Jake Elwes was interviewed by curator Maitreyi Maheshwari, 22 February 2019

ZABLUDOWICZ COLLECTION
Invites
JAKE ELWES
CUSP

Maitreyi Maheshwari: Your work addresses how we see and read the world, dealing principally with ideas of space or language. How did you come to work with machine learning as a tool for thinking about these things?

Jake Elwes: I've always had a very mathematical mind and I get great satisfaction out of analytical problem-solving.

This led me to explore generative art and creating my own software. The furthest place I could push that was machine learning.

MM: Are the processes you're using based on chance? How much of it is about your control, and what's the balance between the machine and you?

JE: The question of agency is a core issue. I wondered how much I could remove myself as the artist and see what an artificial intelligence could do in terms of choosing. But the AI is not making a choice at all, aesthetic or otherwise. It doesn't have free will – but then again, do humans? We are also being fed data from birth: all our visual data and the context of our histories, which we are largely passive recipients of.

My approach has similarities with generative art, which has a very long lineage in art history of chance and randomness.

MM: Duchamp is the king of that.

JE: Exactly. What will the process spit out, and what does the artist do with it? With AI, it's still a conceptual thought experiment.

You provide the dataset from which it creates its own formulas and functions to analyse that data. It then classifies and plots it in a 'latent space'. But it is unsupervised, so even an expert opening a layer of a neural network *wouldn't understand why it's come to those conclusions.

I made a couple of pieces in 2017, *Latent Space* and *Closed Loop*, when I was very interested in unsupervised learning, not curating the results that came out.

In *Closed Loop* there were two different neural networks, one that learned to create captions from what it saw in images, and one that learned to generate new images from captions it saw. They had a conversation. I was the voyeur, despite setting them on their way. The human could sometimes see where the machine was coming from, but sometimes not at all.

MM: It sounds like the machines were playing out a Socratic method, this back-and-forth debate between 'this is what I see' and 'this is what I think you see'.

JE: Yes, and they were also misinterpreting and branching off each other. As an artist, I look at what scientists are researching and then find the mistakes and find poetry in misusing the algorithms they make.

With this project, I gave it a huge dataset of images of birds, and the neural network learned from the pixel data how to create images.

MM: How did you come to work with birds?

JE: I have a deep affinity with a place on the Essex marshes called Landermere. I have strong memories of wallowing around in this black mud as a kid. There are wildlife and bird sanctuaries here, which have some of the largest varieties of wading and migratory birds in the country.

Also, in the history of computer science, studying bird behaviour, such as how birds flock, has been significant in modelling complex systems.

I was playing with a pre-trained model that had different classes built into it, including one for birds. I decided to gather my own dataset of images taken along the north Essex-East Anglia coast of wading birds. Then I carried on training the network on these so it got good at recognising and then generating images that look like marsh birds.

MM: So, it takes archetypal features of 'birdiness' and combines them according to its own code and its own understanding of what bits belong together. What is it actually producing?

JE: It's producing hybrids. It's important that our language is clear, because it's not creating the DNA of a new species. It is creating something that is purely photographic – pixel-based.

I had a big dataset of different species: curlew, oystercatcher, godwit and the like, and from the features the program learns it can start to plot them. It will say that 'all of the ones that have similar beaks exist up here, with these coordinates'. I like to think of it spatially, but it's a multidimensional space that's difficult to comprehend. Each bird has a hundred numbers that represent a point in 'latent space'. You can move those numbers around and it will change the shape of the beak or the shape of the tail. It will never settle on a real bird because it's trained on the whole dataset.

I haven't provided any human taxonomy or classification. It just knows them all as images, and then it starts to generate images of interspecies birds.

MM: It takes away the sense of a singular identity to anything. You produce something almost utopian that's not defined by any one aspect, but it's everything all at once.

JE: Yes, that idea of 'everythingness' is key. It's AI going off on its own course, which is fascinating in terms of evolutionary theory and cybernetics.

