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From Continuous to Discrete to Continuous – Text-to-Image Models as Limit to Indeterminate Phantasy

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Abstract

This essay analyses the interplay of indeterminacy and in the experience of images generated through text-to-image (T2I) models. Through an interdisciplinary approach, it uncovers three layers of indeterminacy: the computational indeterminacy inherent in text-to-image model processes, the indeterminacy of imagination in Husserl's concept of protean phantasy, and finally the visual indeterminacy that figures in meaning making in all images. Generated images pass through these stages of indeterminacy, transforming indeterminate phantasy into determined visual objects, resulting in a conflict of consciousness between potential and actual. A distinction emerges between artificial phantasy, characterized by quasi-experience, and artificial imagination, grounded in images both as training data and perceptual image objects. As mediators between indeterminacy and determination, T2I images appear as technical media that mediate multiple forms of indeterminacy, showing the circulation between phantasy and imagination, between continuous and discrete. The generated image marks the limit of the unlimited indeterminate imagination.

Keywords: AI-generated images, Husserl, Imagination, Image Theory, Indeterminacy, Media Phenomenology, Text-to-Image models.

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Introduction

The effortless transformation of imagination into image is at the centre of the hype and discourse concerning the specific type of generative AI that is text-to-image (T2I) models. Midjourney, one of the most widely used models, places this transformation of imagination at the centre of its advertising, claiming that it brings "imagination into reality," that "imagination is the only limit," and that they are "expanding the imaginative powers of the human species."[1] I want to hold the opposite of this hyperbole, that the generated image marks the limit of the unlimited indeterminate imagination. The present text focuses on some particular indeterminacies present in and around images generated through T2I models, as exemplified in the most widely used and popularised models Stable Diffusion, Midjourney and Dall-E.[2] I argue that the images these models generate are indeterminate visually and perceptually, indeterminate in relation to imagination, and produced through processes relying on the indeterminacy of computation. These models also trigger conflicting concerns and questions regarding the function, naturalness, and independence of imagination, highlighting "processes of perception and imagination."[3] T2I models are based on description. As Jay David Bolter puts it, "the image cannot exist until the text is applied to the model."[4] As a descriptive practice it carries a close connection to Husserl's phenomenology and opens up for phenomenological engagement with technology and aesthetics, computation, and images. This article is concerned with the relationship between the indeterminacy of appearance in imagination (or phantasy, a distinction we will come to) and the determined nature of computationally generated image objects, as well as the constitutive indeterminacy of images from a visual perceptual perspective. In effect, I ask from what horizon the images generated by T2I models make themselves known and show themselves, and the shifts between indeterminacy and determinacy this entails. As several indeterminacies are discussed, indeterminacy is used as a general cross-disciplinary and conceptual term, referring "to the quality or state of not being precisely determined or definitely fixed."[5]

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1 "Midjourney - Discord Servers," Discord, accessed 29 September 2023, https://discord.com/servers/midjourney-662267976984297473. "Midjourney," Midjourney, accessed 29 September 2023, https://www.midjourney.com/.

2 For a general overviews see the following surveys: Chenshuang Zhang et al., "Text-to-Image Diffusion Models in Generative AI: A Survey" (*arXiv*, 2 April 2023), http://arxiv.org/abs/2303.07909; Yihan Cao et al., "A Comprehensive Survey of AI-Generated Content (AIGC): A History of Generative AI from GAN to ChatGPT" (*arXiv*, 7 March 2023), http://arxiv.org/abs/2303.04226; Giorgio Franceschelli and Mirco Musolesi, "Creativity and Machine Learning: A Survey" (*arXiv*, 5 July 2022), http://arxiv.org/abs/2104.02726.

3 Sofian Audry, *Art in the Age of Machine Learning* (MIT Press, 2021), 70.

4 Jay David Bolter, "AI Generative Art as Algorithmic Remediation," *IMAGE* 37, no. 1 (May 2023): 203, https://doi.org/10.1453/1614-0885-1-2023-15472.

5 Aryeh Botwinick, "Interpretation and Indeterminacy," in *Indeterminacy: The Mapped, the Navigable, and the Uncharted*, ed. Jose V. Ciprut (Cambridge, MA: MIT Press, 2009), 79.

Accepting that images created through T21 models are median statistical renderings of their respective data set,[6] they can nevertheless—as a categorical process—be made to say something about the relation between human imagination and the images generated. In this sense they function as pensive images in Jacques Rancière's sense, images placed indeterminately between passive and active, and more precisely between notions of "the image as a duplicate of a thing and the image conceived as artistic operation."[7] In this way the images at hand are concrete articulations of a zone of indeterminacy between art and non-art, as well as activity and passivity. As images poised between instrumental statistical renderings or a new artistic medium, this is the very type of indeterminacy that characterises many public debates about the status of AI generated images today. Taking the integral role of technics in human becoming as a given,[8] I want to understand, as Joanna Zylinska puts it, "how humans can operate within the constraints of the apparatus that is part of us,"[9] with the generated images conceptualised as the way in which the human is plugged into the technical apparatus. This is also a way to approach Bernard Stiegler's claim that perception is subordinated to imagination, that "there would be no perception outside imagination, and vice versa, perception then being the imagination's projection screen."[10] For Husserl, as we will see, this is reversed; imagination is perception of a groundless imageless object. Rather than discussing AI generated images from the standpoint of creativity as such, I will expand upon the role of imagination in the experience and perception of synthetic machine generated images, from the perspective of indeterminacy. This is a media phenomenological concern, an inquiry into what is actually visible and what actually appears in synthetic images and the role of indeterminacy in both appearance and imagination in relation to images generated by T2I models.

While I agree with definitions of algorithms as automated information production rather than instances of computational creativity,[11] T2I models are also image machines, used in the creation of ever more images circulated and encountered by us in everyday life, producing appearances given to our consciousness directly. Correspondingly, while Galit Wellner's argument for digital imagination and a layered co-creation with AI models,[12] as well as Yuk Hui's suggestion to avoid an opposition between human and machine in

6 See Hito Steyerl, "Mean Images," *New Left Review*, no. 140-141 (June 2023).

7 Jacques Rancière, *The Emancipated Spectator* (London: Verso, 2009), 107.

8 See Bernard Stiegler, *Technics and Time*, trans. George Collins and Richard Beardsworth, Meridian: Crossing Aesthetics (Stanford, CA: Stanford University Press, 1998).

