DOOM

ON MUSHROOMS

A CURIOUS COLLECTION OF METAPHORS, SPECULATIONS, AND COMPARISONS BETWEEN THE ORGANIC AND THE DIGITAL

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Introduction

As I delve into the realm of lexicons entwined with the fusion of nature-inspired words and technological jargon, I find myself pondering the reasons behind our inclination to employ bio-inspired vocabulary in describing mineral and non-organic aspects of technology. It brings forth an intriguing question: What motivated us to portray technological entities as living organisms through metaphors?

In my exploration of this phenomenon, I have meticulously curated an array of terminologies that possess dual meanings, demonstrating the metaphorical interplay between the organic world and the evolution of computation. This selection encompasses species, projects, technologies, and elements of digital culture, shedding light on how nature has influenced and shaped the trajectory of computational advancements. Among these connections and inspirations, we encounter an unconventional instance where the infamous video game DOOM intertwines with the concept of fungal computation. This unconventional association offers a lens through which we can understand the mutual influence of the organic and digital domains.

Metaphors play a pivotal role in comprehending the multifaceted nuances embedded in both natural and technological vocabulary, providing us with a conceptual framework to interpret the world surrounding us.

This paper endeavors to delve into the metaphorical relationship between the organic and the digital by examining diverse examples and shedding light on the implications of metaphors in etymology, extending our understanding beyond the conventional boundaries of technological discourse.

Screenshot of reddit comment by user WackyWocky

"The year is 2025. Someone has DOOM running on fucking mushrooms."

It may not yet be the year 2025, but we're getting closer to seeing DOOM run on mushrooms.

DOOM is an iconic first-person shooter released in 1993 by id Software for MS-DOS devices. As one of the most notable games from video game history, it sold an estimated 3.5 million copies by 1999, and by 1995, it was estimated to have been installed on more computers globally than Microsoft's then-recent computing system Windows 95. It was so much more popular in fact that Bill Gates created a promotional video using DOOM to promote the sales of Windows 95 as a platform for playing the video game.

Part of what contributed to DOOM's prolific success was the flexibility of the gaming engine that it was built on. With the diversity of proprietary software at the time, id Software found porting its previous games to multiple systems to be difficult and time consuming. This led to them building the gaming engine for DOOM in a way that it could be easily ported to as many devices possible. In 1997, only four years after the game was launched, id Software did the unthinkable: they released the base code of the game to the public.[1]

The notion of releasing the source code of a highly popular game so soon after its launch was unheard of at that time. However, id Software's

1 Kotzer, Zack. "A Catalogue of All the Devices That Can Somehow Run "Doom."" Vice, 8 May 2016, www.vice.com/en/article/qkjv9x/a-catalogue-of-all-the-devices-that-can-somehow-run-doom. Accessed 13 May 2023.

audacious decision had the desired outcome of ensuring DOOM's longevity for decades to come. The portability of the game's source code has spurred the creation of numerous community-driven source ports. Its accessibility has fostered a dedicated community of modders who share a common goal: to make DOOM run on virtually any platform imaginable. Rick, a passionate supporter of the game, maintains a Tumblr blog named "It Runs Doom!"[2] that showcases remarkable examples of modders running the game on a wide range of devices, including everything from an old Nokia phone to a Peloton exercise machine.

If we live in a world where DOOM can supposedly run on anything, could we imagine it running on, say, mushrooms? And in what other ways are the organic and digital realms potentially linked?

The reddit comment that inspired this idea was a response to an article linked to the research of Andrew Adamatzky, a professor in Unconventional Computing in the Department of Computer Science and Director of the Unconventional Computing Laboratory, University of the West of England, Bristol, UK. Professor Adamatzky is the leading researcher on a new concept of organic computing called fungal computing.[3]

Adamatzky's research focuses on studying the decentralized and adaptive behaviors exhibited by fungi, such as mycelium networks. By drawing inspiration from these natural systems, he aims to design computing architectures that exhibit similar properties. These fungal-based computing systems have the potential to offer solutions for complex optimization problems, pattern recognition, and other unconventional computing paradigms.

2 IT Runs Doom. (n.d.). [Tumblr page]. Retrieved from https://itrunsdoom.tumblr.com/page/2

3 Adamatzky, A. (2018). Towards fungal computer. Interface Focus, 8, 20180029. http://dx.doi.org/10.1098/rsfs.2018.0029

Through interdisciplinary collaboration and experimentation, Adamatzky and his team are pushing the boundaries of organic computing. They explore the potential of fungal networks to process information, adapt to changing environments, and solve computational tasks efficiently. By leveraging the remarkable capabilities of fungi, Adamatzky's research contributes to the development of alternative computing approaches that expand the possibilities of future technological systems.