MM: How does the machine produce something recognisable using just a hundred points of data in any given dimension, and only a set number of pixels? How do these images relate to our perception, because they are very low-resolution?

JE: This is currently a problem with machine learning, although new GAN* models have come out recently (such as BigGAN and PGGAN) which can generate much higher-resolution images.

The process is all about data reduction. You feed the computer images that contain thousands of inputs – each of the pixels as well as the colour channels in each of those pixels.

For the dataset I trained it on, I collected over a thousand images from Flickr. They were from all different angles and perspectives, some with multiple birds, some single birds, some on water, some on mud.

The majority of the images the neural network spat out, and those that made most visual sense, tended to be of single birds in profile, which was an interesting trope.

MM: It reminds me of early forms of representation: the way Egyptians always made their hieroglyphics in profile, or cave paintings were always of animals in profile. It's so hard to depict frontal perspective.

JE: There are, in fact, currently primitive 3D generative models, but the model I'm using has no concept of space and is working just on two-dimensional pixel data. Machine learning is in its infancy – perhaps it does have parallels to humans when we were first trying different methods of representation on cave walls.

Quite often it just created textures; there was no bird. Sometimes the bird would dissolve away. Some of them were very beautiful images. Having animated these, the next stage was to project the generated images onto the marsh. I went out with a Perspex screen and planted it into this wonderful, squelchy, stinky, black, oozing mud and with my brother, who's a film-maker, we documented this performative process.

It's a small intervention but a big statement: creating an artificial intelligence that is generating natural forms and then bringing the AI into that natural habitat. That's why I call it *CUSP*: because it's on the cusp of two different states meeting in the technological and natural worlds. It brings them together. Cusp is also a mathematical function, so it has these different connotations.

MM: How does sound become a part of this?

JE: Machine learning doesn't have to be images. In images you have a finite number of pixels and those are the inputs to your neural network. With raw audio you've got sixteen thousand inputs a second. It becomes exponentially large because each second needs to relate to everything that came before it. A machine must learn from scratch how to create wave forms to sound like something without knowing anything about sound, or timbre or reverb.

I wanted to create a soundscape of artificial marsh bird sounds, and have been training a network using a public dataset and my own dataset from field recordings.

MM: To what extent are your projects about understanding the self and what makes us human, and to what extent are they about new technological possibilities?

JE: I think we are creating artificial intelligence to understand ourselves. There's a danger of anthropomorphising something that is just a mathematical process. A lot of people get caught up in ideas of artificial consciousness.

AI has a very different way of doing things. We liken these to the way our brain works, calling them artificial neurons, and they have some similarity to the way the brain works, but you can only push the metaphor so far. AI also has an amazing power to help humanity: for example, by using machine learning to create and tailor new tools to help with everyday tasks or provide an interface with the world for people with disabilities. We have a responsibility here, because this technology is going to change our lives and the way we do things. But maybe it's a big enough area to also allow us to have fun and experiment with it, to be poetic and playful.

***Neural network** – a programming model that is biologically inspired and that can learn from observing data.
GAN (generative adversarial network) – a neural network that learns to mimic its input data through generation and refinement.

Artist's presentation Sunday 28 April, 3pm
The artist will expand on his current exhibition with a live AV performance.

Jake Elwes (b. 1993, London, UK) received a BA in Fine Art from Slade School of Fine Art, UCL, in 2017, during which he spent a year at SAIC, Chicago. His recent works focused on the technological and cultural developments of artificial intelligence have been exhibited widely, including at Bloomberg New Contemporaries, 2017, in Newcastle and London, UK; Ars Electronica, 2017, Linz, Austria; Centre for Future Intelligence, 2017, Cambridge, UK; Victoria and Albert Museum, 2018, London, UK; City Screen, Loop Barcelona, 2018, Spain; Frankfurter Kunstverein, 2018, Frankfurt, Germany; Nature Morte, 2018, Delhi, India; and ZKM, 2018-19, Karlsruhe, Germany.

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