9 Joanna Zylinska, *AI Art: Machine Visions and Warped Dreams* (London: Open Humanities Press, 2020), 54, http://www.openhumanitiespress.org/books/titles/ai-art/.

10 Bernard Stiegler, *Technics and Time Vol 3: Cinematic Time and the Question of Malaise*, trans. Stephen Barker, Meridian: Crossing Aesthetics (Stanford, CA: Stanford University Press, 2011), 16.

11 Anna Longo, "Computational Creativity or Automated Information Production?," *Balkan Journal of Philosophy* 15, no. 1 (2023): 13–22, https://doi.org/10.5840/bjp20231513.

12 Galit Wellner, "Digital Imagination: Ihde's and Stiegler's Concepts of Imagination," *Foundations of Science* 27, no. 1 (March 2022): 189–204, https://doi.org/10.1007/s10699-020-09737-2.

questions of artificial imagination,[13] are both useful and constructive perspectives, it is exactly the working *with* the machine that is under question here, as a process and relationship between human imagination and artificial imagination. There is a vagueness and indeterminacy in our apprehension of the *process of production*, but the question is how this extends to our aesthetic experience of the output, the generated images. Concerned with the some of the same questions as this present paper, Shane Denson argues that computational images embody an "exteriorized form of imagination. These are schemata that enable and constrain the production of concrete images today, and they therefore exercise an inestimable power in determining what, today, there is to be seen."[14] This is an important perspective, and one that I am in agreement with, but my aim here is a more granular articulation. Just as "our appreciation of art depends in part on our appreciation of the process of art making,"[15] so our experience of AI images is dependent on our conception of the process behind and within the generative model. Therefore, part of the agenda of this paper is to trace the beginnings of a differentiation between artificial phantasy as indeterminate and artificial imagination as reliant on image objects. This distinction will serve to clarify the conflict of consciousness in the use of T2I models.

In what follows I conceive of the experience of T2I models as a simplified and reduced process consisting of three distinct steps: a phantasy which is expressed as a description in text, a prompt followed by the model's process of computing and generating an image or several images from this prompt, and finally the images themselves. All these steps are marked by different types of indeterminacy. From an outline of Don Ihde's and Stiegler's concepts of imagination, Wellner argues for a notion of co-creation, where AI models and humans work in and on different layers of the process.[16] As an externalisation of memory and cognition, this aligns with the way technologies have always functioned, and recent visions of artificial creativity are only the most recent examples of human entwinement with machines.[17] As a limited aspect of this entanglement I will look more closely at the relation between imagination, computation, and images, through the lens of indeterminacy.

The first part of the article looks at computational indeterminacy as underlying condition

13 See Yuk Hui, "Imagination and the Infinite—A Critique of Artificial Imagination," *Balkan Journal of Philosophy* 15, no. 1 (2023), https://doi.org/10.5840/bjp20231512.

14 Shane Denson, "Artificial Imagination," *Cinephile: The University of British Columbia's Film Journal* 18, no. 1 (7 June 2024): 12.

15 Margaret A. Boden and Ernest A. Edmonds, *From Fingers to Digits: An Artificial Aesthetic* (The MIT Press, 2019), 91, https://doi.org/10.7551/mitpress/8817.001.0001.

16 See Galit Wellner, "Digital Imagination, Fantasy, AI Art," *Foundations of Science* 27, no. 4 (December 2022), https://doi.org/10.1007/s10699-020-09747-0.

17 Jan Løhmann Stephensen, "Artificial Creativity: Beyond the Human, or beyond Definition?," *Transformations: Journal of Media and Culture*, no. 36 (2022).

and horizon for T2I models. The second section goes on to discuss the indeterminacy of imagination as it is defined in Husserl's mature account of phantasy. The third section outlines concepts of visual indeterminacy in relation to T2I generated images. This is followed by a discussion of the tension between imagination and phantasy, the role of these models in mediating between them, and how indeterminacy is both a necessary and complex element in the process. The interchange between indeterminacy and determination shapes the viewer's experience. In the next to last section I discuss the manner of appearing of T2I images, showing themselves *as* mediators between indeterminacy and determinacy. In the final section T2I generations are considered as technical media appearances that make us aware of the horizon of the models, at the same time as they mark a limit for the potential of imagination.

Computational Indeterminacy

Conceptualising the conditions of experience for computation itself, Beatrice Fazi considers how computation requires both physical, sensible indeterminacy, as well as conceptual indeterminacy "in order to develop their full potential for actualisation."[18] Computation in her view entails and constitutes a fundamental type of indeterminacy, it is "a process of determining indeterminacy."[19] In a schematic understanding, this is what image generation models do—they are given a textual prompt and determine an absolute result of this, presented as an image output. Fazi describes computation as a process of organisation, measuring, quantification, rationalisation, and arranging the world "via logico-quantitative means."[20] The crucial part here is that indeterminacy, internal to computational processing—the determining of indeterminacy—"is inscribed into the formal and mathematical definition of an algorithmic procedure and that, as such, does not have to simulate the indeterminacies of life or lived experience."[21] In this sense it is the opposite of both imagination and image consciousness. As such, it is separated from human modes of abstraction; "there is no common phenomenological and existential ground" between human abstraction and computational abstraction.[22] They operate on different registers. This indeterminacy is representative of a strictly discrete and computational formalism, beyond human engagement. I see a paradoxical relation in the

18 M. Beatrice Fazi, *Contingent Computation: Abstraction, Experience, and Indeterminacy in Computational Aesthetics*, Media Philosophy (Lanham: Rowman & Littlefield International, 2018), 14.

