Datamorphism: Exploring Artistic Perspectives on the Other-Than-Human World Beyond Anthropomorphism

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Abstract

Limited comprehension of other-than-human beings often leads to the anthropomorphisation of these entities, such as animals, in fictional narratives. This paper introduces the concept of "datamorphisation" as an alternative perspective. Datamorphisation involves integrating real-world data into the representation of non-human entities, offering a new framework for understanding them. The paper outlines the criteria that define datamorphisation and examines an exemplary artwork featuring data-driven representations of non-human beings. The analysis demonstrates that datamorphisation both simplifies and broadens our understanding of these entities, providing a counterbalance to anthropomorphism.

1. Introduction

In our exploration of other-than-human entities, the tendency to anthropomorphize—attributing human traits to non-human entities—can obscure our understanding. This inclination, prevalent in both everyday life and fictional narratives, simplifies complex organisms and systems by filtering them through a human-centric lens. However, as technology evolves, new methodologies are emerging that offer different forms of representation and interpretation of the other-than-human world. One such methodology, introduced in this paper, is "datamorphisation."

Datamorphisation expands upon anthropomorphism by integrating real-world data into the representation of non-human entities within fictional or artistic contexts. This concept challenges the anthropocentric perspective by allowing data—often seen as objective and factual—to shape the portrayal of non-human beings. In doing so, datamorphisation not only provides an alternative framework for understanding but also invites reconsideration of how these entities are perceived and engaged with in both scientific and creative domains.

This paper outlines the mechanics of datamorphisation, establishing criteria that define its use and potential impact. An exemplary artwork will be examined to illustrate the practical application of datamorphisation, demonstrating how data can inform and transform the representation of non-human beings. Ultimately, this analysis argues that datamorphisation offers a more nuanced and expansive understanding of the non-human, serving as a counterbalance to the limitations imposed by anthropomorphic interpretation.

2. Anthropomorphism

2.1. Defining Anthropomorphism

Anthropomorphism can be defined as "[t]he attribution of human traits, motivations, and persona-like qualities to nonhuman animals and/or inanimate objects" [Dol17]. The term "anthropomorphism" originated in Greece, where it was negatively connoted as the attribution of human attributes to gods [dW99]. In the context of non-human entities, various forms of anthropomorphism exist. "[A]nthropomorphism can take two main forms: one that inaccurately applies exaggerated human characteristics to nonhuman animals and inanimate objects, and another where it is used as a critical tool to investigate and construct a framework for understanding both humans and nonhuman animal species" [Dol17].

Thus, viewing anthropomorphism solely as positive or negative is overly simplistic. Critics argue that anthropomorphising non-humans imbues them with agency they do not possess—this perspective often places humans at the top of an intelligence hierarchy, degrading non-humans the further they are from us evolutionarily [dW99]. This view can lead to "anthropodenial": "the a priori rejection of shared characteristics between humans and animals when in fact they may exist" [dW99].

2.2. Anthropomorphism in Art

Anthropomorphism has played a significant role in art and religion [Sil16] [GVCP24] [Hol16]. In stories, other-than-humans are often used as symbolic representations, such as animal doubles serving as reflections in Norse mythology [R4] or to teach moral values in children's books [Dol17]. The most prevalent form of anthropomorphism in contemporary stories involves attributing human voices and psychology to animals, as seen in films like *Finding Nemo*, *Paddington Bear* or *Ratatouille*.

Anthropomorphism is central to our understanding of other-than-humans, yet it also reflects the limitations of our human perspective. As embodied beings, we may never fully grasp what it is like to be another species, as illustrated in Thomas Nagel's thought-provoking essay on the subjective experience of a bat [Nag74]. While some degree of anthropomorphism may always be present in our attempts to understand non-humans, contemporary artists are challenging this anthropocentric view by emphasizing the "otherness" of non-human beings.

Harnessing the power of science and data, the experiential art collective *Marshmallow Laser Feast* creates works that allow audiences to experience the sensory *Umwelt* of various creatures and plants [Fea24]. Their work draws on the concept of *Umwelt*, introduced by German biologist Jakob von Uexküll, which posits that each living being has its own subjective perception of the world based on its physiology [Sch19]. Through scientific research, *Marshmallow Laser Feast* has created experiences that offer speculative glimpses into the perception of a mosquito, an owl, or a tree. These artistic explorations are not meant to simulate the actual experience of being another species but rather to raise awareness of the distinct perspectives of other-than-human entities.

3. Introducing Datamorphism

3.1. The Role of Data

The omnipresence of data in our current times is undeniable: "[d]ata are everywhere and piling up in dizzying amounts" [GJ13]. While data typically describe phenomena, they are increasingly prescriptive, influencing what we see online, who we date, and the policies governments adopt.

