

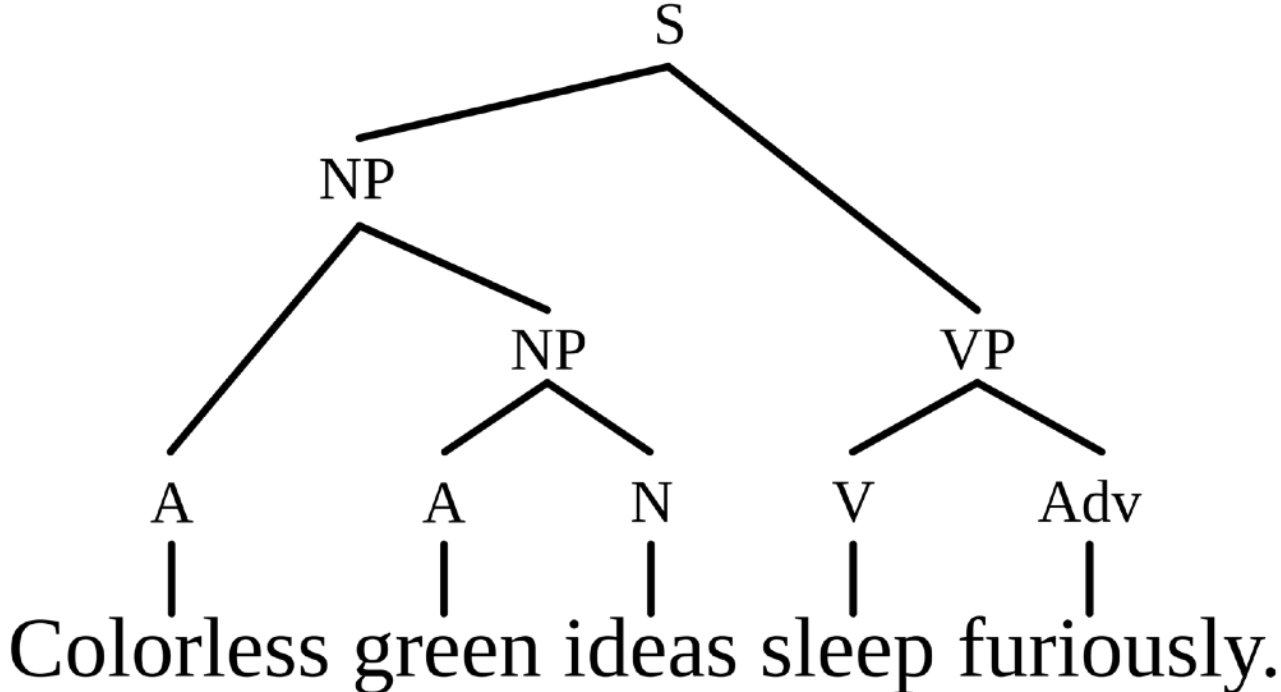
Intimate Inference:

The Case for *Small Data* in an Exponential Era of Generative Art

David Cope, Godfather of A.I. Music, Is Dead at 83

His EMI algorithm, an early form of artificial intelligence that he developed in the 1980s, prompted searching questions about the limits of human creativity.

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(a)

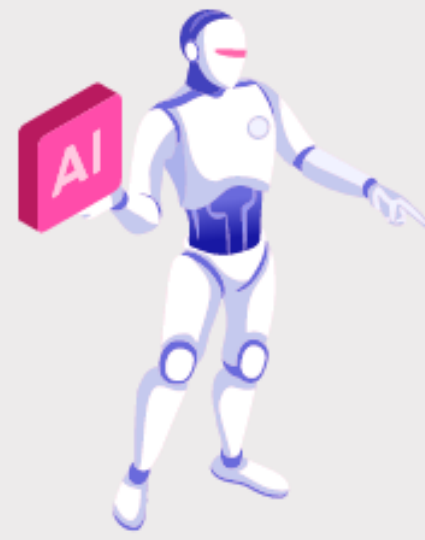
(b)

((2000 65 250 1 64) (2250 69 250 1 64) (2500 72 250 1 64) (2750 77 250 1 64)
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 (5250 70 250 1 64) (5250 67 250 2 64) (5500 69 250 1 64) (5500 65 250 2 64)
 (5750 70 250 1 64) (5750 67 250 2 64))

Figure 8.5 Clarified version of Mozart's K. 310 from Figure 8.4 (a) in music notation; (b) in event notation.

What is Gen AI?

- AI that **generates** “stuff”
- ... as opposed to *predictive AI* which **classifies** (e.g. voice recognition, computer vision) or **forecasts** (stock market price, lending rates, insurance payouts)
- What are the problems of GenAI?



Artificial Intelligence:

Mimicking the intelligence or behavioural pattern of humans or any other living entity.



Machine Learning:

A technique by which a computer can "learn" from data, without using a complex set of different rules. This approach is mainly based on training a model from datasets.



Deep Learning:

A technique to perform machine learning inspired by our brain's own network of neurons.