19 Fazi, *Contingent Computation*, 1.

20 M. Beatrice Fazi, "Digital Aesthetics: The Discrete and the Continuous," *Theory, Culture & Society* 36, no. 1 (1 January 2019): 15, https://doi.org/10.1177/0263276418770243.

21 David Beer, "Explorations in the Indeterminacy of Computation: An Interview with M. Beatrice Fazi," *Theory, Culture & Society* 38, no. 7-8 (December 2021): 291, https://doi.org/10.1177/0263276420957054.

22 Beer, 308.

process of T2I models, where this indeterminacy and determining aspect of computation is the basic step, a passing from continuous to discrete to continuous, from indeterminate to determinate to indeterminate. Fazi describes a "deadlock between the continuity of sensation and of lived experience…and the discreteness of digital technologies,"[23] which has an analogue in T2I models. The user imagines a prompt, a sensuous perceptual object, which is processed formally and logically in the model and generated as an image, which is given to the user again as a sensuous perceptual object, given to image consciousness. I argue that it is precisely as an articulation of this deadlock that the relationship between indeterminate phantasy and determined output of a generative image model plays out. This is aesthetics then precisely as "rapport between determination and indetermination," [24] as Fazi states, but from the opposite perspective to hers. I approach this from the viewpoint of sensible human experience of the determination performed by and passing through the computational, a phenomenological perspective on the "indeterminacy of the digital discrete."[25] Digital aesthetics on this view is a formal process of computation beyond the sensible perceptual grasp of humans. T2I model generated images have passed through exactly such a process, which from a phenomenological perspective becomes part of their manner of appearing. I argue that the generated images show themselves as a circular process between indeterminacy and determination. This is a process where a conventional understanding of abstraction and concreteness is also turned on its head, as the determined image is an abstraction of the memory of the model—the data set. Fazi writes: "To be abstract, in computer science, involves moving away from the particularity of lived experience."[26] The determination of indeterminacy in computation is abstract in the sense of not relating to lived experience, as beyond the phenomenological. Computation is "an abstractive procedure of determination that always confronts indeterminacy."[27] T2I generation is in this computational sense an abstraction of indetermination, where abstraction means a generalisation as well as a reformulation of the relation between concrete and abstract. This is also true in a very concrete sense, where the task of generative models like Stable Diffusion is to determine the indeterminate, as they function by removing successive layers of noise from an image of random noise, until it matches the manifold of vectors corresponding with the text input.[28] The model clears away noise until a high-quality image is generated—it turns indeterminate noise into determined image. The generative process marks a movement from the discrete computation of vectors in latent space, to the continuous and sensible image in pixel space. The actual relations between vectors in the latent space is indeterminate—the compressed vectors

23 Beer, 292.
24 Beer, 293.
25 Fazi, "Digital Aesthetics", 20.
26 Fazi, "Digital Aesthetics," 17.
27 Fazi, *Contingent Computation*, 5.
28 Robin Rombach et al., "High-Resolution Image Synthesis with Latent Diffusion Models" (*arXiv*, 13 April 2022), http://arxiv.org/abs/2112.10752.

cannot be easily mapped to understandable features[29]—but the actual generated image is determined by seed number, iterations, and training data.

From a phenomenological perspective, I think it is productive to frame these modes as the front and back of the generated image, where the computational process forms the back, its absent side, of which we can be aware but not experience simultaneously.[30] The front of the image (object) is accessible on the screen, and can be visually contrastive and indeterminate, but more importantly the invisible back of the image consists not only of an image file, but a machine-learning (ML) model and its process, including the training data. The generated image is an abstraction of the memory that is the data set, simultaneously an abstraction and determination of the prompt, the imagined description of a phantasy object. To determine the possible implications of this passing from continuous to discrete to continuous, from indeterminate to determinate to indeterminate, we must first look closer at the step before the generative computational operation, the indeterminacy of imagination.

Indeterminacy of Imagination

Prior to the indeterminacy of the T2I model's computation is the creation of a prompt, the use of an act of imagination to conceive what the generated image should be. These descriptions function as the indeterminate translation between imagination and image. Roland Meyer argues that prompts are more than descriptions, they are operative: "They do not describe what already exists, even if only in the imagination, but are meant to produce what they describe (and what did not exist before their description)."[31] They determine the description and are determined by the description. Already in Immanuel Kant, indetermination is closely linked to imagination. For Kant, the indeterminate, as in the indeterminate use of concepts, is what sustains the free play of faculties, proceeding by association of ideas and metaphor, not following causal determinations.[32] Much later, Vilém Flusser defines imagination more simply as "the specific ability to produce and to decode images."[33] In this sense T2I models would be only partly capable

29 See Andrea Asperti and Valerio Tonelli, "Comparing the Latent Space of Generative Models," *Neural Computing and Applications* 35, no. 4 (February 2023), https://doi.org/10.1007/s00521-022-07890-2.

30 Edmund Husserl, *Logical Investigations Vol 2*, trans. Dermot Moran, vol. 2, International Library of Philosophy (London; New York: Routledge, 2001), 211.

31 Roland Meyer, "The New Value of the Archive. AI Image Generation and the Visual Economy of 'Style'," *IMAGE* 37, no. 1 (2023): 102.