If we interpret the concept of running "DOOM on mushrooms" metaphorically rather than literally, it serves as a starting point to delve into the blurring of boundaries between artificial and natural realms. This metaphor allows us to explore the potential for technology to acquire organic or life-like attributes, as well as the implications of integrating advanced technology into our organic existence. It symbolizes a concept in which technology and nature cease to be distinct entities, becoming instead intertwined and coexisting. Consequently, it compels us to scrutinize the relationship between the organic and the digital, and to contemplate the potential ramifications and advantages of such a convergence.

Why organic and digital?

Today, we are faced with the daunting prospect of the impending climate crisis and the global repercussions it entails. However, amidst this fear, we also hold onto a glimmer of hope, believing that technological innovations will ultimately come to our rescue. We have witnessed the emergence of industrial sources of "greener" energy, aimed at reducing our global carbon footprint. Individuals have joined forces, sharing strategies to minimize their own ecological impacts. This exchange of knowledge and ideas takes place through the act of typing characters into computers, perusing information on screens, and disseminating discoveries via global networks of cables. Unfortunately, the very foundation of this vast electronic communication system, the internet, relies heavily on the extraction, exploitation, and consumption of rare earth metals and plastics. These materials have had a profoundly detrimental effect on the environment due to the pollution caused by their extraction and processing.

Amidst the concerns surrounding the environmental impact of the internet's infrastructure, there are thinkers like Janine Benyus who have proposed a strategy for sustainable innovation, one that involves emulating nature through a concept known as biomimicry. In her book *Biomimicry*[1], Janine Benyus defines nine principles for innovating like nature:

1 Benyus, J. M. (1997). Biomimicry: Innovation Inspired by Nature. William Morrow.

1. Nature runs on sunlight
2. Nature uses only the energy it needs
3. Nature fits form to function
4. Nature recycles everything
5. Nature rewards cooperation
6. Nature banks on diversity
7. Nature demands local expertise
8. Nature curbs excesses from within
9. Nature taps the power of limits

These principles seem to make sense when we talk about innovating in certain fields. For example, in material design, biomimicry has been a driving force behind innovative and sustainable advancements. By studying the intricate structures and properties of natural materials, scientists and engineers have been able to create materials that possess unique characteristics and functionalities. For instance, the lotus leaf's ability to repel water inspired the development of self-cleaning surfaces that resist dirt and bacteria, reducing the need for harsh chemical cleaning agents. Similarly, the complex structure of spider silk, known for its exceptional strength and elasticity, has inspired the creation of synthetic fibers with similar properties, revolutionizing the textile industry.

In permaculture, biomimicry principles have been instrumental in designing sustainable and regenerative agricultural systems. By observing natural ecosystems, permaculturists have developed strategies that mimic nature's patterns and processes. For instance, incorporating polycultures—diverse combinations of crops—

emulates the biodiversity found in natural ecosystems, enhancing soil fertility, pest control, and resilience. Mimicking the relationships between plants, animals, and beneficial insects in nature helps create self-sustaining and efficient food production systems. By embracing biomimicry, permaculture provides a framework for cultivating food while promoting ecological balance and minimizing the use of external inputs.

In the realm of architecture, biomimicry has influenced the concept of organic architecture, where structures are designed to harmonize with nature and mimic its principles. Buildings inspired by biomimicry incorporate features such as natural ventilation systems modeled after termite mounds, which regulate temperature and airflow. The study of tree branches and veins has influenced the development of efficient distribution networks for energy, water, and other resources within buildings. Additionally, biomimetic materials that adapt to changing environmental conditions, such as responsive facades inspired by plant cells, are being utilized to enhance energy efficiency and occupant comfort.

When the discussion of applying biomimicry to the digital realm arises, we have been able to examine computational strategies in relation to how nature efficiently processes information, adapts to changing conditions, and optimizes resource utilization. Benyus touches on these ideas in her book, writing that

"Unlike the Industrial Revolution, the Biomimicry Revolution introduces an era based not on what we can extract from nature, but on what we can learn from her.…Even computing would take its cue from nature, with software that "evolves" solutions and hardware that uses the lock-and-key paradigm to compute by touch."[2]

The suggestions proposed by Benyus can be applied to how we compute, but they do not directly address *what* we compute. However, given the significant impact that the network infrastructure of the internet has on the planet, it seems restrictive to limit the application of biomimetic concepts solely to the activities occurring within these networks, without considering the networks themselves. While our current 21st-century digital technology heavily relies on silicon, can we envision an internet that is built to align with nature's principles? An internet that goes beyond minimizing its negative impact and actively strives to eliminate it altogether? An *organic* internet?