The rise of Artificial Intelligence (AI), a prominent technology of the twenty-first century, is driven by the vast amount of data available. Our increasing reliance on data hinges on our perception of what data is: "[a]t first glance, data are apparently before the fact: they are the starting point for what we know, who we are, and how we communicate. This shared sense of starting with data often leads to an unnoticed assumption that data are transparent, that information is self-evident, the fundamental stuff of truth itself. If we're not careful [...] our zeal for more and more data can become a faith in [...] their objectivity" [GJ13]. This "unnoticed assumption" shapes the way we think about conclusions drawn from data. Statements are often deemed credible if supported by data. But what exactly are data?

In computing, data can broadly be considered machine-legible representations of real-world phenomena. Lev Manovich suggests that representing a phenomenon with data involves three crucial decisions: "[w]hat are the boundaries of this phenomenon?", "[w]hat are the objects we will represent?", and "[w]hat characteristics of each object will we include?" [Man19]. Therefore, data are not neutral, all-encompassing representations that are merely "found" by scientists but generated representations based on assumptions about a subject. Given that data are often perceived as "the fundamental stuff of truth itself" [GJ13], how are artworks perceived that rely on data? What is data art?

3.2. Data-art

At first glance, data might seem unfit for artistic expression. Data are typically used in scientific contexts to support arguments, while art is often associated with the ephemeral and immeasurable. Data visualization blurs the lines between art and information design, often falling more within the latter category. In data visualizations, aesthetic choices serve to make the data understandable, with artistic considerations becoming secondary.

However, what if data were treated similarly to paint, clay, or sound? In her Ph.D. thesis, Julie Freeman defines data as an art material [Fre18]. She argues that "data can help illuminate and make sense of things we cannot see, feel, or hear with our human senses," making it a medium that allows artists to explore the world.

If we consider the work of a painter as arranging paint in a particular way on a surface, then the work of a data artist might involve translating data in a way that renders them perceptible. In this paper, I rely on Freeman's definition of data art as "[t]ranslations of digital data to create cognitive, physical, and/or sublime artworks."

Perhaps a reason data isn't widely considered an art material is its formlessness. Traditional art forms like painting and sculpture are inherently visual, while music directly results in perceptible sound. Unstructured data, however, is often just a collection of numbers, offering little sensory stimulation. But just as a photograph of a forest can be considered both artistic and informative, so too could a dataset describing the movements of a fox in that forest, provided it is presented in a way that engages the audience's senses. Lev Manovich succinctly puts it: "How is a data representation of some phenomenon or process different from other kinds of cultural representations humans used before?" [Man19].

In this paper, I argue that there are, in fact, no fundamental differences between data representations and other representations. Photographs and other cultural representations are as constrained by human assumptions as data representations. The key, of course, is how the data is represented - be it through visualisation, sonification or other means that are humanly perceptible.

3.3. Defining Datamorphisation

To understand how art that uses data from the other-than-human world introduces a layer beyond anthropomorphism—what I refer to as datamorphisation—we need to grasp what data offers and how it influences our interpretation of an artwork.

Data provides insights into the behaviors and processes of other-than-human beings that our senses alone cannot perceive. The ICARUS project (*International Cooperation for Animal Research Using Space*), initiated by the Max-Planck Gesellschaft, collects extensive data on animal movements. By using trackers attached to animals, satellite technology, and contributions from citizen scientists, the ICARUS project compiles this data in the *Movebank* database. While the project's framework is designed by humans, the data itself reflects the animals' movements and the technology used to record them. Technology allows us to collect data on phenomena we cannot directly observe.

Technology not only captures data on observable phenomena

(such as bird flight) but also on those beyond our sensory capabilities. For example, technology enables us to record the electric signals of plants and measure the bacteria in our guts. Movements invisible to the naked eye become visible, providing us with new information.

It is not only the types of phenomena technology reveals but also the sheer quantity: trillions of bacteria become observable. Data, with its qualitative and quantitative breadth, transcends anthropomorphic perspectives, offering a new lens through which to view the other-than-human world.

In this context, datamorphisation refers to attributing traits, motivations, internal states, and perceptions to other-than-human phenomena based on their representation through data. While anthropomorphism involves projecting traits based on human experiences, datamorphisation involves understanding phenomena through data interpretation.

Anthropomorphism often occurs subtly and implicitly. For example, when narrating a story about two animals forming a friendship, I argue that we tend to project our human understanding of friendship onto the animals. When engaging with data, we might still anthropomorphise, but we may also view data as a more "truthful" representation, which can either reinforce or challenge our interpretations based on our trust in science and personal beliefs. This creates a new space for projection in our thinking. Datamorphisation is inherently subjective, influenced by individual perspectives and contexts. Several properties define datamorphisation, some of which are detailed below.