32 Salim Kemal, *Kant's Aesthetic Theory: An Introduction*, 2nd ed. (New York: St. Martin's Press, 1997), 47.

33 Vilém Flusser, *Towards a Philosophy of Photography* (London: Reaktion Books, 2000), 83.

of imagination, as they can produce images, but not reliably decode them.[34] In a recent article Hui argues that "imagination is already fundamentally artificial. As is patent, the word imagination already carries the term 'image' in it, as is also the case for the word in German *Einbildungskraft*, einbilden precisely means the force of producing images."[35] In his writing on imagination, Husserl eschewed the more commonly used *Einbildungskraft*, for *Phantasie*, phantasy, which avoids associations to a view of imagination as supported by mental images.[36] Imagination in this sense is "presentation by means of an image."[37] While Stiegler sees imagination as *Einbildungskraft*, as constituted through mental images,[38] and conceives the "'objective image' as an object that serves as a basis for imagination,"[39] phantasy is a quasi-perception,[40] an act of consciousness of objects not perceived as real, and based on neither mental nor objective images. This is the nullity of phantasy, it "does not present an actually existing perception, even though it seems to."[41] The phantasy act is "experienced as a simulation of a possible perception" or a distinct "act of consciousness that constitutes a direct sensory awareness of objects, i.e., an awareness that is unmediated by images."[42]

Just as Kant's schema is opposed or in an indeterminate relation to images, so Husserl's phantasy requires no images, neither physical nor mental. It is differentiated from image consciousness, where imagination is activated and made possible with and through a material image. In phantasy, "we experience phantasms and objectifying apprehensions" [43] and nothing given to image consciousness.[44] Phantasy is for Husserl in this sense a vague and indeterminate sphere, "certainly without full determinacy."[45] It is also quasi-actual, in regard to both space and time as well as "its indeterminate world horizon, and

34 See Gabriel Pereira and Bruno Moreschi, "Artificial Intelligence and Institutional Critique 2.0: Unexpected Ways of Seeing with Computer Vision," *AI & SOCIETY* 36, (2021) https://doi.org/10.1007/s00146-020-01059-y.

35 Hui, "Imagination and the Infinite—A Critique of Artificial Imagination," 7.

36 Julia Jansen, "Husserl," in *The Routledge Handbook of Philosophy of Imagination*, ed. Amy Kind, Routledge Handbooks in Philosophy (London New York: Routledge, 2017).

37 Edmund Husserl, *Phantasy, Image Consciousness, and Memory: 1898-1925*, trans. John B. Brough, Edmund Husserl Collected Works, Vol. 11 (Dordrecht: Springer, 2005), 89.

38 Stiegler, *Technics and Time,* 3.

39 Galit Wellner, "Digital Imagination: Ihde's and Stiegler's Concepts of Imagination," *Foundations of Science* 27, no. 1 (March 2022): 199, https://doi.org/10.1007/s10699-020-09737-2.

40 Husserl, *Phantasy, Image Consciousness, and Memory*, 415.

41 Paul Crowther, *The Phenomenology of Aesthetic Consciousness and Phantasy: Working with Husserl*, Routledge Research in Aesthetics (New York, NY: Routledge, 2022), 9.

42 Jansen, "Husserl," 70.

43 Husserl, *Phantasy, Image Consciousness, and Memory*, 86.

44 Husserl conceives of image consciousness as a threefold experience constituted by the physical image, the image object and the image subject. Husserl, *Phantasy, Image Consciousness, and Memory*, 41.

45 Husserl, 387.

its own horizons of indeterminacy in the things themselves."[46] Phantasy is not bound by the form of the external world. This marks a constitutive difference to T2I generated images, as they *are* bound by the form of the world, in the sense that the training data, the images that form its world, determine the horizon of the image output. Phantasy is a profoundly indeterminate and unstable dimension, separate from perception.[47] Phantasy objects for Husserl are also indeterminate in the sense that they are protean in character, changing colour and form, presenting "something so vague, so ghostly, that it could not occur to us to posit it in the sphere of actual perception and imaging."[48] They are unclear phantoms, with undefined surface and unsteady contours. The question to ask regards the relationship between the vague and indeterminate act of phantasy, and the resulting digital image object, after a phantasy is given to a T2I model as description and prompt. Husserl's recurring example of a phantasy of a centaur is clarifying. Phantasy has an optional character, an "unconditioned arbitrariness."[49] While a perceptual object, within "the horizon of perception", has a predelineation made up of memories and expectations, a space and environment in other words, the quasi-reality of a centaur has no such fixed points or content. Imagining a centaur "that quasi lives and exists" as a phantasy object, means to accept it as a quasi-reality, "to restrict the optional character of further phantasying by means of a constant intention aimed at harmony. It means, therefore, to create precisely a world that can be a harmonious world for this centaur."[50] But this harmonious background to the phantasised centaur, "a space, a time, a surrounding world in which it exists", is nevertheless part of it only as an indeterminate horizon.[51] This is not a fixed harmony, rather a continuous eidetic variation, as phantasy objects are not bound by "the spatio-temporal and causal rules that perceived objects are subject to. They may change color, shape, location, size, etc. in an instant and for no apparent reason. They may appear and disappear without further ado."[52] Phantasy here *is* free variation, an "arbitrary process of engaging pure, irreal possibilities in an entirely open and indeterminate manner, in principle ad infinitum, requiring no cessation."[53] But, the image object that results from the input of phantasy as prompt is absolutely fixed within the causal perceptual rules of an image. The indeterminate horizon of phantasy is transformed into a determined image object, through a passing from continuous phantasy to discrete determining computation.

46 Husserl, 639.

47 See Stefano Micali, "Phenomenology of Unclear Phantasy," *Husserl Studies* 36, no. 3 (October 2020), https://doi.org/10.1007/s10743-020-09271-w.

48 Husserl, *Phantasy, Image Consciousness, and Memory*, 64.

49 Husserl, 642.

50 Husserl, 642.

51 Husserl, 642.

52 Jansen, "Husserl," 71.

53 Andreea Smaranda Aldea, 'Imagination and Its Critical Dimension', in *The New Yearbook for Phenomenology and Phenomenological Philosophy. Volume 17*, ed. Timothy Burns et al. (London: Routledge, 2019), 216.