This research explores the intricate relationship between the "organic" and the "digital." To begin, let us delve into the etymology of the term "digital." Its origins trace back to the mid-15th century when it denoted something "pertaining to numbers below ten." In the 1650s, it took on the meaning of "pertaining to fingers," derived from the Latin word digitalis, which stems from digitus, signifying "finger or toe." The numerical connotation emerged from the practice of counting on fingers for numerals below ten. The modern sense of "using numerical digits" arose in 1938, particularly in the context of computers operating on digit-based data (as opposed to analog) following 1945. Today, we define the term "digital" as either "(of signals or data) expressed as a series of the

2 Benyus, J. M. (1997). Biomimicry: Innovation Inspired by Nature. William Morrow.

digits 0 and 1, typically represented by values of a physical quantity like voltage or magnetic polarization" or "relating to a finger or fingers." Over the centuries, we observe a transformation in its definition, which nevertheless remains influenced by the constraints imposed by human biology, specifically the limited number of fingers we possess. As "digital" became associated with technology, we incorporated the constraint of computer communication through binary code—namely, the use of 1s and 0s—into its definition.[3] It is this final definition of the word "digital," meaning "using or relating to computers and the internet" that we will use in this paper.

The term "organic" originated in the 1510s, denoting something that serves as a means or instrument. It was derived from the Latin word "organicus," which in turn came from the Greek word "organikos." This Greek term referred to things related to an organ or serving as instruments or engines, derived from "organon," meaning "instrument" (as seen in the word "organ").

The meaning of "organic" as "pertaining to organized living beings" emerged in 1778, signifying objects that possess organs. The sense of "forming a whole with a systematic arrangement or coordination of parts" was established by 1817. The specific definition of "free from pesticides and fertilizers" emerged in 1942. The field of organic chemistry was recognized from 1831 onwards. In the past, the term "organical" was used in the mid-15th century to describe things relating to the body or its organs, while Middle English had the term "organik" to describe body parts composed of distinct substances with distinct properties around the year 1400.

3 Online Etymological Dictionary. (n.d.). Retrieved from https://www.etymonline.com/

Finding metaphors in the digital and the organic

We can construct a lexicon comprising words derived from nature that possess dual meanings, intertwined with technological terminology. This observation highlights a discrepancy between the language used to describe technology as living entities and its actual technical nature. It begs the question: why did we choose to adopt bio-inspired vocabulary to characterize concepts that are inherently mineral and non-organic in nature?

A selection of vocabulary with double entendres has been curated to exemplify the metaphorical dialogue between the organic realm and the evolution of computation, and by extension, digital culture. These species, projects, technologies, and digital culture elements embody the interplay between nature and technology, shedding light on how the organic world has influenced and shaped the trajectory of computational advancements. Through these carefully chosen examples, we can delve into the connections and inspirations that exist between the organic and digital domains, revealing the impact they have on one another.

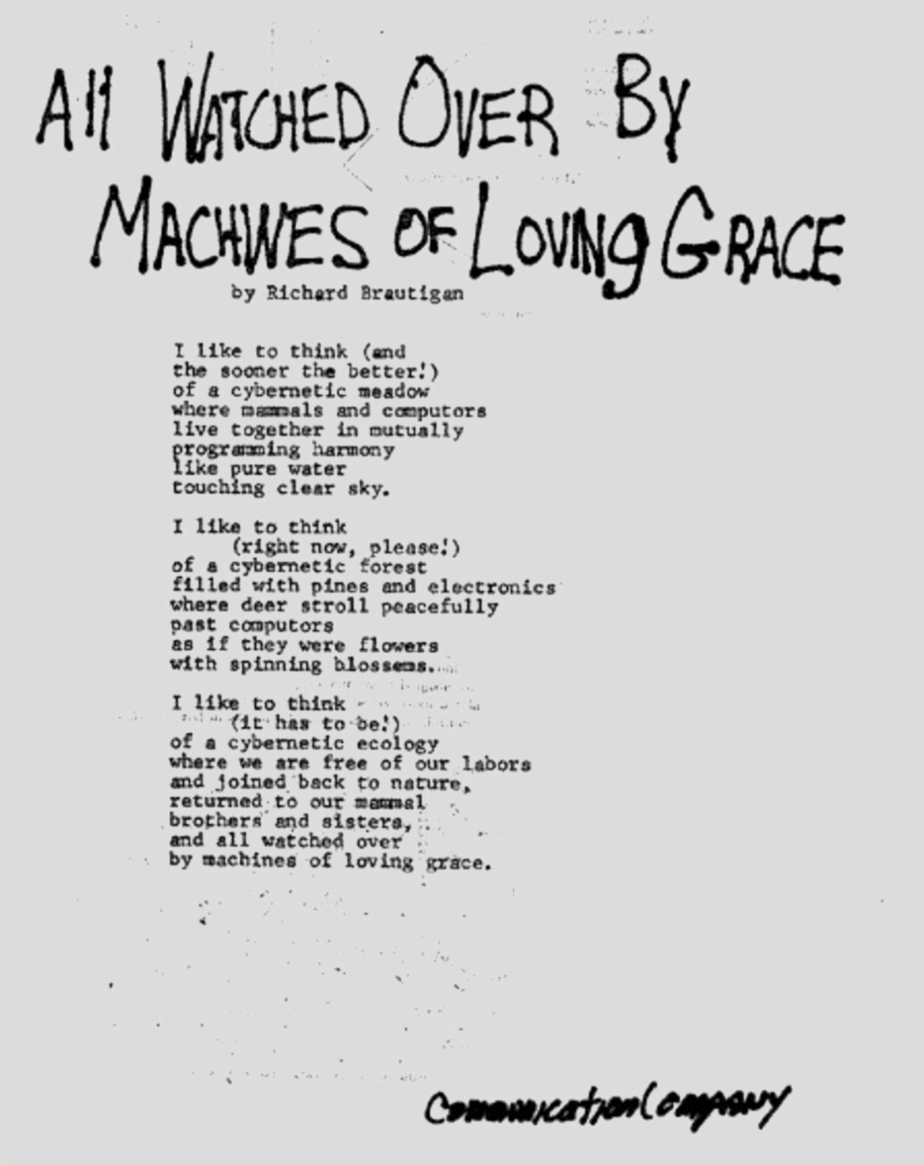
The role of metaphor is crucial in understanding the double entendres found in natural and technological vocabulary, as metaphors provide us with a framework to comprehend and interpret the world around us. Sue Thomas describes the notion of applying natural vocabulary to technological concepts as a part of *technobiophilia*, which she defines in her book *Technobiophilia: Nature and Cyberspace,* as "the innate tendency to focus on life and lifelike processes as they appear in technology".[1] She argues that digital environments can provide opportunities for engaging with nature and experiencing its calming, restorative, and inspirational qualities.

