

AI

EXPANDING THE LIMITS
OF YOUR CREATIVITY



Humans are tool users, and we've long relied on tools to help make art. From painting with pigments made from animal fat and dried fruits to using a chisel to carve marble stones to creating virtual 3D environments with Unity or Unreal, we've always found new and innovative ways to express ourselves. One of the newest tools at our disposal is artificial intelligence.

Modern Artificial Intelligence (AI) has become very good at performing specific tasks within a narrow range of knowledge – whether it's driving a car, scheduling appointments, or composing a photograph. And it's growing at a phenomenal rate. Gartner projects the AI industry will grow to more than \$3.9 trillion by 2022,¹ more than three times the size of the industry in 2018. A lot of that growth can be attributed to a veritable explosion of open source AI initiatives. From TensorFlow² to Keras³ to Microsoft's own open source platform Cognitive Toolkit,⁴ there are a wealth of frameworks that can be used to develop and teach neural networks using machine learning frameworks. The barrier to entry is dropping, and more companies are willing to experiment. AI is gaining support from business leaders as well. Studies show that as much as 73 percent of senior executives want to invest in AI,⁵ mirroring the improvements in hardware that are enabling AI to continue to grow. NVIDIA[®] has

announced a \$99 AI computer called the Jetson Nano,⁶ custom made for machine learning, while Apple recently touted its new A13 Bionic chip for the iPhone 11, designed in part to facilitate applications that rely on machine learning.

All this has set the stage for AI blossoming as a creative partner across the spectrum of creative applications. As long ago as 2015, AI convincingly composed its own classical music,⁷ and today it can apply the style of an iconic artist to make its own art in the same genre, like Shubhang Desai's AI that can render any picture in the visual style of another.⁸

SHIFTING PERCEPTIONS

AI isn't turning out the way many of us expected. While science fiction has long depicted AI with a reputation for evil, real AI is proving to be more of a faithful assistant. Evie,⁹ Sally,¹⁰ and X.AI¹¹ and are all AI-powered assistants

¹ <https://www.gartner.com/en/newsroom/press-releases/2018-04-25-gartner-says-global-artificial-intelligence-business-value-to-reach-1-point-2-trillion-in-2018>

² <https://www.tensorflow.org/>

³ <https://keras.io/>

⁴ https://www.microsoft.com/en-us/research/product/cognitive-toolkit/?lang=fr_ca

⁵ <https://www.celonis.com/press/celonis-study-almost-half-of-c-suite-executives-admit-to-launching-transformation-initiatives-without-a-clear-strategy>

⁶ <https://www.nvidia.com/en-us/autonomous-machines/embedded-systems/jetson-nano/>

⁷ <https://qz.com/488701/humans-are-confusing-music-composed-by-a-computer-for-j-s-bach/>

⁸ <https://medium.com/artists-and-machine-intelligence/neural-artistic-style-transfer-a-comprehensive-look-f54d8649c199>

⁹ <https://www.evie.ai/>

¹⁰ <https://www.welcome.ai/meet-sally>

¹¹ <https://x.ai/>



that schedule meetings and manage calendars like a human assistant. Google Home, Amazon Alexa, and Apple's Siri are all variations on an AI assistant theme. It's no small phenomenon; Amazon has sold more than a 100 million devices with Alexa on board,¹² and Siri has been built into roughly 1.4 billion smartphones (since it debuted in 2010).¹³

AI's prominence has changed the very nature of many creative workflows. Using AI-powered photogrammetry, for example, artists can populate 3D environments with natural looking objects that have been built automatically, without needing to create them by hand. Explains Marc Petit, General Manager for Unreal Engine at Epic Games, "Our goal is to change the economics around content creation, using machine learning to generate more content, and then stylize those assets. That's why you have much less human intervention, which [is] an expensive resource."

Changing the workflow also means expanding possibilities. Danny Lange, Vice President of AI and Machine Learning at Unity Technologies, says, "Today, an architect can have an AI simulate billions of layouts of a house. The architect can say, 'give me the top 100 layouts that give the most sunlight in that house year-round.' And then I can take those and pick one of them and elaborate on it and I'm going to put my touch on it." Essentially, the computer made sure that the architect was starting with the best possible solution for a critical aspect of the design, and then the architect can innovate on top of that.

But while AI is ably demonstrating its ability to free people from performing mundane tasks, it can do more, stepping up to the role of collaborator. "As a filmmaker and designer, I'm very interested in doing the work myself," says designer, director and Z by HP Ambassador GMUNK. "But I like the idea of directing the AI to take from *here* and put it *there*." A favorite example of this kind of human-AI collaboration? Style transfer. "My wife did a bunch of really cool acrylic paintings and [a client] style-transferred this library of paintings to landscapes," says GMUNK. "So you're sampling all these different textures and colors from the paintings and putting them on these landscapes to make these really surreal, dreamlike images. It's really beautiful."