As Husserl notes, phantasising the centaur and making "the imagining into the object of a perception are two very different things."[54]

Husserl's descriptions of phantasy appear closely related to the processes of T2I models. The quasi-world of the phantasy centaur is described as "indeterminate in infinitely many ways,"[55] but that which can make it determined is free and unrestricted, i.e. any variation is possible as long as it "corresponds to the essential style of a world horizon" and can "come together harmoniously and constitute the unity of the thing and the unitary connections among such unities." This discloses infinite possibilities, which are conceived as steps, where each step both limits and opens up "unrestricted possibilities in the same style."[56]

This integrated process of generating variations of an image in T2I models is isomorphic to the indeterminacy of phantasy, where the different variations of the phantasy can replace each other, corresponding to the way in which Husserl describes different phantasies pushing each other aside: "now I see a white-bearded and white-haired centaur, now a flaxen-haired centaur, now a corpulent centaur raising its arms, [.....] and so on."[57] The difference is that in phantasy these are all appearances "without full determinacy," as this vague sphere is generally one of "indeterminacy in the appearance."[58] The possibilities presented in phantasy are always indeterminate "as far as the degree of clarity and obscurity is concerned."[59] In the generated image, these possibilities are fully determined, that is a particular image itself is unchanging and fixed. The *degree* of clarity itself in the image is never visually indeterminate, but the determined obscurity can present as visual indeterminacy.

As empty appearances without instigators, phantasy in Husserl's account is de-naturalised,[60] specifically set apart from image consciousness as well as external supports or prostheses. In the computational process of a T2I model, the de-naturalised indeterminacy of phantasy is determined as a digital object. But now, as an image, it displays a different type of indeterminacy. So, in prompting a T2I model with a certain phrase, a description of a free phantasy of mine, the image, or as is often the case images, present me with an actual presence in image consciousness. As such, as a fixed image with content and form absolutely determined in relation to the indeterminate phantasy act, it

54 Husserl, *Phantasy, Image Consciousness, and Memory*, 218.
55 Husserl, 642.
56 Husserl, 643.
57 Husserl, 387–88.
58 Husserl, 387–88.
59 Husserl, 663.
60 Julia Jansen, "Imagination De-Naturalized: Phantasy, the Imaginary, and Imaginative Ontology," in *The Oxford Handbook of the History of Phenomenology*, ed. Dan Zahavi, Vol. 1 (Oxford University Press, 2018), 687, https://doi.org/10.1093/oxfordhb/9780198755340.013.33.

presents us with a third type of indeterminacy, visual indeterminacy.

Visual Indeterminacy

Visual indeterminacy, indeterminacy as the logic of both images in general and AI images in particular, is the third indeterminacy after that of computation and of phantasy. This denotes images with varying degrees of abstraction, fuzziness or non-recognizability. Robert Pepperell defines visual indeterminacy as "when we are presented with images that are vivid and detailed yet resist easy or immediate identification, that is, when perceptual data cannot be integrated with cognitive data."[61] These are images that demand more meaning making work from the viewer, images that make us "positively aware of the act of seeing" in a way we are typically not.[62] Importantly, Pepperell also stresses that the experience of an indeterminate image is "a momentary state of contradiction" as the spectator must reconcile a certainty of the presence of familiar perceptible objects with their disappearance: "and so moving a step closer to seeing the world as it is (objectless) rather than as perceived (object-full)."[63] Here, similarities to the quasi-perception of Husserl's phantasy are apparent. There is a lack of objects in the indeterminate image, as there is a lack of image objects in phantasy. Aaron Hertzmann extends this to AI images, to argue that a certain fuzziness and visual indeterminacy is a prominent feature in images produced through generative adversarial network models.[64] Today's T2I models can generate images that are largely photorealistic, with a convincing implied optical perspective,[65] as well as more classically abstract or blurred representations. This seems to me in many ways still a valid description of the aesthetics of these images: "Visual indeterminacy describes images that appear to depict real scenes, but on closer examination, defy coherent spatial interpretation."[66] Alice Barale describes this type of indeterminacy connected to aesthetic pleasure and in comparison to twentieth century artworks: "When faced with these pictures, with their uncertain outlines and missing

61 Robert Pepperell, "Art, Perception and Indeterminacy," *Contemporary Aesthetics* 5 (2007): 11.

62 Robert Pepperell, "Seeing without Objects: Visual Indeterminacy and Art," *Leonardo* 39, no. 5 (October 2006): 394–400, https://doi.org/10.1162/leon.2006.39.5.394.

63 Pepperell, "Seeing without Objects: Visual Indeterminacy and Art," 399.

64 See Aaron Hertzmann, "Visual Indeterminacy in GAN Art," *Leonardo* 53, no. 4 (July 2020), https://doi.org/10.1162/leon_a_01930.

65 See Daniel Chávez Heras and Tobias Blanke, "On Machine Vision and Photographic Imagination," *AI & SOCIETY* 36, no. 4 (December 2021), https://doi.org/10.1007/s00146-020-01091-y.

66 Hertzmann, "Visual Indeterminacy in GAN Art," 424. There are many examples of related concepts of visual indeterminacy in AI or technical images. See for example Erwin Feyersinger, Lukas Kohmann, and Michael Pelzer, "Fuzzy Ingenuity," *IMAGE* 37, no. 1 (May 2023), https://doi.org/10.1453/1614-0885-1-2023-15464; Jens Schröter, "The AI Image, the Dream, and the Statistical Unconscious," *IMAGE* 37, no. 1 (May 2023), https://doi.org/10.1453/1614-0885-1-2023-15460; and Shane Denson, *Discorrelated Images* (Durham: Duke University Press, 2020).

details, humans recognize their own uncertainty in understanding and classifying things."[67] More relevant still to the indeterminacy of both images and imagination is her contention that human viewers of certain AI images identify with the errors, malformities, or simply indeterminacies of the images, emphasising the movement between imagination and perception. [68] This corresponds to what Junichi Murata describes as the "circular movement between the determinacy and the indeterminacy of images," a movement present in both everyday perception and imagination as well as artistic production.[69]

In Gottfried Boehm's image theory, indeterminacy is also a constitutive part in the experience of images. Certain types of blurring or vagueness are key characteristics of images in general, and constitutes an iconic difference, it's what makes images stand out from other perceptions. And this type of indeterminacy in both image and horizon is currently part of the principle of T2I generated images. Extending Husserl's apperception Boehm states that "in every perception of 'something', an exciting, an 'impossible' synthesis of the visible and invisible, of the thematically identifiable and the non-thematic horizon takes place."[70] That which is visually contrastive forms a relationship with that which is not visible at all in the image. Boehm describes the way in which:

> […] the perceived object distinguishes itself fundamentally from its representation. The most important difference has to do with the implication of the invisible in the visible. Images, too, present fronts exclusively. Whatever they look like, we look at colors and shapes that show themselves to us that mean "something". Of course, what is missing from them is their backs.[71]

This places the question of visual indeterminacy within the question of indeterminacy of horizon, as "our awareness of the background always determines the manner in which we perceive the object in the foreground."[72] Here, awareness of the background is the sense

67 Alice Barale, "Latent Spaces: What AI Art Can Tell Us About Aesthetic Experience," *ODRADEK. Studies in Philosophy of Literature, Aesthetics, and New Media Theories* 8, no. 1 (2022): 112.