GenAI in 2025 = Deep Learning + Big Data

<https://articles.adxy.in>

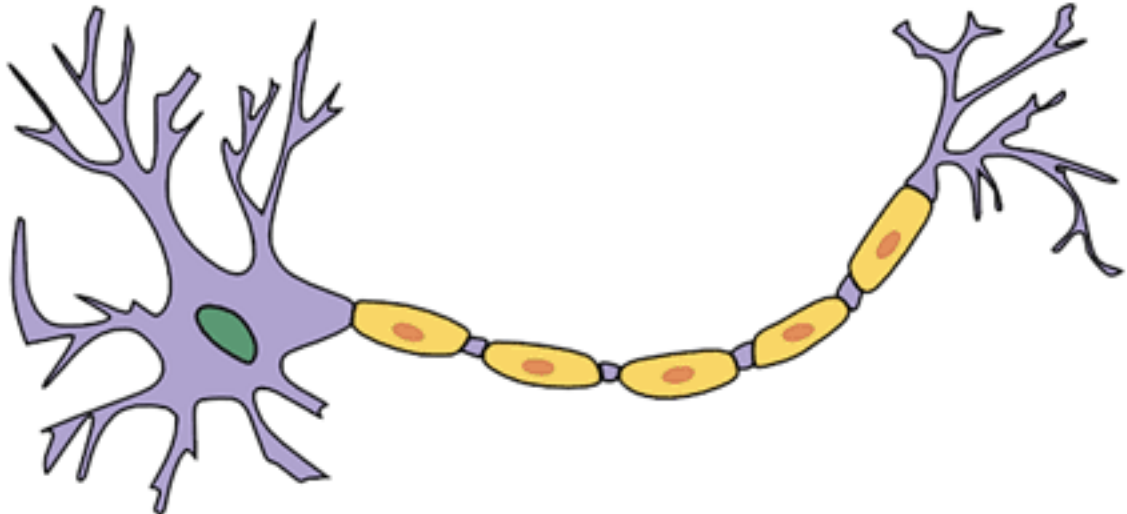


Fig: Biological Neuron