3.4. Properties of Datamorphism

3.4.1. Dataset Size

Engagement with specific data, whether artistic or not, requires a dataset to focus on. A dataset is "a collection of data taken from a single source or intended for a single project" [MW]. The quantity of data collected—measured in data points—varies. A dataset might contain thousands of data points about a single insect or data on thousands of insects at a single moment. Some datasets are vast and continually expanding.

Datamorphisation becomes more pronounced with larger datasets. Data on the movements of a single animal is not significantly different from a video recording of that animal; we can relate to an individual. However, comprehending the scale of trillions of bacteria or global natural phenomena challenges our perception. As Edmund Burke's *Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful* notes, "Greatness of dimension is a powerful cause of the Sublime" [Fre18]. The enormity and vastness of datasets provide a unique perspective in data art, implying a form of "truth" that should be critically examined: "[f]rom a data visualisation angle, a work depicting a so-called 'truth' derived from a sample size of five participants will present a very different view from one based on 50,000 participants. In the latter case, the likelihood of the results being generally applicable is significantly higher" [Fre18].

3.4.2. Types of Data: Perceptible vs Non-Perceptible

The types of representations of phenomena we can create with data are plentiful. If we wish to gather data on a forest, we could decide to count the number of oak trees. Using our understanding of what an oak tree looks like, we may then walk through the forest, using our visual sense - our eyes - to discern the individual oak trees, taking a note of each tree we come across. Later, when we share our findings with others, they will be able to imagine the individual oak trees, providing they know what they look like. Data representations of phenomena that humans are able to perceive I will refer to as *data of the perceptible*.

In contrast, *data of the non-perceptible* shall refer to data representations of phenomena we are cognizant of, but unable to perceive and therefore collect without technological assistance. Through scientific discovery, we have become aware of the presence of fungi in the air [FNPDP09]. However, we cannot observe this through our senses directly, relying on technology to measure the types of fungi and the amounts present. Technology allows us to measure and become of aware of phenomena we otherwise would neglect.

Knowledge of phenomena we cannot grasp through our own senses requires a certain ability to think abstractly. One could argue that part of the widespread COVID-19 or climate change denial is to do with the complexity of these issues - one cannot see the virus or climate change directly. A translation of climate change data may affect us differently than a picture of a burning forest - even though both might be indicative of the same phenomenon, it requires different and perhaps a rarer form of knowledge to understand what is portrayed in the former. This too shapes the reception of art based on data of the non-perceptible.

3.4.3. What the Audience Knows, What the Audience Thinks - Data as Authority

As already hinted at, datamorphisation depends on the context of an audience's reception of data-art. Does an audience know that what they are experiencing is based on data? Do they understand the data that is being translated? Are they aware of the broader context of data?

Jason Salavon's "Home for Sale" images "[show] a series of realtor photos of single-family homes for sale in different cities around the U.S." [VW07] These were constructed through an averaging technique whereby the pixels of many photos of for-sale houses in different U.S. cities were averaged to create a single image per city. While viewing the images without knowledge of how they were created can be just as intriguing as viewing them with background information in mind, I argue that the potential for datamorphisation is only present in the informed reception. An informed reception opens a projection space for the viewer: knowing how the images are aggregates of photographs, a viewer can attempt to deduce meaning. Images such as "Homes for Sale, Seattle/Tacoma", which features more blues and greys than the other images in the series, hint at the cloudy weather Seattle is known for. While this deduction can also be made without knowledge of the production process, the presence of data lends the image a degree of accurateness, of authenticity and "realness," characteristic of datamorphisation.

Data lends the work a degree of authority it otherwise might not possess.

Datamorphisation is largely an explicit cognitive process where attributing traits, motivations, internal states, and perceptions to other-than-human phenomena based on data involves our understanding and judgment of the data as a meaningful representation.

3.4.4. Machine-Generated Data

Machine-generated data can be defined as "information that is the explicit result of a computer process or application process, created without human intervention." [Rou18] Data generated by taking a photograph or recording an observation involves human agency at the point of creation. In contrast, browser cache data, generated by a computer without direct human involvement, is considered machine-generated. Viewing photography as data collection, nonhuman photography exemplifies the relevance of machine-generated data in datamorphisation.