If we are to examine this metaphorical relationship between the organic and digital, a good place to start would be one of my personal favorite poems, titled *All Watched Over by Machines of Loving Grace*. It was first published in 1967 by Richard Brautigan.[2] The poem presents a vision of a harmonious coexistence between humans and machines, but it also hints at the potential drawbacks and challenges of such a relationship.

We can read the poem from two points of view: from a utopian perspective, the poem suggests a world where machines fulfill human needs and desires, providing care and protection. The phrase "machines of loving grace" evokes a sense of benevolence and compassion associated with these mechanical entities. It conveys a belief that technology can create an idealized state of existence where all human concerns are addressed by these caring machines. This utopian view reflects a longing for a technologically mediated paradise where humans are freed from labor and hardships.

However, the poem's utopian vision is not without a touch of irony. The title itself, with its reference to machines "watching over" humans, implies a loss of personal autonomy and agency.

1 Thomas, S. (2013). Technobiophilia. [Book]
2 Brautigan, R. (1967). All Watched Over by Machines of Loving Grace. [Book]


ALL WATCHED OVER BY MACHINES OF LOVING GRACE

by Richard Brautigan

I like to think (and
the sooner the better!)
of a cybernetic meadow
where mammals and computors
live together in mutually
programming harmony
like pure water
touching clear sky.

I like to think
(right now, please!)
of a cybernetic forest
filled with pines and electronics
where deer stroll peacefully
past computors
as if they were flowers
with spinning blossoms.

I like to think
(it has to be!)
of a cybernetic ecology
where we are free of our labors
and joined back to nature,
returned to our mammal
brothers and sisters,
and all watched over
by machines of loving grace.

Communication Company

Scan of All Watched Over by Machines of Loving Grace, Richard Brautigan, 1967

It raises questions about the potential dangers of surrendering control to machines and becoming passive recipients of their surveillance and governance. This hints at a dystopian undertone within the poem's metaphorical exploration.

The metaphor of being "watched over" by machines can also be interpreted as a commentary on the dehumanizing aspects of technology. It suggests a detachment from the natural world and a loss of personal connection and responsibility. The poem may be seen as a cautionary tale, urging readers to critically examine the impact of technology on human existence and to question the potential loss of human agency and connection to nature.

Reading this poem prompts us to question the underlying purpose of relentless technological innovation. Are we aiming to absolve ourselves of responsibility, in order to revert to a perceived "natural" state, and distancing ourselves from the digital realm in order to reconnect with the "organic" world? Personally, I find the imagery of forests filled with "pines and electronics" to be bordering on absurdism, but I revel in the opportunity given by Brautigan to imagine this as a possible future.

Going back to the practical applications of the principles of biomimicry as a manifesto for design practices, we can now take a moment to reflect on how the inclusion of the metaphor as a tool of reflection can enhance our understanding of the practice. While drawing inspiration from nature for innovative design can result in remarkable discoveries, viewing nature as a metaphor for comprehending the world around us is equally valuable. In an interview with DISNOVATION.

ORG, Geoffrey C. Bowker, Professor of Informatics at the University of California, Irvine, eloquently articulates this necessity:

"Michel Serres, one of my favourite French philosophers, wrote this wonderful book called The Parasite, where he says the fundamental relationship in the world is that of parasitism: it's living forms living off and living with other living forms. If we see ourselves as having parasites within us, then we too are parasitic. We live in this constant world of relationships. That's why we need the artists, that's why we need the storytellers, it's why we need the mythtellers. We need to start telling stories in new ways and we then need to tell those stories to others. I could convince you of this on paper, but it wouldn't change how you were in the world. What we need is what's called in some literature, a gestalt switch, to suddenly see the world differently."[3]

3 disnovation.org. (n.d.). Bestiary of the Anthropocene. [Book].