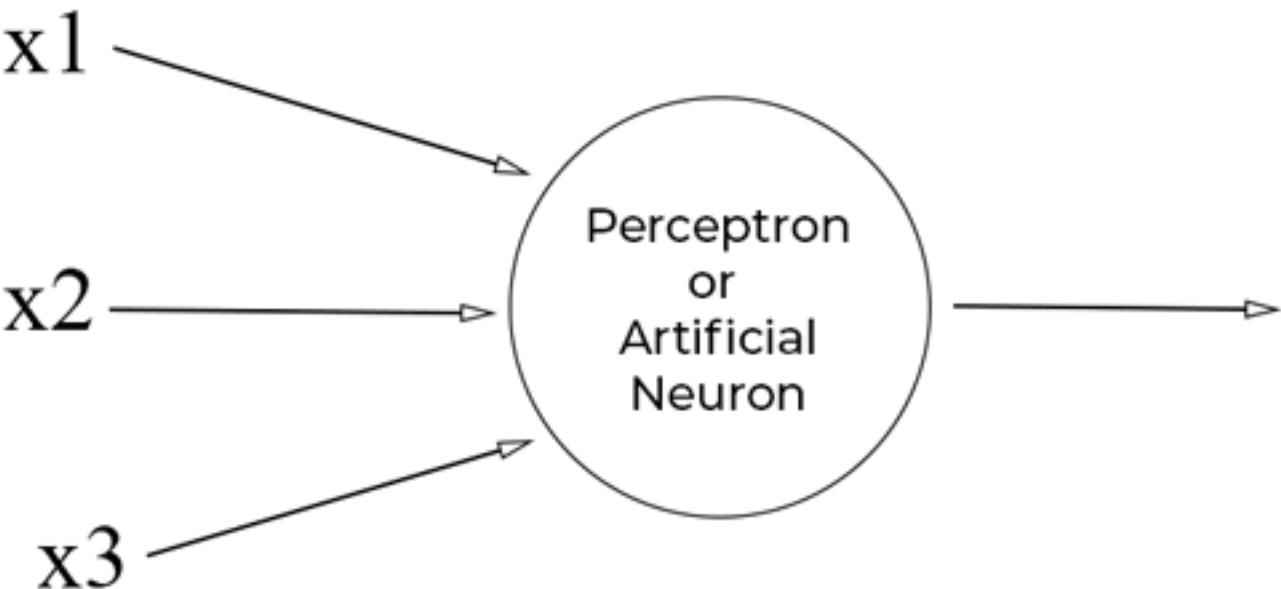
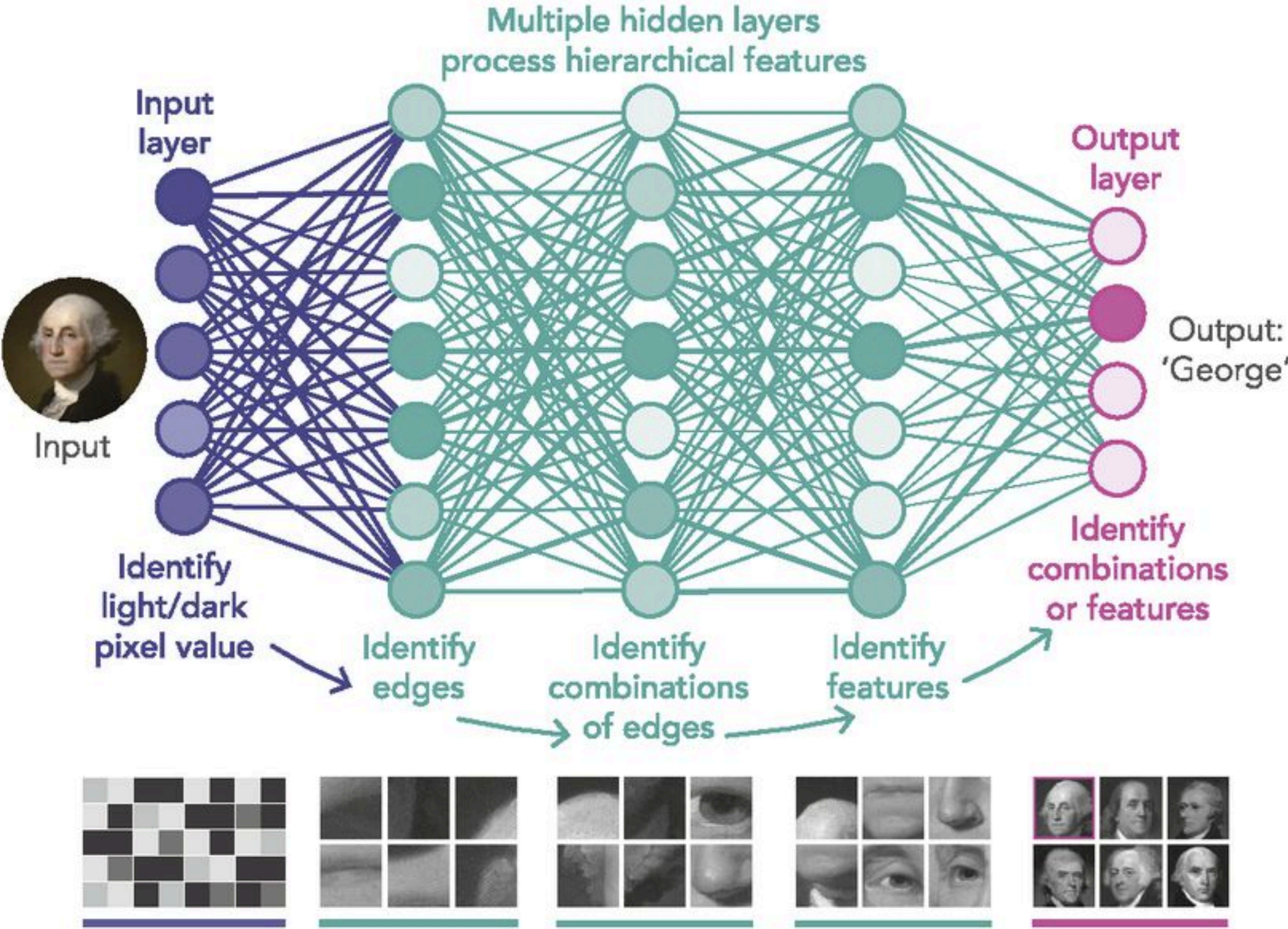
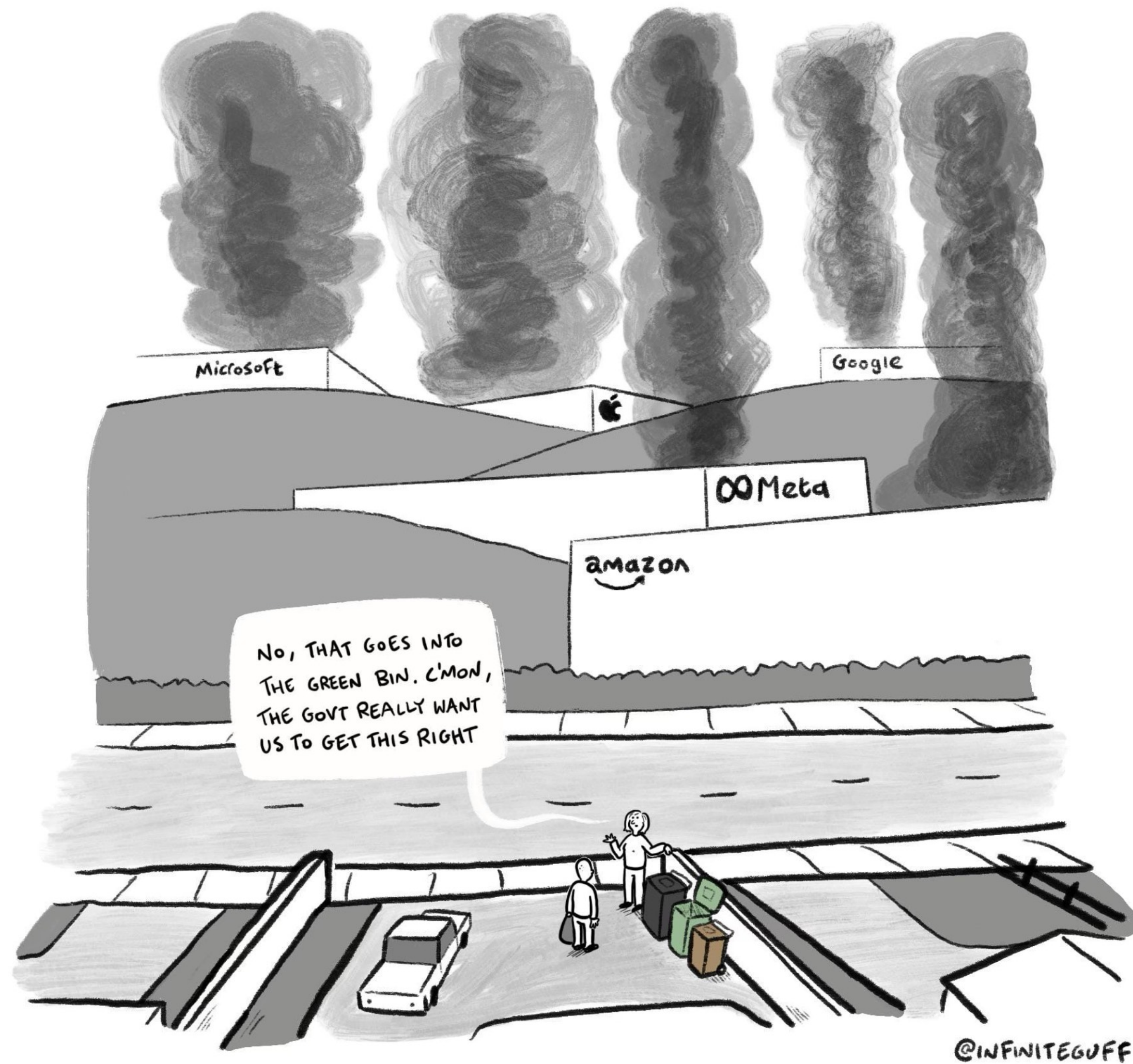