Joanna Zylinska's *Nonhuman Photography* discusses how "in the age of CCTV, drone media, medical body scans, and satellite imaging, photography is increasingly decoupled from human agency and human vision". [Zyl24] In the photography project described in the introduction of the book, the photographer James Balog documents the retreat of a glacier. By attaching microcomputers to cameras that he fastened onto rocks, he could take photographs over several years, something he couldn't do without the help of the technology in use. He created a time-lapse of the retreating glacier, with photographs generated by the computers and the cameras. In doing so, he created a representation of a glacier that goes both beyond the anthropomorphic perspective and perception of time - the resulting photographs, taken by a machine, weren't subjected to a human photographers decision on when to take the picture.

Machine-generated data arises from a collaboration between human intention and machine processes. Although humans may anthropomorphise or impose their own interpretations during the conceptualization and design of data collection, the resulting machine-generated data supports datamorphism. This is because the data is produced through automated processes that are not influenced by human perception or subjective interpretation at the moment of data creation. Consequently, machine-generated data offers seemingly a more objective, unbiased representation of phenomena, which allows for a datamorphic interpretation—one that attributes traits, motivations, and states to other-than-human entities based on their data. This separation from human bias and direct observation facilitates an understanding of the other-than-human world shaped by data, thus aligning with the principles of datamorphism.

3.4.5. Abstraction

Data-art, through its abstract representation of phenomena, can engender an appreciation for the otherness of other-than-humans, rather than reducing them to the traits (we think) they share with us. When we anthropomorphise, we reduce other-than-humans to what they share with us or we imprint this onto them outright. Datamorphism, on the other hand, allows us to think of other-than-humans beyond our anthropomorphic view with the help of technology.

3.5. Datamorphism in "The Lake" (2005) by Julie Freeman

An analysis of the data-artwork "The Lake" [Fre18] by Julie Freeman shall serve as an exemplification of the concept of datamorphism in the context of data-art of the other-than-human world.

This artwork was designed to investigate whether fish could produce music. Freeman utilized real-time data from tracking 16 fish in a lake around the clock for six weeks, which informed an abstract animation and soundscape. Each fish was assigned a set of seven environmental sound samples, recorded from both underwater and lakeside locations. The sound samples were triggered and modulated based on the fish's location, position, speed, and direction. For instance, if a fish's speed changed significantly, the corresponding sound sample's rate was adjusted. The interactions between the fish—whether they were in proximity to many others or isolated—also influenced the soundscape, creating a "complex emergent soundscape" coupled with visual effects. "The work was presented overhead in a 9m cylindrical tower, immersing the audience in an audiovisual datascape."

The dataset size - 16 fish - while not so large as to be perceived as referring to some "truth", goes beyond what is consistently observable by an individual. If just one fish leaves the viewers field of view, an observation by the viewers eyes becomes unobtainable. The "location, position, speed, and direction [...]" data collected of the fish constructs a specific and accurate representation, one that goes beyond what we can perceive. The potential to detect and project onto patterns and irregularities emerges, creating room for datamorphism.

The movement data in question falls more in the category of data of the perceptible than data of the non-perceptible. While we cannot readily observe a numerical representation of the features in question, we can observe what they represent; through our own, subjective lens.

Short of empirical evidence, pure speculation is all one can conjure regarding how an audience might position themselves to the data. As the artwork was viewed in the vicinity of the pond the fish inhabited, the authenticity of the data seems undeniable.

By translating movement data into an abstract audiovisual form, the data becomes a disembodied representation. New projections are welcomed, ones that perhaps contrast an anthropomorphising perspective on fish, in favour of a perspective informed by an understanding of data.

"The Lake" is a data-artwork created through a datamorphic lens. Rather than describing a story of fish, Freeman merely constructs a framework wherein the behaviour of fish becomes expressive. There is little if any discernible anthropomorphising on the part of the artist's choices here. The fish do a substantial part of the work thanks to data and their translation.

4. Discussion

This paper introduced the term *datamorphism* to describe the attribution of traits, motivations, internal states, and perceptions to nonhuman phenomena based on their representation through data. While *datamorphism* shares some similarities with anthropomorphism, the two concepts are distinct and do not necessarily exclude

one another. The prevalence of data and the necessity of new perspectives on the other-than-human world make defining *datamorphism* a worthy pursuit.

However, the current definition of datamorphism requires further refinement and expansion. The theoretical underpinnings, as outlined in this paper, would benefit from greater detail and elaboration. Key questions remain about where datamorphising occurs, what specific traits are projected, and what distinguishes these projections as datamorphic. These aspects are only partially addressed in this discussion.

To fully establish datamorphism as a valuable concept, further empirical research is needed. Investigating both artists and audiences will help solidify datamorphism as a concept to think with, enhancing its applicability in understanding how data art shapes perceptions of other-than-human phenomena.

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