Can a computer program be creative?

There is no doubt that software and computer code kicks ass at creation. From Photoshop to HTML to (dare I say it?) MS Paint, bundles of 1s and 0s can be incredibly powerful tools for creation.

But few people would say that code can be more than a tool -- few would agree that computers can be creative in their own right.

Simon Colton (http://en.wikipedia.org/wiki/Simon_Colton) is one of those few people.

"There's no inherent creativity," says Colton, a computer scientist who for the last ten years has been developing The Painting Fool (http://www.thepaintingfool.com/), a piece of software that he says exhibits creativity. "There are [only] processes that are more likely to have creativity projected onto them by people."

Over the years a range of "robot artists" have created works of art that come close to matching -- or arguably have matched -- human artistic ability. AARON (http://en.wikipedia.org/wiki/AARON), a piece of software developed by artist Harold Cohen, is a notable example.

Another is the e-David (http://www.informatik.uni-konstanz.de/en/edavid/news/), a robot developed at the University of Konstanz in Germany that uses a visual feedback loop to constantly check the effect of its paint strokes.
"We try to mimic how a human painter creates a drawing," says its co-developer Oliver Deussen. But he's sceptical about whether a robot can display intentionality.

"Regardless of what we implement, the machine will never be a person," he says. "It will only have a very limited idea about what it is doing, no intention".

However, Colton's goal with The Painting Fool is not to produce beautiful, human-like works of art. It's far loftier than that. It's to have the world accept this piece of software as an artist, talented or not.

"The goal of the project is not to produce software that can make photos look like they've been painted, Photoshop has done that for years," he says. "The goal is to see whether software can be accepted as creative in its own right."

The Painting Fool's most recent iteration was on show at an exhibition in Paris in July called "You Can't Know my Mind", where it painted portraits of attendees. It is now a moody artist, which reads news articles to give it a "mood" -- positive news stories make it happy, negative news stories make it sad. That moodiness results in some interesting outcomes, including sometimes refusing to paint...
the person sitting for it, which Colton says happened six or so times.

When the person sits in front of The Painting Fool, which lives on a laptop, the software chooses an adjective based on the mood it is in -- for example, it might choose the adjective colourful if it's in a good mood. It then tries to paint a portrait of that person -- using pencil, paint or pastels -- that evokes that adjective.

"It sets [itself] a goal at the start, based on a mood that we don't give it," explains Colton. "It [then] attempts to achieve that mood with the painting styles that it has."

After completing the painting, it self-assesses to see whether it has achieved the goal it set itself. It's this self-assessment, achieved by combining the software with an artificial art critic called "Darci", that means The Painting Fool now displays all of the behaviours that amount to creativity, says Colton.

Darci is the creation of a team led by Dan Ventura at Brigham Young University -- by drawing on a database of images labeled by humans, it is able to understand what types of adjectives a new image conveys.

"We built a neural network model that would try to learn a mapping from the images to the adjectives, so that it could predict in the future, using new images, whether that image was bloody or happy or dark or bleached," says Ventura.

With this ability to analyse images, The Painting Fool can now be self-critical. And when it fails to achieve a goal, which occurs often for this struggling artist, says Colton, it becomes unhappy. But it picks itself back up and tries again.

"It reflects on its failures [to achieve a look] and tries to redo it and learns in the future which rendering style is better for [that look] and which is worse," says Colton.

So, self-criticism, an independent personality, learning, the ability to set itself a goal and then try to meet it -- like it or not, this software is beginning to look "creative".

"You can imagine a child doing exactly the same thing as
software, but people project creativity onto the child and not onto the software, because of the context."

Despite his advances with The Painting Fool, many are likely to remain unconvinced, at least for the moment. The term "creative" itself is fraught and prone to controversy, much in the same way as the word "Art" is. For Colton, that's not a problem.

"You'll find a hundred newspaper articles written this year with the headline, 'Is It Art?'" says Colton. "We're not meant to agree what Art is, that's what drives it forward. And creativity is exactly the same."

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