Fig: Artificial Neuron

DEEP LEARNING NEURAL NETWORK

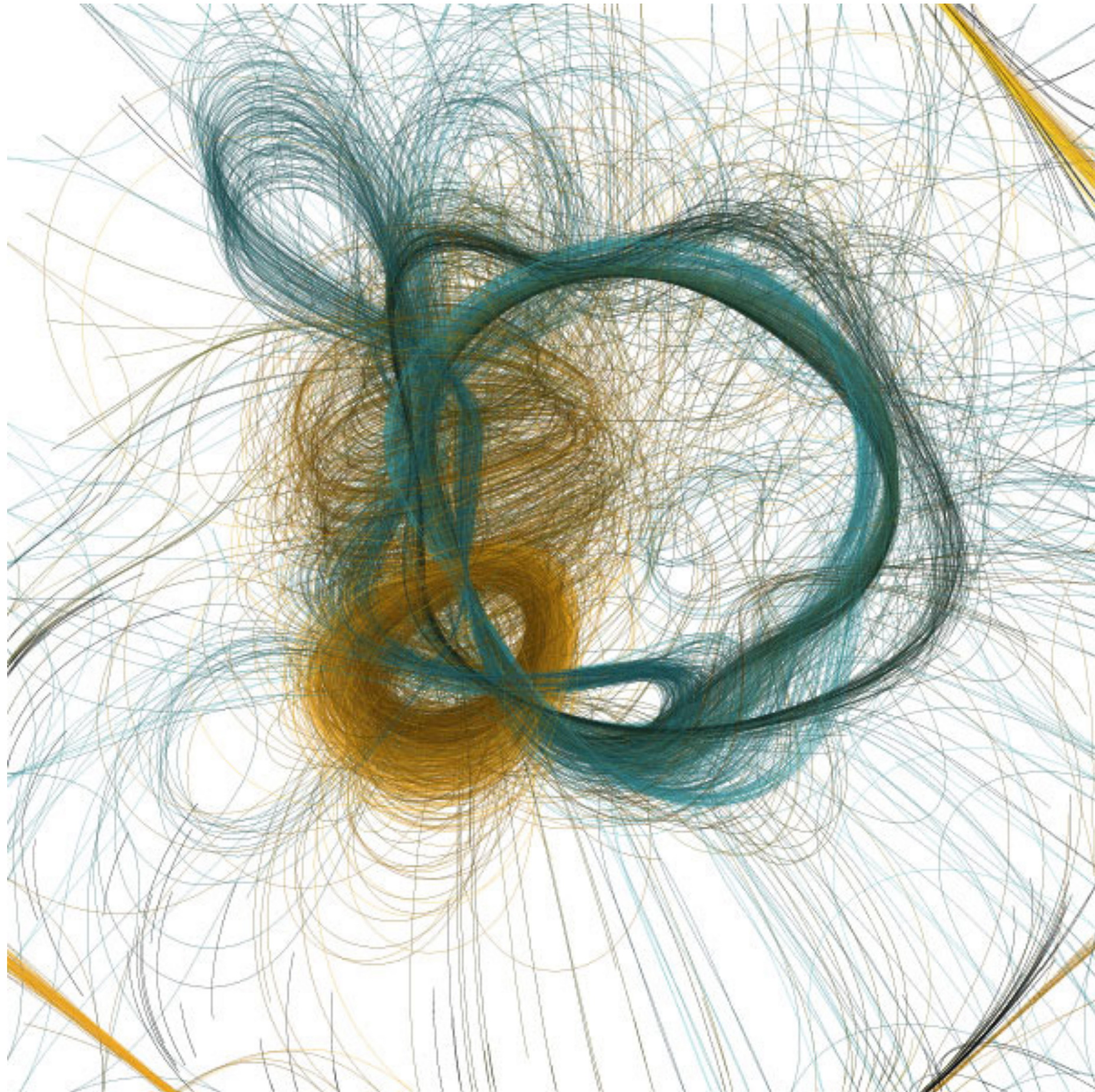




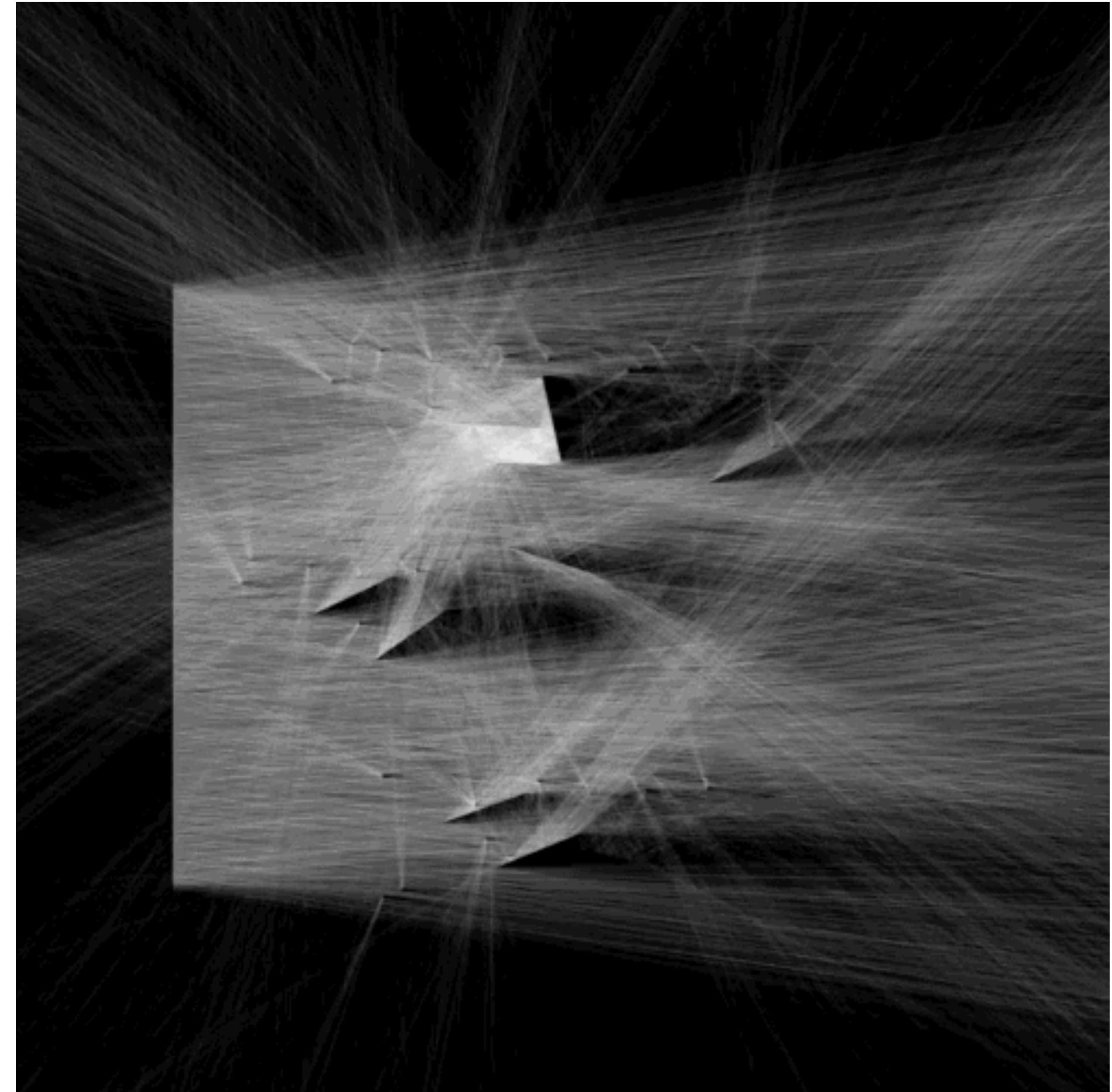
Bender, Emily M., et al. "On the dangers of stochastic parrots: Can language models be too big? 🦜." *Proceedings of the 2021 ACM conference on fairness, accountability, and transparency*. 2021.

What is Generative Art?