The AI approaches creative and technical problems in novel ways that humans might never envision. Modern AI relies on machine learning, in which computers teach themselves after being fed enormous amounts of information. Because the resulting data structures are

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Documentary Photographer
and Z by HP Ambassador

so complex, it's not clear how a computer arrives at the decision or recommendation that it does. "It's the same as looking at a brain," says Lange. "I can look at it, but I'm not sure I understand what's going on in there. It's a black box. We do what a psychologist would do; we start feeding the system examples, and then we see what it outputs and we get a sense of the way that it performs."

Documentary photographer and Z by HP Ambassador Jody MacDonald finds AI intriguing for just this reason. "I'm not ready to start using it because I feel like a lot of what AI does still looks too fake. I can look at a photo and know if it's been manipulated with some machine learning algorithms. But at the same time, AI sometimes makes decisions and does things that no human would do on their own. And that's exciting."

Back in 2016, IBM's Watson computer was tasked with helping to create the trailer for an AI-themed horror film. Watson was fed 100 horror film trailers and then used those examples to analyze the film. In the end, Watson recommended 10 scenes (about 6 minutes of video) for the trailer, which was then stitched together by human video editors.

WELCOMING AI INTO THE CREATIVE INDUSTRY

It's debatable – and has been extensively debated¹⁴ – whether elephants understand what they are doing when they paint. But it's certain that there's no intent behind what computers do (at least, not yet). Says Matthew



Game balancing optimization within Unity Simulation allows for playtesting games before launch to help achieve better game balance efficiently and accurately.

Carse, Founder of Image Data Systems, "Medieval painters relied on skilled craftsmen to create ultramarine blue from lapis lazuli, grinding it into powder and adding pine resin, gum mastic and wax, working it over a period of days. Michelangelo's Sistine Chapel would not have been possible without their work, but they received no credit. The genius lay in how to apply the material, not how to make it."

Computers are just modern-day versions of those skilled craftsmen. GMUNK does a lot of work with data that he often needs to visualize. "I might need to shoot a library of content that's visualizing music on stage," he says. "You photograph a bunch of different things, and then you have AI selectively edit the library of footage according to the music." GMUNK, in other words, is the artist who captured the content, but he then delegates the time-consuming musical synchronization to an AI apprentice.

"Whatever the music is playing, it's sampling the library of footage to create edits that you would never have thought of," says GMUNK. "That's super interesting. But it's

just a tool."

Meanwhile, Adobe's Sensei¹⁵ – a rich framework of AI-powered graphics tools – is finding its way into the entire portfolio of Adobe products. Morph cut is a Sensei-powered tool that suggests editing effects for film editors using Adobe Premiere Pro, while Sensei lets Adobe Lightroom's Face Aware Liquify help artists make more natural edits to human faces. And the list goes on – Sensei uses AI for faster and smarter editing, image search, and image sourcing. It's the ultimate journeyman craftsman, helping the pro work faster and smarter.

The power of AI is clearing the deck of mundane and repetitive tasks so that artists can concentrate on doing the work that requires the most brain power. This is true across the gamut of AI, machine learning, and the internet of things. These technologies let humans concentrate on the most intellectual aspects of their jobs.

¹² <https://www.theverge.com/2019/1/4/18168565/amazon-alexa-devices-how-many-sold-number-100-million-dave-limp>

¹³ <https://www.statista.com/statistics/276306/global-apple-iphone-sales-since-fiscal-year-2007/>

¹⁴ <https://www.treehugger.com/can-elephants-really-paint-4864229>

¹⁵ <https://www.adobe.com/sensei.html>

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Digital Craftsman and Z by HP Ambassador

Says Lange, “Computers can be creative. There's no doubt in my mind about that – but I don't want that to be confused with art. I wouldn't care about a painting generated by a computer because it doesn't really matter to me what the computer does. But computers can help do a lot of the creative work that may probably be less valued by the audience, but which allow the artist and the creative individual to focus on the more high-value, high-impact aspects.”

That dynamic is appealing to many artists. Says digital craftsman and Z by HP Ambassador Alex Trochut, “I think it's super interesting to think about using a machine that understands me and my technique so well [that] it finds ways to help connect my ideas together, like I'm having a conversation with the app.”

Nonetheless, as computers and automation inexorably move into more and more career fields, creative professionals have long felt insulated because what they do has been difficult to automate. But that's starting to change. Some artists worry that AI is getting too good. “It's a little scary,” says Trochut. “If an AI knows you so well, there's this vulnerability. What keeps the AI from replicating your style? Then someone can just use an AI instead of your own work.”

