings with artists and researchers exploring the frontiers of computer creativity, Miller gives us a relatively comprehensive survey of the artificial painters, poets, composers and storytellers that have been developed over the past few decades. What is clear is just how broad and mature this field is.

There is a nice mix of scientists teaching machines new tricks and artists experimenting with a new medium. We meet Simon Colton, a computer researcher who has been building an AI painter called The Painting Fool for most of his career. It can produce portraits in styles that reflect its "mood", which changes depending on what is in the news that day, and then critique its own efforts. Mark Riedl at Georgia Tech teaches computers how to invent and tell stories, giving them a sense of characters, motivations and plots.

Then there are artists such as Anna Ridler and Mario Klingemann, who have turned machine-learning software into a medium-cum-muse, feeding images into a computer and then reworking the machine-twisted results into strange new forms. For now at least, the most promising art produced by machines comes from this kind of collaboration in which human and machine riff off one another, making something

that neither would have been able to create on their own.

Some of the projects lean more to the side of "art made with a computer" than others. But with the advances in AI in the past few years, we are increasingly seeing examples of machines creating music or images or stories without, or with very little, human guidance. For now, these solo efforts won't win any awards. But why shouldn't they in future? "In this day and age, we are going to have to rethink what we mean by thinking and what we mean by creativity," writes Miller.

It is when Miller does just that, and mulls over the significance of what he has been writing about, that I have less confidence in him as a guide. For a start, he wants to separate "everyday creativity, like discovering a new route to work" from "the big, domain-breaking feats of creativity, such as discovering the theory of

relativity". He is interested in the big stuff and dwells quite a bit on genius, at times invoking the likes of Beethoven, Picasso and Einstein with near-mystical reverence.

But what about all the muddle in the middle? The bad poetry, a toddler's painting? A computer that could independently produce the equivalent of a doodle you might make while on the phone would still be doing something creative. Most art isn't high art. What is more, what if discovering the theory of relativity is in fact akin to coming up with lots of new routes to work, rather than some indivisible flash of genius?

Then there is the odd way Miller talks about AI. In one example, he writes: "And all this means that computers are now finally beginning to create art, literature, and music in ways that exhibit not only their creativity but their inner lives." It isn't at all clear what a computer's inner life might be.

This strange idea crops up more than once. Here he is discussing the overall aim of the book: "This will involve looking into the 'lives' of computers, exploring their creativity, their innermost thoughts, to what extent they may be similar to ours and to what extent different."

Miller also jumps on a quip by David Ferrucci, the lead on IBM's Watson AI, a machine that took part in, and won, the TV quiz show *Jeopardy!*. When asked whether Watson could really think, Ferrucci replied: "Can a submarine swim?" Miller seems to miss the point. "Of course, a submarine swims – not like a fish, but better," he writes. "It's an apt analogy."

But I suspect that isn't what Ferrucci meant at all. He was probably alluding to an aphorism by the pioneering computer scientist Edsger Dijkstra: "The question of whether machines can think is about as relevant as the question of whether submarines can swim." Miller misses this – or misses it out – completely.

Still, the questions that Miller pursues in his book are some of the most exciting ones you can ask about artificial intelligence today. Computers that surprise us – that make things we haven't imagined or find solutions to problems we have overlooked – will change the world. And there is good reason to think that computers will do these things in ways that will feel alien to us.

Miller asks whether computers will develop the qualities we see in creative people, or develop their own form of autonomous creativity, "not as replica people but as an altogether different and independent form of intelligence". It is one of the big questions and Miller gives us a taste of what is possible. It goes down even better taken with a pinch of salt. ❚

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Left: Mario Klingemann's *Memories of Passersby*
Below: Picasso's *Ma Jolie*

> "The most promising art, for now, comes from collaborations between human and machine"