TERMINOLOGY

The next sections of this paper explore a few examples of the aforementioned terminologies that describe both the organic and the digital, further highlighting the intricate relationship between the two domains. By examining these instances, we can gain valuable insights into the ways in which language and symbolism shape our perception and interaction with the natural and digital worlds.

Bug

On September 9th, 1947, researchers in the Harvard lab run by Grace Hopper ran into a problem: the famous Mark II, the precursor to modern computers, was malfunctioning. The Mark II, also known as the Aiken Relay Calculator, had a problem in its relays. After some careful examination of the machine, the researchers found the culprit: a small moth. The incident is recorded in Hopper's logbook alongside the offending moth, taped to the logbook page: "15:45 Relay #70 Panel F (moth) in relay. First actual case of bug being found." The logbook, with the moth preserved with a bit of scotch tape on the page, can be found in the collection of the Smithsonian's National Museum.[1]

Although Grace Hopper was credited with the popularization of the use of the term "bug" to mean "errors in computers," we can trace back the first usage of the term to 1878 by Thomas Edison. As Hopper writes, "First actual case of bug being found" Edison's use of the term "bug" referred to a physical obstruction in a system rather than a software malfunction. In a letter dated September 15, 1878, he wrote about a technical issue with one of his inventions, stating, "It has been just so in all of my inventions. The first step is an intuition, and comes with a burst, then difficulties arise—this thing gives out and [it is] then that 'Bugs'—as such little faults and difficulties are called—show themselves and months of intense watching, study and labor are requisite before commercial success or failure is certainly reached."[2] Although Edison's

1
2

Common Gray Moth (Anavitrinella pampinaria)

Computer bug discovered by Grace Hopper on Sep 9, 1947.

usage predates Grace Hopper's, it was Hopper who popularized the term in the context of computer science and software errors, contributing to its enduring association with technology glitches.

Although the invention of the term "bug" in this context predates modern computing, it was then used to refer to faults in engineering hardware, either mechanical or electrical. The bug metaphor is now widely used beyond the realm of computers, serving as a symbol for any unexpected glitch, problem, or obstacle that disrupts the normal functioning of a system, process, or organization. It implies that even small issues or errors can have significant consequences and need to be addressed or "debugged" to restore proper functionality.

The metaphor of the bug in the machine serves as a powerful reminder of the vulnerability and intricacy of systems. It emphasizes that even the most meticulously designed processes can experience unexpected issues, necessitating careful identification, troubleshooting, and resolution. By portraying the organic actor of the bug as an adversary to the inherent functioning of technology, this metaphor highlights the potential consequences of unforeseen interactions between the two, which can result in malfunctions and death.

To provide a brief elaboration on the application of this metaphor, I have personally encountered instances where small reptiles sought refuge within technology. An anecdotal example of this occurred while I was involved in the installation of an exhibition alongside artist Dasha Ilina. We faced difficulties while attempting to install a media player, which prompted us to conduct a

more thorough investigation. To our surprise, we discovered a lizard concealed within the internal circuitry. Dasha remarked, "The bug in the machine was a lizard all along."

Lizard discovered after just escaping a media player by Dasha Ilina

DNA

While participating in an artist residency in the south of France, I had the opportunity to attend a small workshop led by Zito Tseng, a fellow artist and trained biologist. During the workshop, he taught us a simple method of extracting DNA from strawberries. With only isopropyl alcohol and glass jars at our disposal, we proceeded to mash the strawberries and separate the white viscous substance that rose to the surface, leaving behind the pink flesh.

I was truly captivated by the sight of the DNA, short for deoxyribonucleic acid, taking on a tangible form. It appeared so unassuming and delicate, gently floating within that tiny jar. It amazed me to think that the entirety of the strawberry's genetic code, encompassing millions of years of evolution and every biological decision it had ever made, was contained within that small cloud of white substance. All it took was a bit of mashing with a mortar to catch a glimpse of the materiality of evolution.

