Machine, Perchance to Dream

Gary Singh

■ **IF MACHINES CAN** learn, then can they dream? Or hallucinate?

As an artist, it was only a matter of time before Refik Anadol began to ask those questions. The cognitive skills of humans—dreaming, remembering, imagining—have always inspired him, but new doors began to open when he discovered that machines could "learn." New ways to push the boundaries of cinema, painting, and architecture all came together.

"I know it's a very science fiction question," Anadol admits. "Of course, a machine cannot dream, but there is this tendency, at least as a speculation, that machines can really create an output that feels like a dream or a hallucination, but also based on a memory that we give to it."

To Anadol, this is very similar to how humans operate. Our experiences and our memories are a form of input, while dreams and hallucinations can be understood as outputs. We learn, we evolve and we grow, while reinterpreting and reaccessing our own storehouses of memories.

Such are the issues that inspired Anadol's Machine Hallucination project (see cover and Figures 1 and 2). A multimedia installation harnessing

the largest raw dataset ever gathered for a single artwork, Machine Hallucination ran through February, 2020, at ARTECHOUSE in New York City. For the project, Anadol's team deployed and modified NVIDIA's StyleGAN algorithm, training it on millions of public domain images of New York's architecture and urban landscapes, as well as publicly available recordings and broadcasts of the city's actual sounds, to produce a previously unimaginable futuristic version of New York via a 30-minute experimental 3-D cinematic presentation. Taking advantage of the floors, walls and ceiling of the ARTECHOUSE space (see cover and Figures 1 and 2), Machine Hallucinations unfolded in 1025 latent dimensions, with 18 video projection panels and 32 channels of audio to create a futuristic data universe of New York, as if the neural network had actually dreamed what the city's future would resemble based on the original data. The source images and sounds functioned as collective memories and hidden layers of history, while the final product seemed like the city's future self was writing a hi-tech immersive message back to its present self, thus pointing the way toward an imaginary near future when machine intelligence could expand the urban dweller's capacity to dream. Visitors became participants in the narrative, stepping into the story rather than simply watching it on the walls, allowing them to intuitively

Figure 1. Machine Hallucination at ARTECHOUSE in New York City.

Figure 2. Machine Hallucination at ARTECHOUSE in New York City.

understand the ways that memory can be spatially experienced, as well as the power of machine intelligence to simultaneously access and augment human memories. The normally separate realms of architecture, cinema and performance art were thus woven together and reinvented. For a section of the storyboard, see Figure 3.

PERSONAL INPUT

When it comes to experiences, memories, and inputs, Anadol got his first computer, a Commodore 128, when he was eight years old, the same age when he first watched the film, *Bladerunner*. While science fiction and the gaming world together became his biggest influences in his youth, Anadol also fell in love with cinema. Eventually during his undergraduate years, he got to travel around Europe and learn about the historical development of new media arts and how technology played a role in that history. After learning visual programming languages, he never stopped crunching code, while always maintaining a passion for technology, culture and the routes between artistic disciplines.
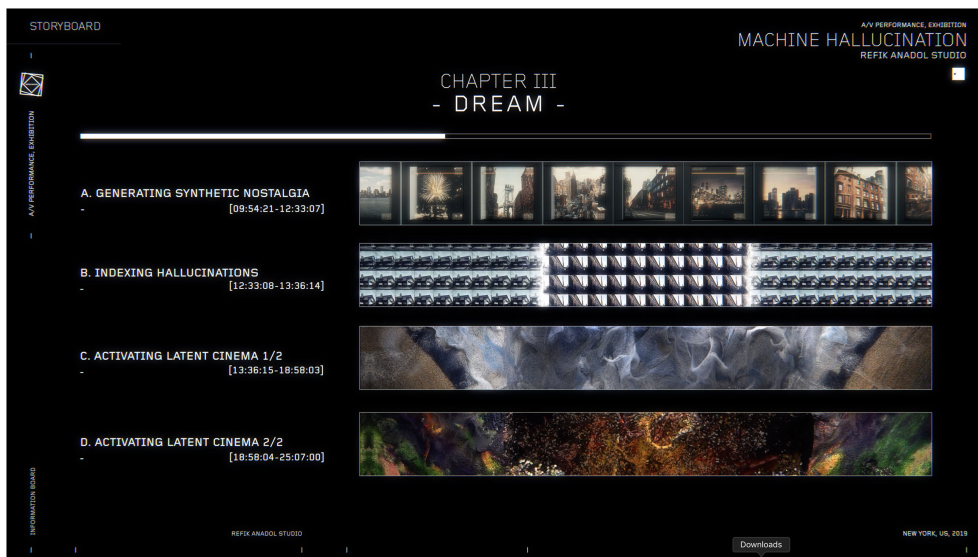
Figure 3. A page from the storyboard for Machine Hallucination.

Then came computer graphics, AI and, more specifically, generative adversarial networks.

"I was super inspired by computer graphics because I found out that, basically in my work, my dream is making the connection between physical and virtual roles by using data as a pigment, and technically using a thinking brush with AI," Anadol said. "And that combination eventually made architecture a canvas. So all these narratives simply connected and collided."

While Machine Hallucinations represents the latest example of those interconnected narratives, the collision originally came to fruition at the UCLA Department of Design Media Arts, where Anadol studied with Victoria Vesna, Casey Reas, and Christian Moeller, all of whom gave him the confidence to take his practice to the next level. As a result, he dreamed up his own professional studio to push his art to the very edges of imagination and technology, while never giving up the concept of data as memory, as pigment with which to paint, rather than a bunch of numbers.

Now as a faculty member at UCLA five years running, and someone with his own professional studio and worldwide commissions flying in, at least in the pre-Covid-19 era, Anadol has his own team that helps make any given project happen. The team consists of 12 people that can speak 12 languages.

"[We're a] very diverse group of people," Anadol says. "That makes it so exciting because we can create works all around the world, but being 12 people—neuroscientists, AI engineers, data scientists, architects, computer graphic designers, all kinds, really—we have this diversity. Because every project is very unique. Every project requires a different computational challenge or architectural challenge."

HALLUCINATORY HOPE

Despite its cyberpunk boiler room feel, Anadol says Machine Hallunications reflects an intrinsically optimistic approach to machine learning. Participants get to see how a machine would dream up a future city filled with hope. Anadol says he doesn't ignore the ramifications, he's aware of what might go wrong, he's aware of the misuse of technology on any scale, but if art can be used as a channel of communication, inspiring the next generation with purposeful and impactful stories, then this technology doesn't need to be bad.

"These technologies can be extremely useful to learn and remember better, and eventually dream better," Anadol says. "So machines can learn and we can learn. And how we can learn together better, is, I think, the question. Or what else we can do with these things that are beyond just useless, dystopian ideas? What else we can do to really enhance humanity's cognitive skills? We have this potential. Why not use it?"

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