68 Alice Barale, "Portraits of Non-Existent People: AI Art and (Human) Imagination," *Aesthetica Preprint*, no. 120 (2022): 7, https://doi.org/10.7413/0393-8522103.

69 Junichi Murata, "The Indeterminacy of Images: An Approach to a Phenomenology of the Imagination," in *Phenomenology: Japanese and American Perspectives*, ed. Burt C. Hopkins, vol. 36, Contributions to Phenomenology (Dordrecht: Springer Netherlands, 1999), 183, https://doi.org/10.1007/978-94-017-2610-8.

70 Gottfried Boehm, 'Indeterminacy: On the Logic of the Image', in *Dynamics and Performativity of Imagination*, ed. Bernd Huppauf and Christoph Wulf (New York: Routledge, 2009), 227.

71 Boehm, 227.

72 Saulius Geniusas, *The Origins of the Horizon in Husserl's Phenomenology*, (Dordrecht: Springer Netherlands, 2012), 6, https://doi.org/10.1007/978-94-007-4644-2.

in which the T2I model figures as an indeterminate horizon, the form of the world of the image.

This indeterminacy, understood with Husserl as part of image consciousness, as intuiting "in" the image, is an example of a perceptual phantasy, as opposed to reproductive phantasy, which is phantasy without instigator, not relying on perception or image.[73]

Describing his conception of a general "logic of images," Boehm uses the phrase qualitative transformation,[74] the same phrase which Fazi opposes to "the logico-quantitative operations of computational structures themselves."[75] In the qualitative transformation of images:

> …the factual is transformed into the imaginary, and a surplus of meaning results that allows mere material (color, stucco, canvas, glass, etc.) to appear as a meaningful view… Indeterminacy is indispensable here, since it creates those spaces for free play and potentialities that enable the factual to show itself and at the same time to show something.[76]

The potential of the image which Boehm describes here is a potential made possible through its lack of determination, as vague forms or blurring are open to different meanings and perceptual experiences, indeterminacy "becomes a surplus of meaning."[77] Clive Cazeaux makes a similar argument, further emphasising indeterminacy as a foundational aspect of images in general: "the purpose of an image is to show potentiality, to create a sense of the possible…Indeterminacy is integral to what it means to be an image, since it is the lack of determinacy that leaves room for the suggestion of possibilities."[78] The visual indeterminacy described by Hertzmann and Barale is a way in which the indeterminacy of phantasy is repeated visually in the generated image. The indeterminacy of images themselves is productive, but it is located in the physical image, not in phantasy.

Artificial Phantasy?

Thus far we are dealing with a nexus of indeterminacies, several types of indeterminacy of different orders of magnitude. First, the determination of indeterminacy in the

73 Husserl, *Phantasy, Image Consciousness, and Memory*, 605.
74 Boehm, "Indeterminacy: On the Logic of the Image," 228.
75 Fazi, "Digital Aesthetics," 22.
76 Boehm, "Indeterminacy: On the Logic of the Image," 228.
77 Boehm, 222.
78 Clive Cazeaux, "Image and Indeterminacy in Heidegger's Schematism," *Ergo: an Open Access Journal of Philosophy* 7, no. 0 (22 October 2021), https://doi.org/10.3998/ergo.1132.

computational process of the model generating the images. Second, the indeterminacy of imagination itself, its quasi character and indeterminate horizon. Third, the indeterminacy of all images, as a foundational aspect of image consciousness. What then are the implications of this indeterminacy for T2I images in particular? A differentiation between artificial phantasy and artificial imagination seems necessary in order to articulate the conflict of consciousness that occurs in the experience of using T2I models. Imagination relies on images, whereas phantasy "is in *opposition* to the existing world, while perception, memory, and expectation relate to *the way things are*."[79] As previously stressed, the "world of pure phantasy is another world, one that is radically separated from the world of the perceptual presence,"[80] i.e. separated from image-consciousness. Where Wellner's digital imagination requires "the exteriorization of the production of possibilities, leaving the user with the task of selecting, arranging and linking the various possibilities in surprising ways,"[81] and conceives of models as tools that function in layers, my focus on indeterminacy in phantasy and image focuses on the internal relationship between these modes of perception and consciousness, as mediated through T2I models. In their specific incarnations, after the passage through computational determining, that is after being an experience for computation, each generated synthetic image *is* fixed. That means the image is determined, given to image consciousness not as unclear or vague phantasy, but as an absolute actuality. This statistically rendered actual, while governed by the indeterminacy of computation in its process—resulting in contingencies regarding exactly what background is rendered for example—can also retain its iconic indeterminacy to some degree, but its phantasy is a clear and determined *Einbildung*. As a contained image object, it appears with the fuzzy logic of images that affords potential meanings and perceptions, but in relation to the unclear phantasy provided as prompt, it is wholly fixed. It stands as an image object ready for inspection,[82] free of the distortion of phantasy, as well as cleared of the noise of the seed image. After the passing into determined image object, the logic of AI leaves "the production of meaning to humans. It is difficult for these algorithms to decide which variation is meaningful."[83] The phantasy is determined, but the result is not determined *for* the model only, it is determined in pixel space, as a rendered representation. The logic of the image is given to human perception, not machine. The visual determinacy, a result of the model's determining process—noise to image—provides the ground for human production of meaning.

