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AI can catch art forgers at a stroke

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An original Picasso ink drawing with the artificial intelligence interpretation, right, used to spot fakes

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Ely Sakhai, who ran a successful art forgery business in New York for 15 years, was caught only when Sotheby's and Christie's discovered in 2000 that they were both selling the same supposedly original work by Gauguin.

Now, thanks to computer technology, there might be an easier way to catch art forgers than waiting for them to make a mistake: researchers have found that the individual strokes in line drawings have specific characteristics that are impossible to replicate. They were able to programme a computer to recognise an artist's personal style, and distinguish genuine works from fakes with a 100 per cent success rate.

The team, from Rutgers University and the Atelier for Restoration & Research of Paintings in the Netherlands, broke down nearly 300 line drawings by Picasso, Matisse, Modigliani, Schiele and other artists into 80,000 individual strokes.

An artificial intelligence system known as a deep recurrent neural network was used to learn how to identify the hand of each artist from the features of their strokes. They also used an algorithm to look for specific features, like the shape of a line in a stroke. Combining the two techniques, the researchers were able to identify artists correctly about 80 per cent of the time.

The paper said: "The main result . . . is that we can discriminate between artists at the stroke level with high accuracy." It even worked with images from the internet or scanned from books. They then commissioned artists to create copies of the line drawings in the same style as the original artists. The system was able to spot the fakes every time, the researchers said. "A human cannot do that," Ahmed Elgammal, a professor at Rutgers and one of the authors, said.

The paper said that the results showed "that the proposed method is robust to such imitated drawings, which highlights that the method can indeed capture artists' invariant characteristics that is hard to imitate".

So far the technique can only be applied to line drawings where the strokes are obvious. However, Professor Elgammal said that they plan to test the method on Impressionist works and other 19th-century art where brush strokes are obvious.

The researchers argue that developing their technology will complement other technical analysis techniques for several reasons, including providing "a quantifiable scientific way to approach the traditional stylistic analysis". It will be a more cost-effective solution than existing methods, they believe.

The process was inspired by the work of the art historian Maurits Michel van Dantzig, who developed a system to identify artists by their brush or pen strokes that he called Pictology. Dantzig found that shape, length, direction, and pressure all contributed to a kind of stroke signature, unique to each artist. He suggested that such characteristics captured the spontaneity of how original art was being created, in contrast to the inhibitory nature of imitated art.