IMPLICATIONS

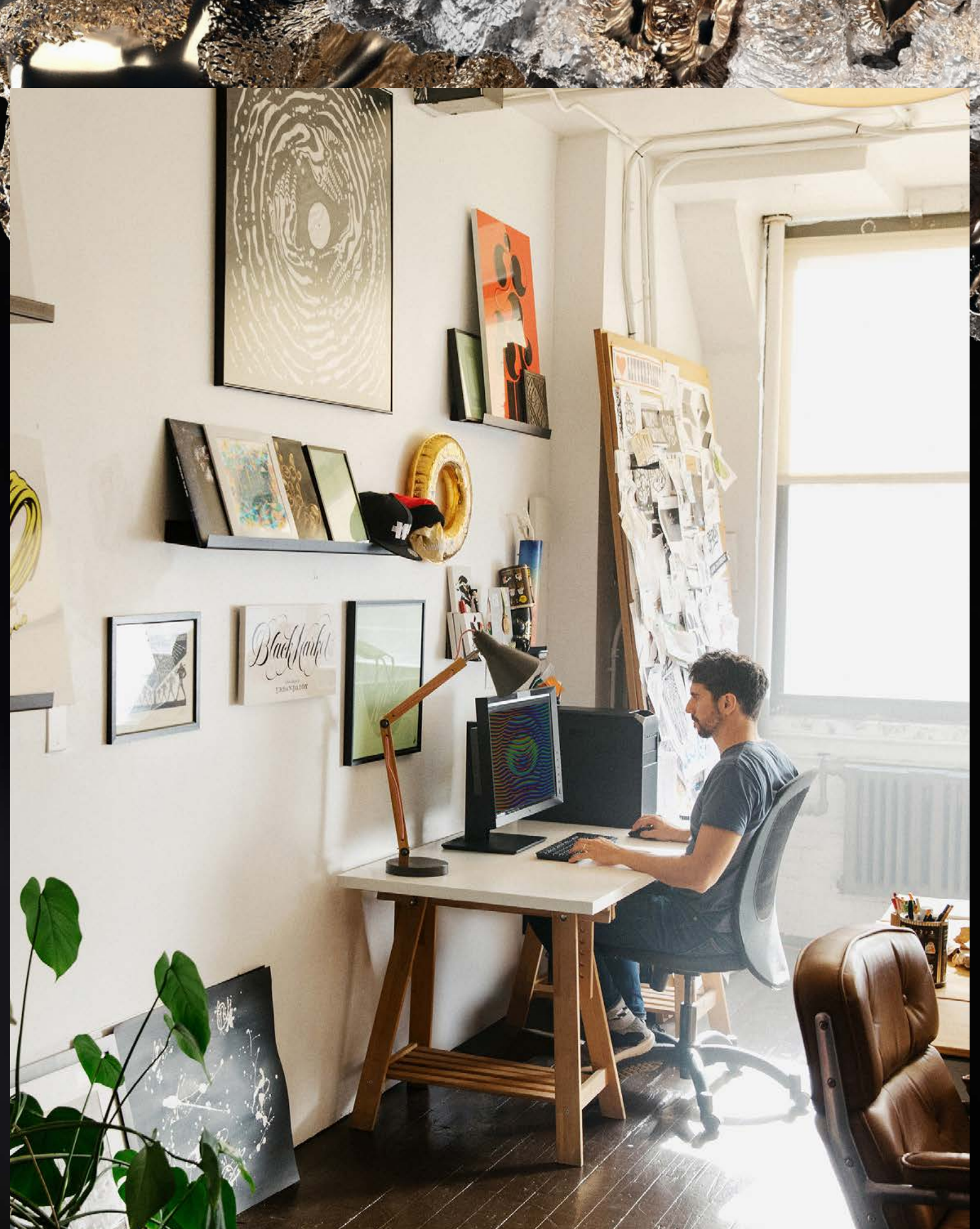
Even as computers increasingly collaborate and assist humans in the creation of art, there's little doubt to whom

the credit should go. Not to the programmer – machine learning ensures that no human being can fully explain how an AI comes up with what it does. But at the same time, these AIs aren't really demonstrating true creativity.

No one would suggest that Sensei, for example, is meaningfully contributing to the creative process; it's simply streamlining an artist's workflow. Neither Photoshop's content-aware fill nor the iPhone's Deep Fusion (the iPhone 11 feature designed to improve the exposure of a scene that was painstakingly composed by a very human photographer) deserves equal billing with a photographer. Even as assistants and collaborators, they're still just tools in the hands of creatives. That said, as the technology becomes increasingly sophisticated, will there come a point at which the AI is capable of unambiguous creativity, full partners with human artists?

Lange is certain that creators and AI will work much more intimately in coming years. “They are going to be more partners than tools. Where we in the past used tools to fill in colors or find outlines or something very trivial, these new tools are going to be much more intellectual, because they're driven by patterns that we humans are driven by as well. They are not going to be as powerful and creative as we are, but they may suggest stuff that you're going to look at and say, wow, that was actually a good suggestion. And then we can build upon that.”

Perhaps it's just a matter of time before an AI gets its name in the credits of a film without it seeming like little more than a novelty.



Digital craftsman and Z by HP Ambassador Alex Trochut creating in his studio.