79 Tanja Todorovic, "The Manifold Role of Phantasie in Husserl's Philosophy," *Filozofija i Drustvo* 32, no. 2 (2021): 247, https://doi.org/10.2298/FID2102246T.

80 Micali, "Phenomenology of Unclear Phantasy."

81 Wellner, "Digital Imagination," 202.

82 Andreea Smaranda Aldea and Julia Jansen, "We Have Only Just Begun: On the Reach of the Imagination and the Depths of Conscious Life," *Husserl Studies* 36, no. 3 (October 2020): 207, https://doi.org/10.1007/s10743-020-09276-5.

83 Wellner, "Digital Imagination," 201.

Stiegler, Wellner argues, "seeks the political-cultural constraints that do not enable us to recognize more variations."[84] As an attitude open to infinite variations, phantasy consciousness is a consciousness of the *as-if,* a consciousness that according to Husserl negates actual experience,[85] and it is this *as-if* that is deprived of its particular indeterminacy with T21 models. Husserl makes a distinction regarding everyday phantasies, arguing that they are "phantasies 'into,' phantasying a figment into a portion of intuitively experienced reality."[86] The process of using a T2I model functions as such a phantasying into, bringing phantasy into actuality, determining the phantasy in relation to reality. All phantasies can be posited into reality: "Assume that this centaur exists, and so on; in that case, I am displacing the centaur into the nexus of reality." [87] I believe this points towards the positive aspects of the determining of phantasy's vague sphere, as it allows for valuation and judgement of a different order, as connected to aesthetic consciousness. Husserl writes: "As soon as we…can throw bridges between what is actual and what is phantasied. I can compare the two, distinguish them. I can value them in relation to one another."[88] And in relation to each other, they present as conflicting appearances, as the oscillation and passing between indeterminacy and determination, between discrete and continuous.

We perceive the appearance of our phantasy mediated through these T2I models, doubly prompted by indeterminate phantasies. This leads to what Husserl calls a "consciousness of conflict," as every determination of vague phantasy, "every transforming within the mode of phantasy of what is given and intuited in actual experience, leads to a consciousness of conflict,"[89] i.e. a conflict between actual and potential. Here this conflict is extended, the image as a product of externalised digital imagination in conflict with the unclear phantasy object – it marks the limit of the indeterminate and thus unlimited phantasy. It becomes an externalisation of the conflict of consciousness, as the "intentional object of the experience" shifts from internal indeterminate phantasy, to externally generated physical image.[90] I believe this points towards the complexity of the viewer's experience. The viewer is confronted with the tension between potential and actuality, and this conflict is amplified by the models role in mediating the transition.

The indeterminacy of phantasy also seems to carry a degree of necessity, introducing a necessary measure of indeterminacy for T2I models. When image generative models are trained on generated data—i.e. fixed, determined images—what Alemohammad et. al. call "autophagous (self-consuming)" loops occur, and the quality as well as diversity

84 Wellner, 201.
85 Husserl, *Phantasy, Image Consciousness, and Memory*, 614.
86 Husserl, 610.
87 Husserl, 467.
88 Husserl, 467.
89 Husserl, 639.
90 Husserl, 397.

of the generated images starts to degrade, producing less precise, realistic, and coherent images.[91] In other words, just as the "the indeterminacy of the horizon is a necessary feature of perception," [92] the circulation between indeterminate and determinate is necessary for the functioning of the model, the transformation between continuous and discrete is constitutive for the generation of new images. The image marks the *necessary* conflict between determination and indetermination of phantasy, computation, and images.

The Appearance of T2I Models and the Limit to Indeterminate Phantasy

Through an interdisciplinary inquiry, encompassing philosophy of computation, phenomenology, and image theory, I have highlighted the relations and operations between several layers of indeterminacy present in T2I models, emphasising the determining of indeterminacy in computational processes, the indeterminacy of Husserl's phantasy, and the foundational indeterminacy inherent in all images. Following this, I introduced a distinction between artificial phantasy as an indeterminate and quasi-experiential aspect, not dependant on images, and artificial imagination which relies on image objects. T2I images effectively bridge this distinction, by transforming phantasy into determined images. These images are in turn marked by a specific visual indeterminacy that can be understood as part of their manner of appearing as AI generated image. T2I models effectively mediate between phantasy and imagination, and in a sense between continuous experience and discrete computation.

A conflict arises from the transition between indeterminate phantasy and determined but visually indeterminate images. The viewer of these images is confronted with the tension between the potential and actual, between continuous phantasy and discrete determination, and this conflict is amplified by our knowledge of the algorithmic model mediating the transition. Where imagination is a quasi-experience, the experience of these images is one of actual presence of an image object, actualised but also determined. The background is filled out, and it is no longer a phantasy object, but a picture. Once the image is generated, it passes from imageless unclear phantasy to the world of actual experience, to a fixed image object given in image consciousness. In their appearance as sensible images T2I images are made visible from/against a particular horizon and through a particular medium, here doubly and indeterminately so. Both the free variation and open

91 Sina Alemohammad et al., "Self-Consuming Generative Models Go MAD," (*arXiv*, 4 July 2023), http://arxiv.org/abs/2307.01850.

92 Steven G. Crowell, "Determinable Indeterminacy: A Note on the Phenomenology of Horizons," in *The Significance of Indeterminacy: Perspectives from Asian and Continental Philosophy*, ed. Robert H. Scott and Gregory S. Moss, Routledge Studies in Contemporary Philosophy 110 (New York: Routledge; Taylor & Francis, 2019), 128.

horizon of phantasy, as well as the determining horizon of computation, training data and the parameters of the model. From a media phenomenological perspective, the way T2I images are apprehended, the visual indeterminacy, the consistency and knowledge of the computational process, reveals the indeterminate essence of the images themselves.
Every part of the T2I generation process is marked by oscillations between indeterminacy and determinacy, where the generated image marks the limit of the unlimited indeterminate imagination. The generated image can in turn be the instigator for *Einbildungskraft*, for further imagination and variation, but its determined character restricts protean phantasy rather than fuelling it. So, while the process of generating images in variations gives the appearance of protean changeability, it restricts the actual protean appearance of phantasy. Synthetic T2I generated images are thus indeterminately placed between the protean indeterminacy of phantasy, and the exact statistical rendering of the computational process, presenting something of this conflict to the viewer.