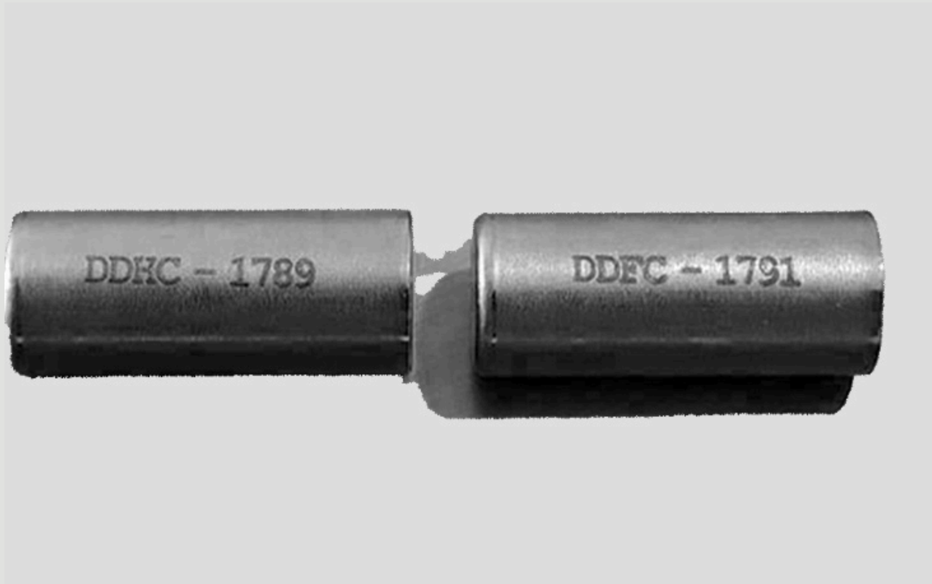
DNA (deoxyribonucleic acid) is a molecule found in the cells of all living organisms. It serves as the genetic blueprint that carries the instructions for the development, functioning, and reproduction of an organism. A process called DNA transcription is responsible for converting the genetic information stored in DNA into a complementary RNA molecule, known as messenger RNA (mRNA). This mRNA serves as a template for protein synthesis. Therefore, DNA transcription plays a crucial role in gene expression, allowing the genetic code to be translated into functional proteins that are essential for various cellular processes and the overall functioning of living organisms.

There exists a way to create this process synthetically in order to artificially write to DNA. For the past three years, biologist Stéphane Lemaire collaborated with Pierre Crozet, an associate professor at Sorbonne Université (Paris), to create a novel system called DNA Drive. This innovative approach harnesses biological mechanisms to facilitate the production and replication of data using DNA fragments. Originating in 2018 through an article on DNA storage featured in Alma Mater, a student association journal, their project, known as "The DNA Revolution," has evolved to include a diverse team of historians, philosophers, computer scientists, and archivists.[1]

The process is straightforward: binary digital data (0 or 1) is converted into quaternary data (using the four DNA nucleotides: A, T, C, and G), where A and C represent 0, and T and G represent 1 (forming a 1 bit/base code). An algorithm is employed to convert the data into DNA sequences in the DNA Drive format. These sequences are then stored, akin to how living organisms store information, within long double-helix DNA fragments known as plasmids or chromosomes. The DNA molecules in DNA Drive are designed to be manipulated by cells, such as bacteria, which can copy or produce the encoded information in this manner.[2]

The encoding process typically takes several days, while decoding can be accomplished within a few hours. The DNA Drive serves as an

1 "Data Storage: The DNA Revolution." CNRS News, news.cnrs.fr/articles/data-storage-the-dna-revolution.
2 ibid.



Capsules containing the Declaration of the Rights of Man and the Citizen, and the Declaration of the Rights of Woman and the Female Citizen encoded on DNA.

Stéphane Lemaire / CNRS – Sorbonne Université

environmentally-friendly storage solution that is durable, ecologically sound, and exceptionally compact. By storing DNA within secure metal capsules, protected from water, air, and light, the data can be preserved for thousands of years without the need for energy consumption.

A new technology like the DNA Drive offers the potential to store and retrieve vast amounts of data within a compact biological capsule. However, instead of viewing the relationship between synthetic and biological storage as a metaphorical comparison, it raises crucial questions about the nature of the data we consume, store, and transfer. Why do we accumulate such large volumes of data? What types of data do we choose to store? And who has the authority to access and control this data?

While the concept of replacing energy-intensive server farms with small DNA storage biocapsules appears promising, it doesn't address the fundamental question of why there is such a tremendous demand for data in the first place. Artists like James Bridle challenge the demand for vast amounts of data and its environmental impact through projects like "Server Farm."[3] By creating physical installations that visualize the scale of server farms, which power our digital infrastructure, Bridle raises awareness about energy consumption and prompts critical reflections on data storage and processing. The project also explores broader societal implications, such as data privacy, surveillance, and the commodification of personal information. Through visualizing server farms and

3 "Rebooting the Server Farm." Serverfarm.jamesbridle.com, serverfarm.jamesbridle.com/reboot/. Accessed 13 May 2023.

encouraging contemplation of data collection and surveillance, Bridle fosters critical awareness of the implications and potential misuse of personal data.

Projects such as "Grow Your Own Cloud"[4] also raise questions about the ownership and energy consumption associated with online data. By exploring alternative data storage methods that involve living organisms, these projects challenge the notion of centralized ownership and control over personal data. Additionally, they prompt discussions about the environmental impact of traditional data storage systems and encourage us to consider more sustainable and decentralized approaches to managing and storing our digital information.

By reimagining the relationship between individuals, data, and the environment, initiatives like "Grow Your Own Cloud" push us to critically examine the current data ownership models and energy-intensive practices in the digital realm. They invite us to envision new paradigms where data ownership is decentralized, energy consumption is minimized, and individuals have greater agency over their personal information.