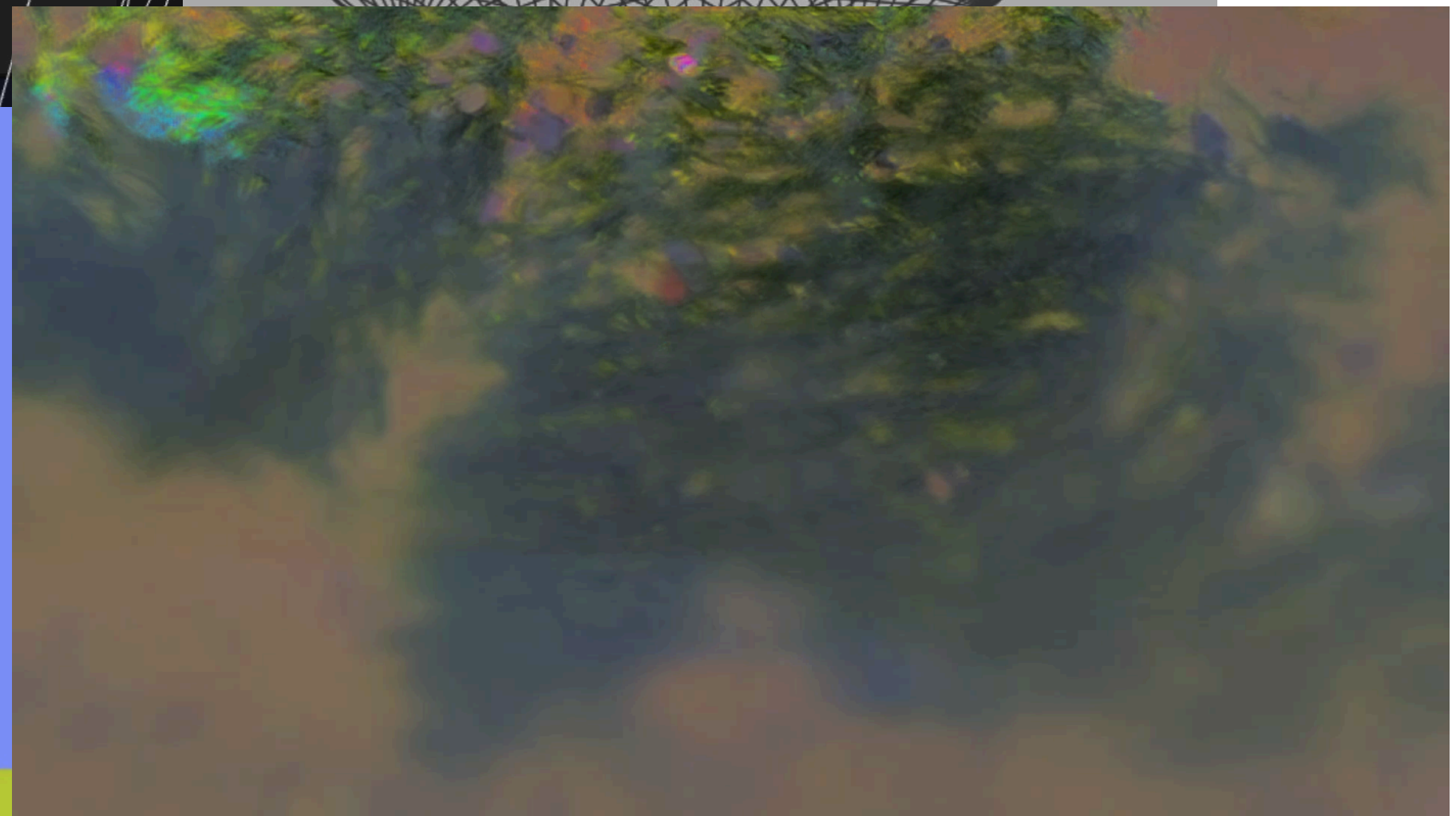
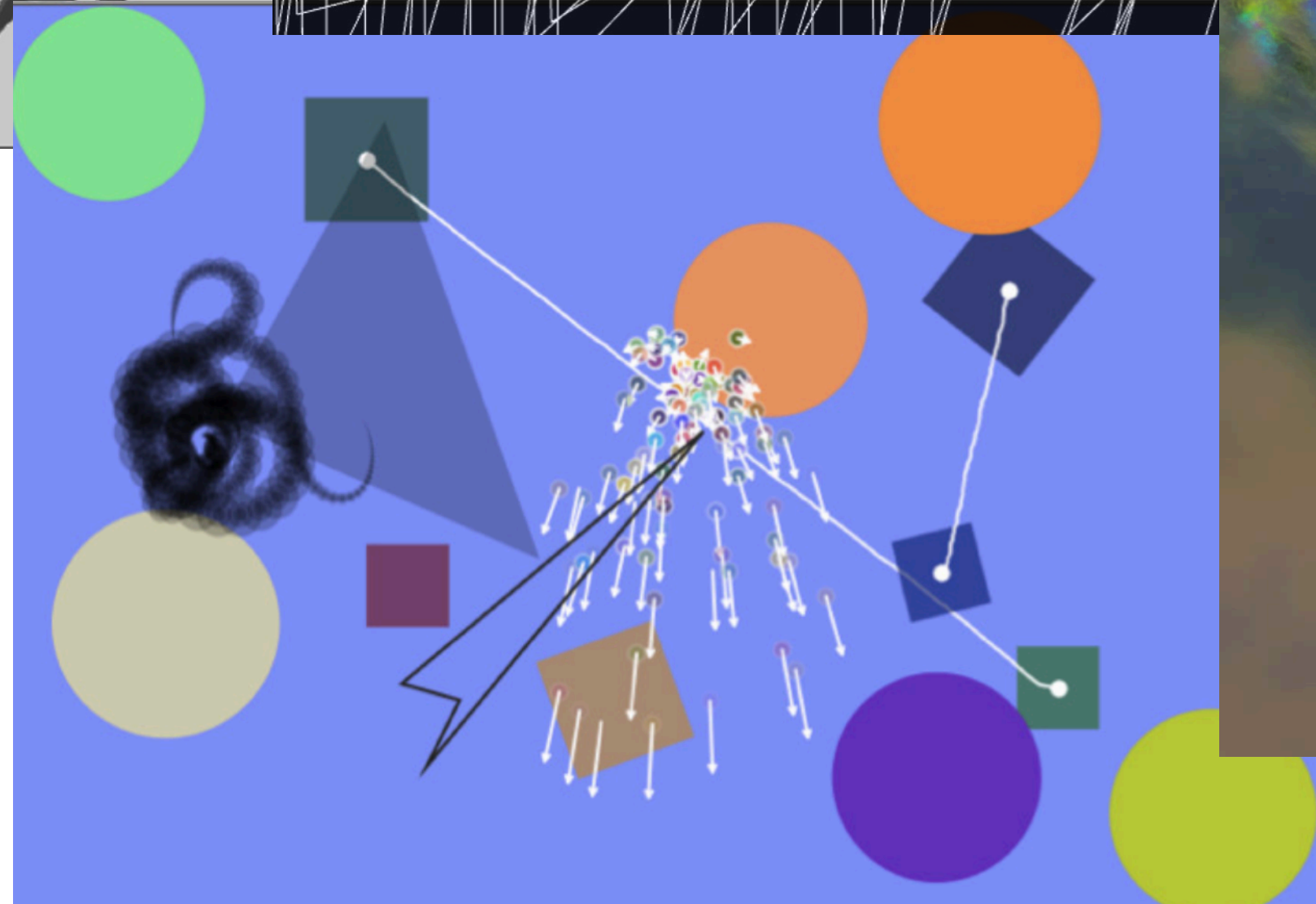
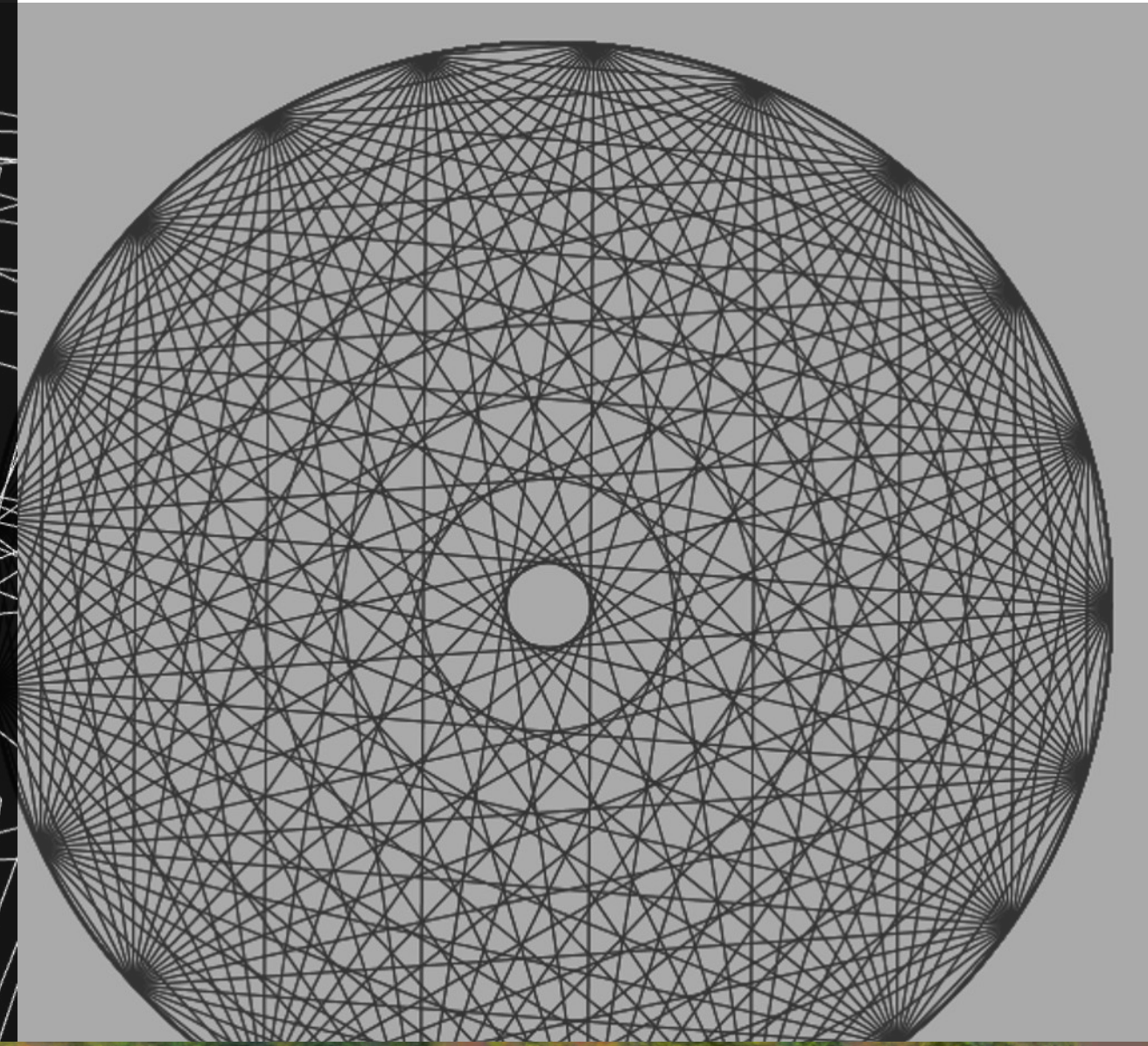
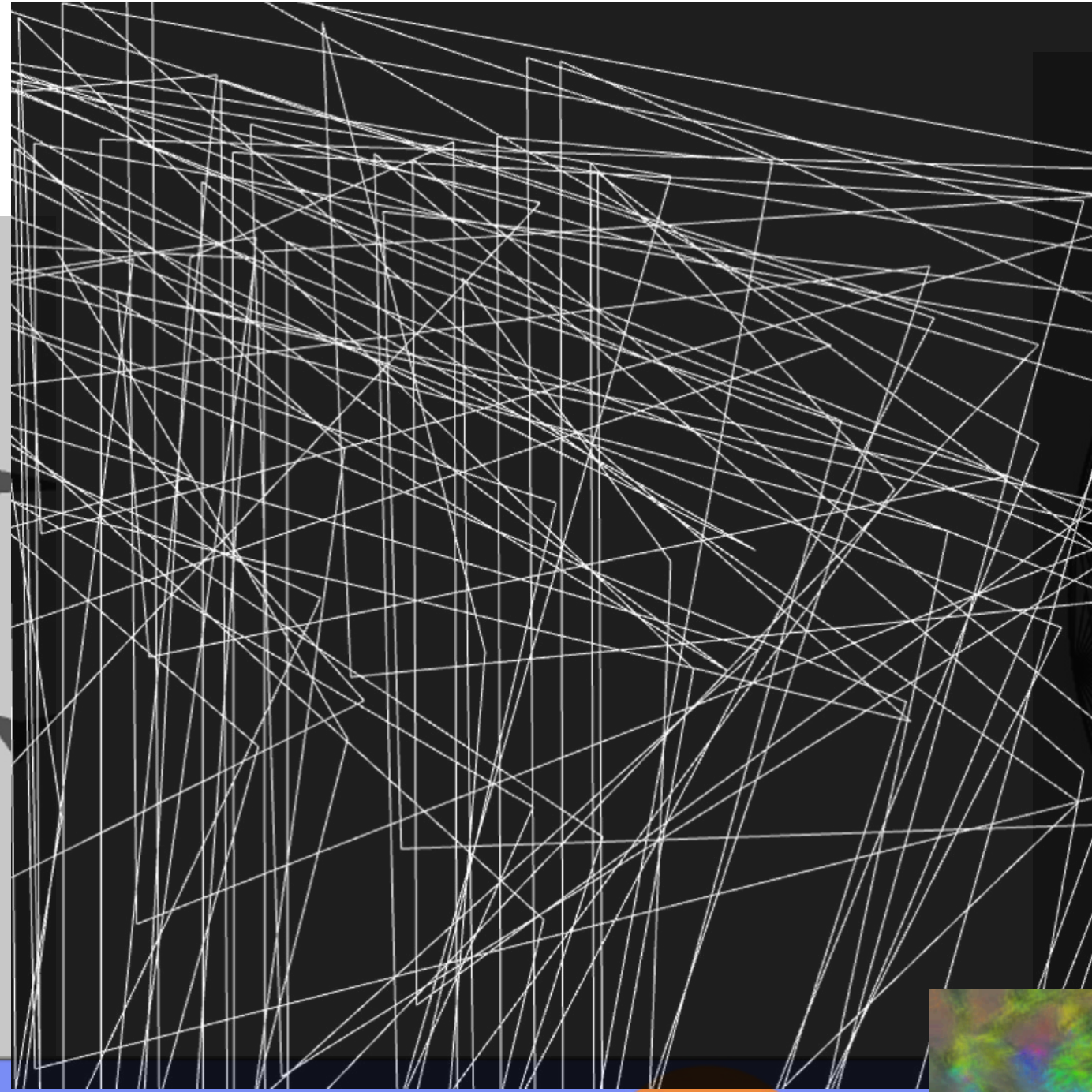
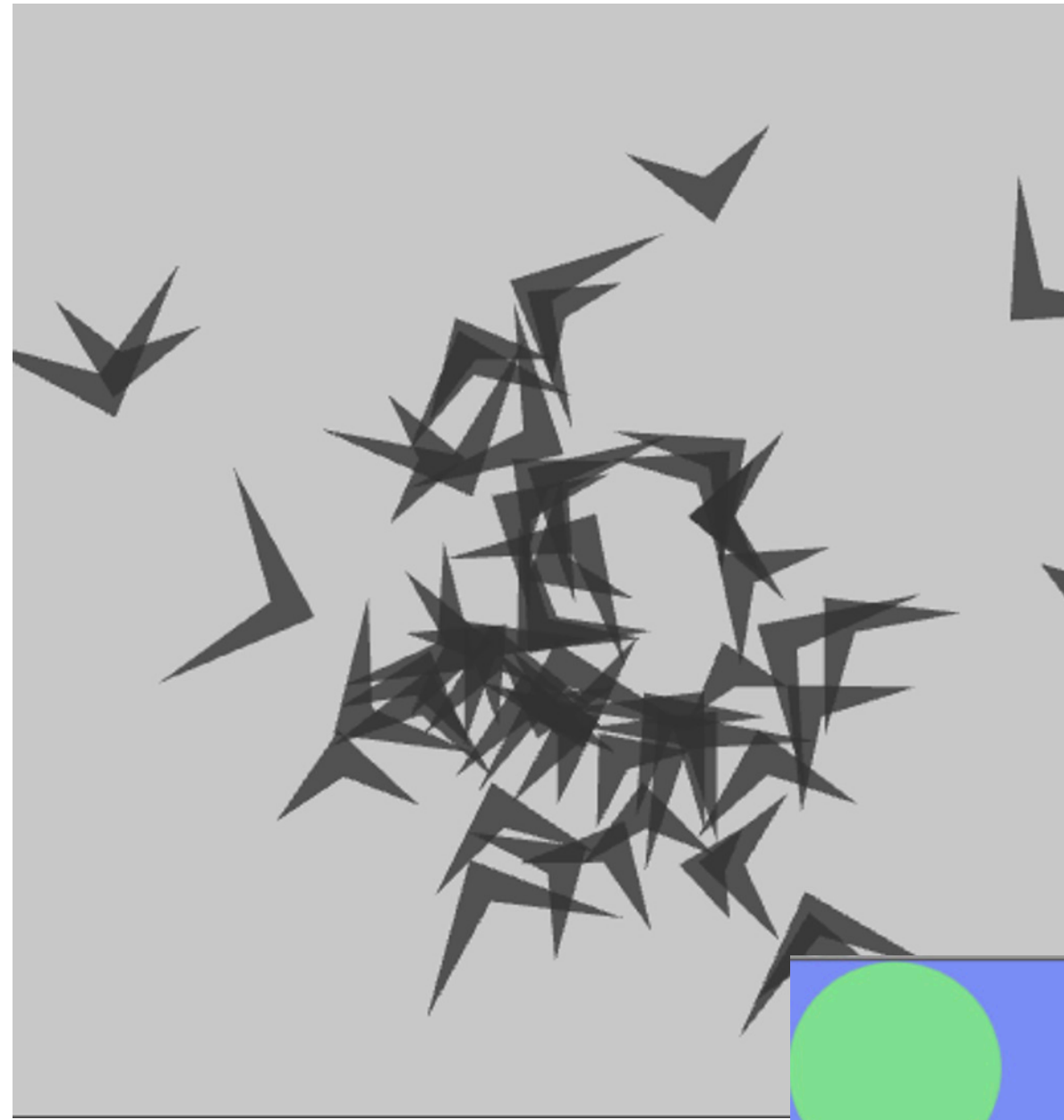
- *Generative art refers to any art practice in which the artist uses a system, such as a set of natural language rules, a computer program, a machine, or other procedural invention, that is set into motion with some degree of autonomy, thereby contributing to or resulting in a completed work of art. (Galanter 2003)*
- *In G-art, (df.) the artwork is generated, at least in part, by some process that is not under the artist's direct control. (Margaret A. Boden & Ernest A. Edmonds, 2009)*



