

## Deciding whether artificial intelligence can one day make great art demands a deep dive into human consciousness, says **Marcus du Sautoy**

**I**N OCTOBER 2018, a portrait of Edmond Belamy sold at Christie's in New York for \$432,500, nearly 45 times its maximum estimated price. Nothing that out of the ordinary, perhaps. Except Belamy didn't exist. He was the fictitious product of the artist's mind – and the mind that created him wasn't even human.

Signed in the corner by a formula that is part of the algorithm that created it, the portrait was the first artwork made by artificial intelligence brought to auction. There have been many similar seeming breakthroughs in AI creativity. In 2017, an AI wrote a continuation of the *Harry Potter* books by using machine learning to analyse the first seven volumes of J. K. Rowling's output. The music for US singer Taryn Southern's 2018 album *I AM AI* was bigged up as having been composed and produced entirely by machines. Back in 2016, SACEM, a French professional association in charge of artists' rights, was the first to acknowledge an algorithm, the Artificial Intelligence Virtual Artist or AIVA, as a composer.

It fits into a common theme that anything we can do, AI can do – and probably better. But it is worth looking under the hood of all these creative outputs to understand how much the machines really are doing, and how much is just hype. Answering the question of whether AI can be creative isn't easy – and raises fundamental questions about the nature and origins of human creativity.

Ever since the 1840s, when Ada Lovelace became obsessed with the possibility that Charles Babbage's Analytical Engine, a proposed mechanical computer, could do more than simple computations, we have been contemplating the idea that it isn't just biological life that may be creative. Recognising that music is an art form similar to mathematics in its manipulation of pattern, Lovelace speculated "the engine might compose elaborate and scientific pieces of music of any degree of complexity or extent".

It is fairly easy to discount or at least qualify many claims of AI creativity today. Just as, at the turn of the millennium, companies wishing to make it in the tech boom would indiscriminately tag .com on the end of their names, today businesses and individuals are using the labels "AI" or "Deep" to jump on a bandwagon. Much of what they are doing involves little more than data science and statistical number-crunching, and requires a lot of human intervention. The *Harry Potter* "writer", for example, relied on a statistical analysis of J. K. Rowling's existing oeuvre to suggest possibilities for the next words, but a human still chose which words to use. A new tale created by humans with the aid of some computational data science just isn't as good a story, however. Similarly, Southern got more press traction for her album by bigging up the novelty of a contribution from AI.

That isn't to say that there aren't some striking examples of AI potentially demonstrating true creativity. Take move 37 of the second game in the titanic battle of Go between the human champion Lee Sedol and the DeepMind algorithm AlphaGo in March 2016. Lee had already lost the first game, but many commentators felt this was because he had tried to play unconventionally to disrupt AlphaGo's dependence on learning from previous games. But in the second game, it was AlphaGo that tore up the rule book.

Having made the 36th move, Lee had retired for a quick cigarette break. Not requiring the same stimulation, AlphaGo thought a while and then asked its human representative to place a black stone on the line five steps in from the edge of the board. Conventional wisdom says that during the early part of a Go game you play stones only on the outer four lines, and so prepare the ground for an assault on the central part of the board later.

Lee flinched when he returned and took in the move. But as the game played out, rather than being a mistake, that stone turned out to be the key to establishing control of the

**“How much are creative machines really doing – and how much is just hype?”**