While the DNA Drive offers a compact and environmentally-friendly storage solution, it is crucial to examine the underlying reasons for our immense data demand. Artistic endeavors around the subject encourage critical reflection and envision alternative paradigms for data ownership and energy consumption in the digital realm.

4 "Grow Your Own Cloud." Grow Your Own Cloud, growyourown.cloud/about/. Accessed 13 May 2023.

Mouse

Late one summer night, I woke with the feeling of something moving on the back of my hand. Still half asleep, I opened one eye slightly — behind my hand there was the faint LED glow from my phone charger illuminating a small black silhouette perched on my knuckles. My groggy brain initially perceived this to be the pill-shaped case for my bluetooth headphones, it was approximately the same size and weight, but then I remembered why I had woken up: *it had moved.*

The shock that there was a tiny creature crawling on me in my sleep sent me into panic mode, and I jumped up, screaming and flailing my arms every which way in an attempt to fling it as far away from me as possible, and to rid myself of the tactile memory of small paws on my skin.

Yes I had a mouse problem, like many habitants of dense European cities, and it seems as though they are utterly impossible to get rid of. A plethora of products exist in order to deter mice from entering your home, and to kill the small intruders if they do: sprays, traps, poisons, even ultrasonic devices that output frequencies between 20hz and 60hz that are supposedly bothersome to the mice. Plenty of other strategies exist as well: patch up all the holes leading outside, don't leave crumbs and seal your food in glass bins, even putting out peppermint oil is supposed to deter them. I can say from personal experience that I have tried them all, and found that only solution that worked was moving.

I hate mice. Waking up with a small mouse on my hand was a traumatic experience. However,

Dead mouse

on a larger social scale, we seem to all harbor some sort of disdain for the creature. Historically, there is merit to it: mice are tiny, furry disease carriers, known to harbor illnesses such as Hantavirus and Salmonellosis. While it is true that mice are often associated with being disease carriers, it is important to note that not all mice carry harmful pathogens, and many can coexist with humans without posing significant health risks. However, the historical association between mice and disease transmission has perpetuated a negative perception of these small creatures. This deep-seated aversion can be traced back to times when mice infestations were more common and posed a threat to human health and food supplies. However, they aren't inherently aggressive, and are objectively cute, which leads me to beg the question: why else do we dislike mice?

In a 1991 discussion between artists Mark Dion and Alexis Rockman, Dion mentioned that *"..we are both fascinated by this issue of r-selected species [such as weeds, insects or small rodents whose chief defense against unstable environments is rapid reproduction rather than adaptation]. I imagine this is because these animals and plants have a direct relationship to the theme of extinction.."*[1] Essentially, the presence of large mouse populations serves as a stark reminder of the potential consequences of environmental instability. Their ability to rapidly reproduce, rather than adapt, suggests a reliance on sheer numbers as a defense mechanism against unpredictable conditions. When we observe an abundance of these species, it serves as a haunting signal of our underlying fears: the looming collapse of ecological systems and the loss of biodiversity.

Moreover, delving into the origins of the word "mouse" sheds light on its dual connotation as a small rodent and a technological device, revealing an intriguing linguistic progression. The origin of the word "mouse" comes from the Middle English mous, from Old English mus meaning "small rodent." However, starting in 1965, the technological definition of the word "mouse" was introduced, meaning a "small device moved by the hand over a flat surface to maneuver a cursor or arrow on a display screen" though the word was applied to other things resembling a mouse in shape since 1750, mainly in nautical use.[2]

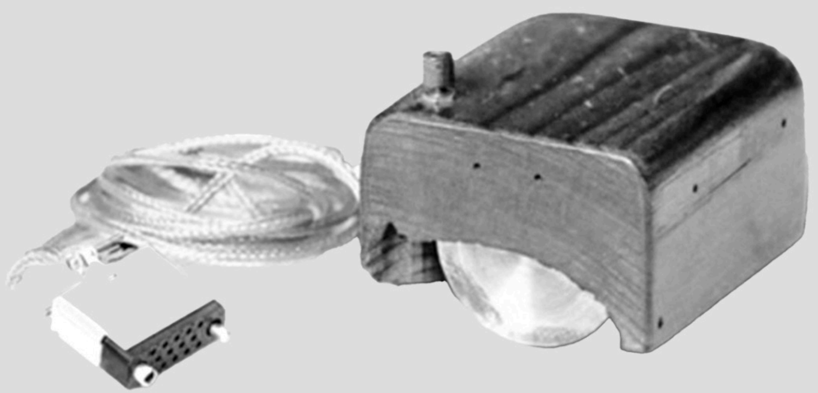
How did the word "mouse" come to encompass both a technological object and a small furry rodent in its semantic evolution? The connection between the two stems from the physical resemblance and movement of the early computer input device to that of a mouse. The first computer mouse, as we know it today, was developed in the 1960s by Douglas Engelbart and his team at the Stanford Research Institute.[3] The form of how we know computer mice today has come far from its first prototype, which was cubical in form and made from wood.