Path from MICROIMAGE, 2001 - 2004 (Casey Reas)



Reflection Studies (Zach Lieberman, 2016)



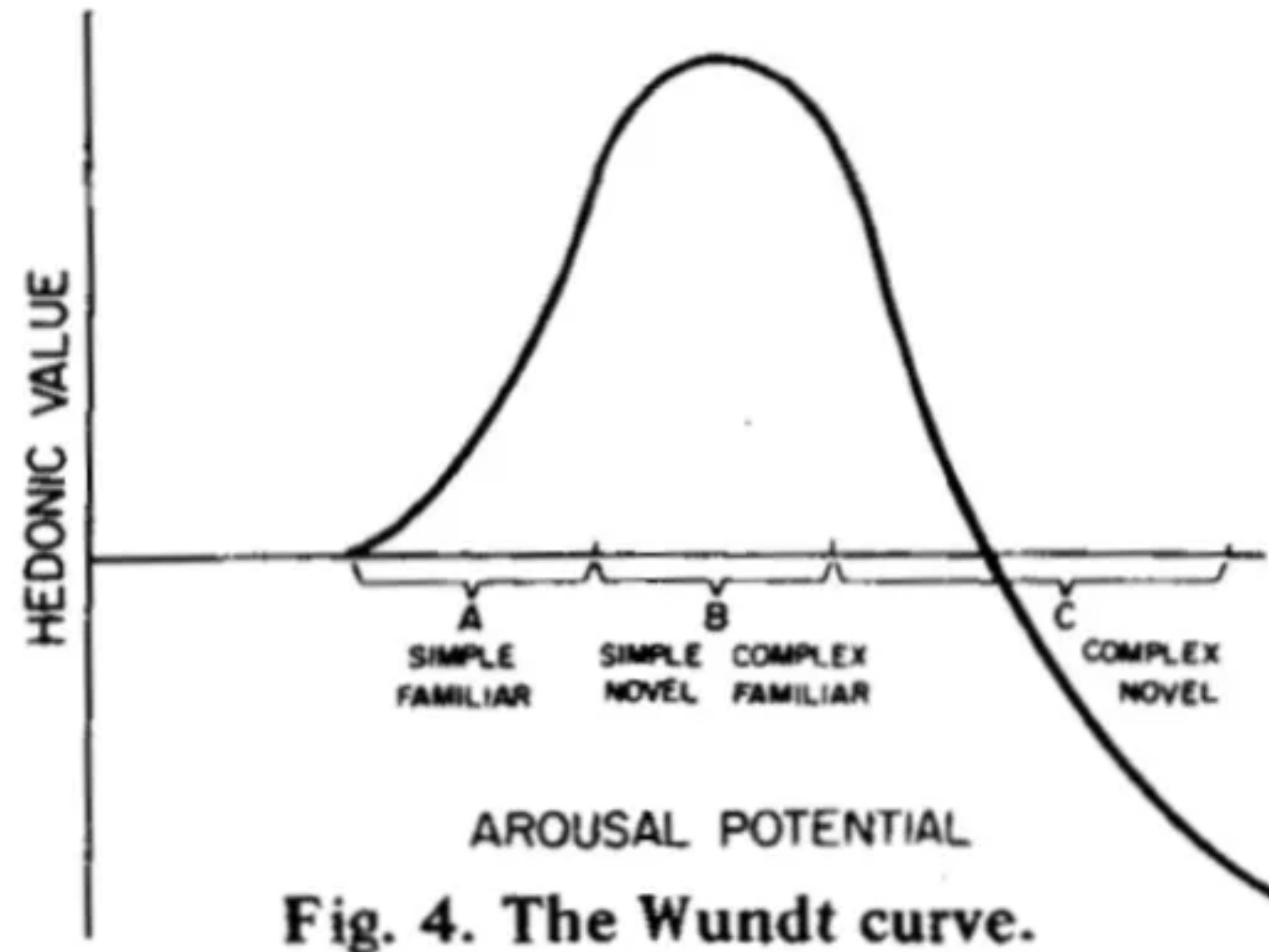
2021

Generative Art Strikes Gold

2025

Generative Art in Crisis

Is it Interesting?



Ó Nuanáin et. al. (2015). Target-Based Rhythmic Pattern Generation and Variation with Genetic Algorithms. *In Sound and Music Computing Conference 2015.*

Andersen, Kristina, and Peter Knees. "The dial: Exploring computational strangeness." *Human Factors in Computing Systems*. 2016.



Oneiric imagination through painting and Cinema Hybridisation (Brían Crotty, 2025)

What about music?

- <https://www.udio.com/library> (2025)
- https://soundcloud.com/openai_audio (2020)

Small Data is...

1. Efficient
2. Ethical
3. Explainable
4. Expressive
5. Authentic
6. Interesting

Concert 2 - July 5th, 12h00

wood, metal and tension - for violin and electronics
Cárthach Ó Nuanáin (Cork School of Music)

This piece continues a cycle of compositions known as *Materials* that explores the interaction between acoustic instruments and real-time analysis and intelligent organisation of timbres using concatenative synthesis. In a process that is antithesis and antagonistic of Big Data, I am fascinated by the seemingly endless sound shapes and sonic events that can be squeezed out of smaller, intimate collections of carefully-curated sounds through selection and myriad post transformations that render the original unintelligible.

The piece is built around the *Deacon* [<https://github.com/carthach/deacon>] instrument where collections of sound samples are loaded into a Max/MSP device that segment the samples by onset times then analyse their spectral, timbral and perceptual characteristics. The device can then listen to live input and select and play the closest matched samples using those timbral fingerprints.

The instrument was conceived for my acousmatic piece *Sem Cordas*, selected as a highlight work of the International Computer Music Conference in 2021 [<https://artes.uc.cl/noticias/concierto-presenta-las-mejores-obras-musicales-en-formato-acusmatico-y-audiovisual-de-la-icmc-2021/>]. I first experimented by recording long improvisations with a detuned Irish tenor banjo, exploiting the sharp attacks to create curious collisions of sounds with the computer. Hours of material was then edited down to form the cohesive piece I was satisfied with.

Since then I have elaborated instrument and technique to enable live performance with other instrumentalists. This brought with it significant challenges. The instrument needed to be refined to be less chaotic, more controlled and efficient in its role as automaton accompanist. A notation system was devised using MuseScore and Inkscape to engrave graphic scores to help human performers navigate a piece. This culminated in *metal and air* for flute and electronics - first performed in 2022 [<https://soundcloud.com/carthach/metal-and-air-flute-and-electronics>].

wood, metal and tension for solo violin and electronics renews a focus on mechanical and digital materiality. The corpus of sound curated is thematically related to the physical qualities of the violin, and includes recordings of wooden string-based instruments like the bouzouki and fiddle along with metallic impacts, scrapes and other electronic noises from sampled sources and synthesisers.

The piece is divided into 4 sections according to the electronic material that responds to the violin player's performance.

Section A is mostly percussive, noisy electronics with corresponding extended techniques for the violin. Section B contains more coherent pitched material for both electronics and violin. Section C combines material and approaches from A and. Section D concludes with dissipating harmonics coupled with bouzouki samples.

Sound spatialisation of the electronic sources is achieved using the E4L open-source tools for Ambisonics 3D panning [McArthur, Angela, et al. "A survey of 3D audio through the browser: practitioner perspectives." 2021 Immersive and 3D Audio: from Architecture to Automotive (I3DA). IEEE, 2021.]. This allows flexible deferral of final speaker configuration to the point of performance.

Vítor Vieira (ESMAE), violin



SMC2024 / 4-6 July

ESMAE, Porto, Portugal

wood, metal and tension

for violin and electronics

(Anonymised)