Through the prompt, indeterminate phantasy passes through the indeterminacy of the computational model, the latent space, and into a determined image object. But this image object mirrors the indeterminacy of phantasy in its visual indeterminacies. If "computation is a process of determining indeterminacy"[93] then one of the indeterminacies here is on a different register from what Fazi argues, as the model's computation determines the indeterminacy of phantasy (in the form of a descriptive prompt), but simultaneously produces a visual indeterminacy given to image consciousness. This process of making the indeterminate determinate is isomorphic to some degree to what Fazi describes as "continuous, infinite movement of experiential, lived dynamics into what is static and finite, such as the digital machine,"[94] but as a static computationally generated output the resulting image has the appearance of lived dynamics, as part of its visual indeterminacy. In their oscillation between continuous and discrete, as well as indeterminate and determinate, T2I images also take on a mediative role, just as phantasy itself mediates between "the world of the sensible and the possibility for reflectivity."[95] While our phantasy consciousness is shaped by the fact that it is aimed at description of the phantasy object, and further with the aim of tasking a T2I model with generating an image based on this, the openness to potential this might seem to engender conflicts with the fact that the indeterminacy of phantasy is determined and closed off in the generated image. But the potential indeterminacy of the generated image, through the wrong type of clarity, wrong amount of fingers,[96] a blurring or smearing of shapes or lines, for example, brings the appearance of this indeterminacy back to our consciousness. As images, that

93 Fazi, "Digital Aesthetics," 21.
94 Fazi, 8.
95 Todorovic, "The Manifold Role of Phantasie in Husserl's Philosophy," 252.
96 See Amanda Wasielewski, '"Midjourney Can't Count"', *IMAGE* 37, no. 1 (May 2023), https://doi.org/10.1453/1614-0885-1-2023-15454.

in Pepperell's definition, make us aware of the act of seeing, the visual indeterminacy they present is part of their appearance as computationally generated images. In this sense T2I generated images can be defined as technical media images, that from a media phenomenological perspective appear as themselves and show their potentiality through indeterminacy. These images contain a fundamental indeterminacy precisely in their oscillatory process between indeterminacy and determination. That is their manner of appearing. As Emmanuel Alloa notes, "the capacity of the medium for being determined…is conditioned by its formal indeterminacy"[97] As medial objects, mediating between different forms of indeterminacy, they have "the capacity for taking the shape of something that one is not."[98] The phantasy is mediated as prompt which is mediated as noise determined into a generated image, which in turn is visually indeterminate. As a technical *and* visual medium, T2I models become figures "of the possible as such," their indeterminacy indicating "a fundamental potentiality."[99] Our perception of generated images is not neutral, we are, as Barale argues, aware of their origins in a generative model. "Therefore," she writes, "we perceive it as showing, in a certain measure, the way the AI "sees" the world"[100] This can be understood with Alloa, in the sense that every appearance "appears through something else,"[101] where this appearance as something that gives the meaning to the appearance. Appearance, Alloa notes, "is more than an optical impression; it has a consistency of its own."[102] I believe the consistency here is that of phantasy, which clashes with the computational determination. The visual indeterminacy of the generated image points our perceptual attention towards the way in which the image appears.[103] Their manner of appearing is the mediacy of the limited phantasy. They appear as images constituted by the passage from indeterminate to determined to indeterminate again, as abstract compression. It is abstraction as a generalisation and formalisation of both phantasy and training data images. The model's image generation functions as a discretisation, abstraction, and compression of the lived experience that is the indeterminate phantasy. Their manner of appearing is abstract in the sense of presenting the images in their own power of appearance, by presenting the relations between indeterminacy and determinacy, and presenting the indeterminacy between continuous and discrete that appears in T2I generated images. In other words, T2I models are also models of the relation between indeterminate phantasy and a preformatted and exteriorised imagination, a mediation of this relation between the vague and the fixed.

97 Emmanuel Alloa, *Looking through Images: A Phenomenology of Visual Media*, trans. Nils F. Schott (New York: Columbia University Press, 2021), 84.
98 Alloa, 84.
99 Alloa, 84.
100 Barale, "Portraits of Non-Existent People," 14.
101 Emmanuel Alloa, "What Is Diaphenomenology? A Sketch," in *Phenomenology and Experience*, ed. Antonio Cimino and Cees Leijenhorst (Brill, 2018), 27, https://doi.org/10.1163/9789004391031_003.
102 Alloa, 17.
103 Crowther, *The Phenomenology of Aesthetic Consciousness and Phantasy*, 26.

It is important here to underscore that these stages of determined and undetermined are not equal in magnitude. The preformatting of the digital platforms and machines, the discrete, is a much larger power than both the input and the output. In this sense the discrete computational imagination, of T2I models for example, often exert an unbalanced force on the users, publics, and communities that make up their technical ensemble.

Following Fazi's assertion that the determining of the indeterminate in computational processes is the self-actualisation of computation, I argue that the generated image *appears through* computational self-actualisation and determination.[104] The mediacy of the generated image is double, comprising both the mediation of the dataset as well as the mediation of the immediacy of phantasy—the passage between indeterminate and determinate. Indeterminacy here is "the absence of limit,"[105] and the generated image as determined phantasy marks the imposing of absolute limits to the potential of phantasy. Their manner of appearing presents as a sensibility of indeterminacy, showing the necessary and constructive conflict between determination and indeterminacy in T2I models.

104 Fazi, *Contingent Computation*, 205.

105 Gregory S. Moss, "The Emerging Philosophical Recognition of the Significance of Indeterminacy," in *The Significance of Indeterminacy: Perspectives from Asian and Continental Philosophy*, ed. Robert H. Scott and Gregory S. Moss, Routledge Studies in Contemporary Philosophy 110 (New York: Routledge; Taylor & Francis, 2019), 5.

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