This early prototype had a small device with a cord attached, resembling the shape of a rodent with a tail. The mouse as a computer input device gained popularity in the 1980s with the advent of personal computers. As this technology became

1 Mark Dion and Alexis Rockman, extract from conversation, Journal of Contemporary Art (Spring/Summer 1991); 6-8.

2 "Organic." Etymonline, n.d. Web. https://www.etymonline.com/word/organic?ref=etymonline_crossreference#etymonline_v_7140.

3 Greenemeier, Larry. "The Origin of the Computer Mouse." Scientific American, 18 Aug. 2009, www.scientificamerican.com/article/origins-computer-mouse/.



Engelbart's mouse, courtesy of the Smithsonian Institute

more widespread, the term "mouse" became a standard way to refer to this pointing device across the industry. This linguistic adaptation is an example of how metaphor and analogy can shape language, as the mouse's physical characteristics and movements were reminiscent of those of the small rodent, leading to the adoption of the term for the computer peripheral.

As a response to Dion's earlier remark, Rockman stated *"I view the r-selected species as symptomatic of Western intolerance and arrogance. It's surprising to think that most of the species synonymous with American history were deliberately introduced by Europeans. The horse, the pig, and cattle all outcompeted the indigenous species. There is, of course, an even darker side to the equation. With the Europeans came a host of freeloading inquiline species: rats, roaches, European sparrows. It's like the return of the repressed: no matter how controlled or controlling, there is always a fly in the ointment."*[4]

It is intriguing to contemplate the mouse in this dual capacity, both as a small rodent and as a symbol of control in technology. As Rockman and Dion describe, the mouse represents an uncontrollable manifestation of our attempts to domesticate nature. While we strive to regulate nature to meet the demands of agricultural industrialization through biodiversity homogenization, we struggle to manage mouse populations effectively. Conversely, the mouse as a technological tool is entirely designed to be within our control. It rests in the palm of our hands and serves as a conduit between our physical gestures and the digital realm we engage with.

4 Dion and Rockman, 6-8.

Conclusion

In conclusion, this exploration has delved into the metaphorical connections between the digital and organic realms, serving as an exercise for me to reconcile my comprehension of their interconnectedness. Nature, on one hand, can serve as a wellspring of inspiration for the development of novel technologies. Simultaneously, it can function as a lens and a reference point, aiding us in comprehending the world in which we exist, much like our own technological creations can serve as tools to enhance our understanding of the organic world.

Glossary

Branch

- a part of a tree which grows out from the trunk or from a bough

- a control structure in which one of several alternative sets of program statements is selected for execution.

Cloud

a visible mass of particles of condensed vapor (such as water or ice) suspended in the atmosphere of a planet (such as the earth) or moon

- Something that obscures or blemishes

- Make (a matter or mental process) unclear or uncertain; confuse

- Make or become less clear or transparent

- The computers and connections that support cloud computing

Digital

mid-15c., “pertaining to numbers below ten;” 1650s, “pertaining to fingers,” from Latin digitalis, from digitus “finger or toe”. The numerical sense is because numerals under 10 were counted on fingers. Meaning “using numerical digits” is from 1938, especially of computers which run on data in the form of digits (opposed to analogue) after c. 1945. In reference to recording or broadcasting, from 1960.

Lifespan

- the length of time for which a person or animal lives or a thing functions

Mouse

- a small rodent that typically has a pointed snout, relativelylarge ears and eyes, and a long tail

- a small handheld device that is dragged across a flat surface to move the cursor on a computer screen, typically having buttons that are pressed to control functions

Root

- the part of a plant which attaches it to the ground or to a support, typically underground, conveying water and nourishment to the rest of the plant via numerous branches and fibers

- a user account with full and unrestricted access to a system

Stream

- Computing: a continuous flow of data or instructions, typically one having a constant or predictable rate.

- a continuous flow of video and audio material transmitted or received over the internet.

- a small, narrow river: a perfect trout stream.

- a continuous flow of liquid, air, or gas: Frank blew out a stream of smoke | the blood gushed out in scarlet streams.

Tree

- a woody perennial plant, typically having a single stem or trunk growing to a considerable height and bearing lateral branches at some distance from the ground.

- a thing that has a branching structure resembling that of a tree.

• (also tree diagram) a diagram with a structure of branching connecting lines, representing different processes and relationships.

Virus

- an infective agent that typically consists of a nucleic acid molecule in a protein coat, is too small to be seen by light microscopy, and is able to multiply only within the living cells of a host

- a piece of code that is capable of copying itself and typically has a detrimental effect, such as corrupting the system or destroying data

Web

-a network of fine threads constructed by a spider from fluid secreted by its spinnerets, used to catch its prey.

- a complex system of interconnected elements: he found himself caught up in a web of bureaucracy.

• (the web or the Web) the World Wide Web or the internet: material downloaded from the web | [as modifier] : web publishing.

- a membrane between the toes of a swimming bird or other aquatic animal.

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